Volume 1

rEIAR Non-Technical Summary

FOR

SAND AND GRAVEL QUARRY

AT

Maplestown, Co. Carlow

NOVEMBER 2021

ON BEHALF OF

MARK PHELAN

Prepared by
Enviroguide Consulting

Dublin
3D Core C, Block 71, The Plaza,
Park West, Dublin 12

Kerry
19 Henry Street
Kenmare, Co. Kerry

Wexford
Unit 11 Floor B
Westpoint Business Park
Clonard Road, Wexford

www.enviroguide.ie
info@enviroguide.ie
+353 1 565 4730

TABLE OF CONTENTS

LIST OF TABLES

NO TABLE OF FIGURES ENTRIES FOUND.

LIST OF FIGURES

1 INTRODUCTION

This Remedial Environmental Impact Assessment Report (**rEIAR**) has been commissioned by the applicant, Mr. Mark Phelan, in respect of an application to An Bord Pleanala for Substitute Consent for the currently unauthorised quarry at Maplestown, Co.Carlow.

The purpose of the (r)EIAR is to provide the Planning Authority with information on the likely and significant effects on the environment that may have resulted from the operation of the unauthorised quarry. This (r)EIAR presents a retrospective assessment of potential environmental impacts and reflects the potential cumulative impact of other developments.

A Remedial Environmental Impact Assessment Report (rEIAR) is a retrospective assessment and analysis of potential impacts on the receiving environment that may have arisen as a result of the Unauthorised Development. An EIAR is required to accompany a planning application for development of a class set out in Schedule 5, Part 1 of the Planning and Development Regulations which exceeds a limit, quantity or threshold set for that class of development.

Schedule 5, Part 2 of the Planning Regulations defines projects that are assessed on the basis of set mandatory thresholds for each of the project classes including:

> *Schedule 5, Part 2 - Extractive Industry*
>
> *2(b) Extraction of stone, gravel, sand or clay, where the area of extraction would be greater than 5 hectares.*

This Unauthorised Development wcovered an extraction area of greater that the 5Ha threshold. As a result, a mandatory rEIA is required in this instance.

In assessing the environmental impacts, this rEIAR will evaluate the existing situation and assess any potential impacts of the Unauthorised Development. Where potential impacts are identified, mitigation measures will be proposed. In addition, the in-combination effects of any other known plans or projects will be identified and assessed.

This Non-Technical Summary (NTS) describes the Unauthorised Development, the Environmental Impact Assessment (EIA) process and summarises the key environmental impacts arising from each of the environmental assessments carried out by a panel of experts in accordance with best practice. The environmental assessments involved desktop studies, site visits, surveys, and site-specific investigations. The NTS also outlines the mitigation and monitoring measures proposed along with a list of any residual impacts that may occur from the Unauthorised Development.

2 OVERVIEW OF THE UNAUTHORISED DEVELOPMENT

2.1 Historic (Unauthorised) Extraction and Infill

The Historic Development comprised of the development and operation of a sand and gravel pit, including a washing/rinsing plant, a dry screener; 3 no. settlement lagoons, one bunded

fuel storage tank, a wheel wash, areas of stockpiling, landscaping and all other site development works, including the restoration works of the final pit void (extractive area).

This was described in the 2004 EIS as '*The proposed extraction area comprises approximately 11.78 hectares and measures between 384 m and 245 m in width, 450 m in length, and 10m in depth. The extraction will focus on a high glacial feature standing approximately up to 10.00m - 12.00m higher at its peak than the immediately surrounding pasturage. The extractive area at its highest point is approximately 130 m AOD at present and is proposed to be work to a depth of 119.55 m AOD. The proposed pit is to be used for the excavation and processing of sand and gravel only. There will be no blasting operations, and it is not proposed to excavate below the existing recorded ground water level. Following extraction, it is proposed to revert the site back to agricultural use. Further details regarding the construction, operation, and restoration of the proposed sand and gravel pit are provided below.*

Based on initial site investigations, it is estimated that there are approximately 700,000 to 950,000 tonnes of saleable sands and gravels to be extracted. It is proposed to extract approximately 70,000 to 95,000 tonnes per annum, depending on market demand (note that the worse-case scenario extraction rate of 95,000 tonnes per annum is used in the assessment of impacts). Based on this rate of extraction, the pit would have a lifespan of up to ten years.

Extraction of sand and gravel necessarily entails the extraction of topsoil and overburden as well as saleable materials.

It is proposed that the entire development, construction to restoration, will span approximately 12 years. Sand and gravel would be extracted in five overlapping phases, with approximately equal amounts of aggregate being extracted during each phase.

The pit will generally be worked from south to north and from west to east during each phase. However, the precise direction of working may alter to meet varying customer specifications and to ensure safe operation. Overall, this will largely be dependent on specific ground conditions as encountered on-site''.

The quarrying and restoration activities which took place at the Site were all permitted in 2007 under Ref. Reg. PL01.221741. Planning was granted for the Historic Development from 2007 to 2012, there was, however, unauthorised development at the Site and quarrying continued after 2012.

The area of unauthorised development, which requires Substitute Consent, comprises of an area of quarry and a previously infilled quarry which has been restored for agriculture. The unauthorised quarrying, which continued after 2012, comprised of the extraction of approximately 192,240 tonnes of material (included in this total figure is 75,060 tonnes of overburden) from an area of approximately 4.18 hectares in the central part of the Site. The unauthorised quarry area was subsequently restored during 2018 using overburden from the quarried areas. This area is defined in Figure 2-3 with a dotted Cyan line and Cyan hatching.

The applicant, Mr. Mark Phelan now wishes to apply to An Bord Pleanala for Substitute Consent for the currently unauthorised quarry at Maplestown, Co.Carlow.

3 SITE DESCRIPTION

The overall Site area is approximately 15.21 hectares (ha) and is shown on Figure 3-1 outlined in Red. The Site contains the following:

1. Area of land which was quarried and infilled outside of the granted planning permission period (4.18 ha) for which substitute consent is being sought (refer to Figure 3-2).

Figure 3-1: Overall Site Layout

3.1 Historic (Unauthorised) Extraction and Infill

The proposed area of extraction occupied an inverted L-shaped area measuring approximately 454 m east to west by 355m and 255 m north to south at its maximum and minimum respectively. The area is shown in Figure 3-2 below outlined in Cyan:

Figure 3-2: Area of Unauthorised Development for which Substitute Consent is Required (Drawing No. P-02)

The subject site comprised approximately 15.205 hectares of agricultural grassland bounded to the West by the Kildare County Road L-8097; to the East by a fence and a farmhouse occupied by the Landowner and agricultural land; to the South by small west-flowing stream, fences and agricultural land, and to the North by fences, agricultural land and thin hedgerows. The high ground at the centre of the extraction area sloped steeply to the North and to the South toward a low-lying area of boggy ground, which was occupied by mature coniferous copse.

The proposal for the Historic Development was to excavate 700,000 tonnes to 900,000 tonnes of sand and gravel site at an average rate of 90,000 tonnes per annum up to a maximum of 100,000 tonnes per annum over a period of 10 years. Planning was granted for the extraction from 2007 to 2012, there was however unauthorised development at the Site and quarrying continued after 2012.

The unauthorised development comprised of the quarrying of an area of approximately 4.18 hectares in the central part of the Site. It has been estimated by Enviroguide Consulting that the total tonnage excavated from the unauthorised development after 2012 was approximately 192,240 tonnes of material (included in this total figure is 75,060 tonnes of overburden). The area of the unauthorised development which was quarried after 2012 was subsequently restored during 2018 using overburden from the quarried areas. This area is defined in Figure 3-2.

The quarrying and restoration activities which took place at the Site were all permitted in 2007 under Ref. Reg. PL01.221741. The area of unauthorised development, which requires Substitute Consent, comprises of an area of quarry and a previously infilled quarry which has been restored for agriculture

4 ENVIRONMENTAL IMPACTS

The potential Environmental Impacts of the Proposed Development during all phases of the historic (unauthorised) development and Proposed Development are addressed in the rEIAR under the following headings as prescribed under the EIA Directive:

- Population and Human Health
- Biodiversity
- Land and Soils
- Hydrology and Hydrogeology
- Air Quality and Climate
- Noise and Vibration
- Landscape and Visual Amenity
- Archaeology and Cultural Heritage
- Material Assets: Traffic, Waste and Utilities

Additionally, risk management and interactions between environmental factors have been examined, and a programme of mitigation and monitoring measures has been set out.

4.1 Population and Human Health

Human beings are one of the most important elements of the 'environment' to be considered. One of the principal concerns in any Proposed Development is that the local population experiences no reduction in the quality of life as a result of the Proposed Development on either a permanent or temporary basis.

This Chapter of the rEIAR has retrospectively assessed the impact on the receiving environment as a result of unauthorised extraction and infilling activities which historically took place at the site of the unauthorised development. The chapter specifically focuses on Population, Employment, Travel, and Human Health.

An Environmental Impact Statement (EIS) was compiled for the existing quarry (EssGee Consultants, August 2004) in which potential impacts relating to population and human health arising from the historical quarry development were identified. This remedial assessment has utilised the historical EIS in order to retrospectively assess the impacts, if any, on the receiving environment as a result of unauthorised extraction and infilling activities which historically took place on the Site. Environmental impacts that may impinge, directly or indirectly, on human beings have been identified as dust, noise, traffic, water, visual amenity and heritage. Provided the mitigation measures outlined in relevant Chapters of the previous EIA it is deemed that there is no potential for significant impacts as a result of the unauthorised Development as it was a continuation of what was permitted and assessed.

4.2 Biodiversity

An appraisal of the likely effects on biodiversity (flora and fauna) arising as a result of the Historic and Proposed Developments at Maplestown, Co. Carlow was undertaken by Enviroguide Consulting. The assessment involved several steps and was carried out by suitably qualified ecologists. Firstly, baseline ecological surveys were undertaken to assess the nature conservation importance of the Historic/Proposed Site. In the case of this Historic Site, an EIS conducted by EssGee Consultants in 2006 was used to determine the baseline ecological conditions of the Historic site prior to development. Secondly, the direct, indirect and cumulative ecological implications or impacts of the Historic/Proposed Project during its lifetime were assessed. Finally, where possible, mitigation measures to remove or reduce negative impacts during the Operational Phases the Historic/Proposed were proposed, utilising the original EIS in the case of the Historic Development.

For this biodiversity chapter, baseline ecological surveys involved a combination of both desk-based and field studies. A desk study was initially carried out to assess existing information relating to the Site's natural environment. A wide range of field surveys were undertaken, including habitat surveys, bird surveys and mammal surveys. All surveys were carried out following standard and/or best practice protocols.

The Site itself is not designated. The closest designated sites include Holdenstown Bog Special Area of Conservation (SAC) and Corballis Hill proposed Natural Heritage Area (pNHA). These sites are not hydrologically linked to the site of the unauthorised development. However, the River Barrow and River Nore SAC is hydrologically linked to the Site via the Broadstown, Graney (Lerr) and Lerr watercourses, however the Unauthorised Development did not result in a deterioration of water quality within the waterbodies and potential impacts to these designated sites have been ruled out. Potential impacts to European sites have also been addressed in the Appropriate Assessment screening report accompanying this application.

The Historic Development Site was a greenfield site, which has previously been used for grazing by local farmers. The Broadstown stream ran along the southern boundary of the Site and is a tributary of the River Barrow. Habitats within the Site were classified and coded as per Fossitt (2000). Four distinct habitat types were recorded, two of which were identified as Key Ecological Receptors (KERs). KER's are those habitats which are evaluated to be of at least local importance (higher value). Habitats identified as KERs include *Hedgerows (WL1) and Depositing Lowland streams (FW2).* The Historic Development did not result in a loss of sections of these habitats at the Site. The Broadstown stream runs south of the southern boundary of the Site and is a tributary of the River Barrow. Habitats within the Site were classified and coded as per Fossitt (2000). Eleven distinct habitat types were recorded, four of which were identified as Key Ecological Receptors (KERs). KER's are those habitats which are evaluated to be of at least local importance (higher value). Habitats identified as KERs include *Hedgerows (WL1) and Depositing Lowland streams (FW2), Exposed Sand, Gravel or Till (ED1) and Treelines (WL2).*

As part of the Historic project design, a minimum 5m buffer zone was in place the duration of the Historic Development between the quarry activities and KER Habitats such as Hedgerows. In addition, there was a 150m land buffer between the quarry activities and the stream habitat.

These measures have ensured that the Unauthorised Development has had no significant impact on the KER habitats.

The field surveys carried out at the Site revealed no evidence of protected mammals within the survey area. Nevertheless, it is acknowledged that there is potential for mammals such as for Hedgehog, Pygmy shrew, Badger, Irish hare, and Amphibians to utilise both the Historic/Proposed Site. At the Historic site, one Amber-listed species (Robin) was recorded in the vicinity of the Site in 2006. At the Proposed Site five Amber-listed species were recorded (Starling, Swallow, Robin, Mistle Trush and Sand Martin) at the Site in 2021.There was/is several areas of hedgerow and tree cover present at the Site, with several bird species recorded utilising these habitats. The treelines present at the Site were assessed as having bat potential. No Historic works occured within or directly adjacent to these habitats.

Should the unauthorised not have proceeded the lands would have remained as an exhausted quarry. Should the existing quarry facility not be infilled in time vegetative succession would occur and it is likely that exposed cliff faces would remain and continue to be utilised by nesting Sand Martin annually as valuable nesting habitat in the area.

No significant impacts on biodiversity occurred as due to the Unauthorised Development.

All historic mitigation measures have been implemented in full and remained effective throughout the lifetime of the unauthorised development, no significant negative impacts on the local ecology or on any designated nature conservation have occurred from the Unauthorised Development.

4.3 Land and Soil

An assessment of the potential impact on the existing land, soils and geological environment was carried out by Enviroguide Consulting for the Unauthorised Development.

The assessment undertaken for the remedial Environmental Impact Assessment Report r(EIAR) provides a description of the land, soils and geology within and immediately surrounding the Development Site, an assessment of the potential impacts of the Development requiring substitute consent on land, soils and geology and sets out any required remedial measures, where appropriate.

The assessment was carried out taking cognisance of appropriate national guidelines and standards for rEIAR and was prepared using data collected from a detailed desk study, a Site walkover survey and Site-specific investigations and assessments (i.e., trial pitting, borehole drilling and laboratory analysis). The results of the assessment provided information on the baseline conditions at the Site. A detailed assessment of the potential impacts that have occurred, which are occurring, or which can be reasonably expected to occur as a result of the Unauthorised Development. The assessment outlines appropriate avoidance and mitigation measures to reduce any identified potential impact associated with the Unauthorised Development.

The Unauthorised Development comprises the following:

- Application for substitute consent for the Unauthorised Development at the site since 2012 when planning permission expired in 2012 (An Bord Pleanála Planning Ref. 221741);
    - Approximately 192,240tonnes of sand and gravel including 75,060tonnes of overburden was extracted over an area of 4.18Ha since 2012;
    - Approximately 4.18Ha of the existing quarry was subsequently restored using surplus materials already on Site;

Processing was carried out using the existing screening and washing plant together with all existing site infrastructure including site access, haul roads, settlement lagoons, office, canteen and truck wheel wash.

The long-term proposal for the Site includes restoration of the proposed quarry that will eb subject to a separate planning application.

4.4 Hydrology and Hydrogeology

An assessment of the potential impact on the existing water hydrological and hydrogeological environment was carried out by Enviroguide Consulting for the Unauthorised Development at the Site.

The assessment undertaken for both the remedial Environmental Impact Assessment Report r(EIAR) provides a description of the hydrological and hydrogeological environment within and immediately surrounding the Development Site, an assessment of the potential impacts of the Development requiring substitute consent on hydrology and hydrogeology and sets out any required remedial measures where appropriate.

The assessment was carried out taking cognisance of appropriate national guidelines and standards for Environmental Impact Assessment using data collected from a detailed desk study, a Site walkover survey and site-specific investigations and assessments (i.e., trial pitting, borehole drilling, groundwater level measurement, water quality sampling and sample analysis). The results of the assessment provided information on the baseline conditions at the Site. A detailed assessment of the potential impacts that have occurred, which are occurring, or which can be reasonably expected to occur as a result of the Unauthorised Development. The assessment outlines appropriate avoidance and mitigation measures identified to reduce any identified potential impact associated with the Unauthorised Development.

The Unauthorised Development comprises the following:

- Application for substitute consent for the Unauthorised Development at the site since 2012 when planning permission expired in 2012 (An Bord Pleanála Planning Ref. 221741);
    - Approximately 192,240tonnes of sand and gravel including 75,060tonnes of overburden was extracted over an area of 4.177Ha since 2012;
    - Approximately 4.177Ha of the existing quarry was subsequently restored using surplus materials already on Site;

There were no significant adverse residual impacts on the receiving hydrological and hydrogeological environment associated with the Unauthorised Development.

The restoration of the existing quarry will have an overall 'positive', 'slight', and 'permanent' impact on underlying groundwater and receiving surface water environment.

4.5 Air Quality and Climate

This Chapter of the rEIAR has retrospectively assessed the impact on the receiving environment as a result of unauthorised extraction and infilling activities which historically took place on the Site lands.

An Environmental Impact Statement (EIS) was compiled for the existing quarry (EssGee Consultants, August 2004) in which air quality and climate baselines were established. This investigation also explored potential impacts relating to air quality arising from the historical quarry development. This remedial assessment has utilised the historical EIS in order to retrospectively assess the impacts, if any, on the receiving environment as a result of unauthorised extraction and infilling activities which historically took place on the Site.

A desktop study involving various national and international documents on climate change and analysis of synoptic meteorological data was carried out in order to compile this Chapter. Furthermore, a semi-quantitative assessment of fugitive dust emissions from operations of the Proposed Development was undertaken.

There are a number of potential sources of dust generation associated with the operation of the historic (unauthorised) quarry at Maplestown, Co. Carlow. The extraction and infilling operations had the potential for an increased temporary impact on air quality. This would have increased or decreased depending on local weather conditions, the level of activity, the location of the works within the site and the mitigation measures employed. The assessment for the proposed 10-year operations carried out in 2004 considered the potential magnitude of the dust emissions over a full calendar year using meteorological data from Dublin Airport (Year 1999). Modelling using ISCST3 was then used to predict the dust deposition rate for each scenario investigated for comparison with the TA Luft dust nuisance criteria. The cumulative dust deposition level (inclusive of all onsite activities and transportation) is estimated to have peaked at 130 mg/m^2/day, which is just 36% of the LA Luft Limit Value (350 mg/m^2/day). Thus, no dust nuisance is predicted to have occurred as a result of the operation of the facility at the nearest residential receptors. Furthermore, the remedial measures employed by the operators would have ensured that any such emissions would be low level and very localised. It is therefore concluded that it is extremely unlikely that the existing quarry and infill operations have had an adverse impact on the surrounding environment in terms of air quality.

The movement of vehicles at the site during the operational phase of the historic (unauthorised) development will have generated exhaust fumes and consequently potential emissions of volatile organic compounds, nitrogen oxides, sulphur dioxide and particulate matter. While the levels of these pollutants will have increased locally on site during this phase, strict adherence to 'good site/engineering practices' such as switching all vehicles off when not in use will have minimised the generation of any unnecessary air emissions. In any event it is considered that the level of any contamination emitted will have been minimal and of short

duration. Similarly gaseous emissions from static or mobile diesel-powered plant operated on site are deemed to have been insignificant. Furthermore, indicative criteria for requiring an air quality assessment have not been met by the existing extraction and infill operations. It is therefore considered unlikely for significant air quality impacts to have occurred due to increased traffic flow, and an associated air quality assessment would not have been required.

It is likely that combustion emissions from onsite machinery and traffic derived pollutants of Carbon Dioxide (CO_2) and Nitrous Oxide (N_2O) were emitted during the historic (unauthorised) quarry and infill operations. However, due to the overall size and magnitude of site activities, and the mitigation measures proposed, the effect on national GHG emissions would have been insignificant in terms of Ireland's obligations under the Kyoto Protocol and therefore will have no considerable impact on climate. Furthermore, the development did not result in a significant change to traffic movements. Therefore, no significant increases in associated greenhouse gas emissions are expected to have taken place.

4.6 Noise and Vibration

The likely noise and vibration impacts associated with the Unauthorised Development have been evaluated, and changes that are likely to impact the surrounding environs have been considered.

The noise-generating activities associated with the Unauthorised Development are as follows:

- Extraction by hydraulic excavators and transfer to wash/screening plant by dumper trucks;
- Washing and screening plant;
- Generator;
- Trucks exiting and entering the facility;

Eleven (11 No.) Noise Sensitive Locations (NSL) were identified within a 250m buffer of the overall Site boundary. Noise prediction calculations have been completed for noise from the use of onsite plant up to 250m from the source using the inverse square law. According to the inverse square law, for each doubling of distance from a point source, the sound pressure level decreases by approximately 6 dB. As part of the original EIS noise measurements were carried out outside the houses to the southwest corner, to the west and northwest of the Site and outside the school to the southwest corner.

As per industry guidelines, the predicted noise levels from onsite machinery exceed the specified limit value(s) at these NSLs for the Unauthorised Development. A qualitative noise assessment was carried out as part of the original Environmental Impact Statement (EIS) for the historic quarrying and infill operations, and this predicted that there would be no adverse noise impacts (*EssGee Consultants*, 2004). Furthermore, no noise complaints were made throughout the duration of the operations undertaken at the Site to date. It is therefore considered unlikely that any adverse noise impacts have arising from the Unauthorised Development.

4.7 Landscape and Visual

The purpose of the landscape assessment is to evaluate the existing landscape character of the Site and surroundings, to assess the visual impact of the Unauthorised Development and to identify landscape designations and planning policies that may concern the subject Site and its environs. The Site is not designated as a Natural Heritage Area or Natura 2000 site. The application Site is situated at Maplestown, Co. Carlow. The townland of Maplestown is located in the northern part of Co. Carlow bordering Co. Kildare and Co. Wicklow. It is located approximately 5 km northwest of the town of Rathvilly, Co. Carlow, and 4.5 km southwest of Baltinglass, Co. Wicklow. The larger urban centres of Carlow Town, Co. Carlow and Naas, Co. Kildare are situated approximately 15 km and 35 km away, respectively. The quarry is set back ca. 20m from the public road via a private lane and is set within surrounding agricultural lands.

A detailed landscape and visual assessment was carried out and has concluded that the site had the capacity to facilitate the Unauthorised Development. Overall, it is considered that the Unauthorised Development will have had an 'imperceptible' visual impact on nearby sensitive receptors. There are no protected views within this area that could have been affected by the Unauthorised Development.

4.8 Archaeology and Cultural Heritage

A retrospective assessment of the Archaeological, Architectural and Cultural Heritage impacts of unauthorised extraction activities which took place since 2012 was carried out and secondly, an assessment of the baseline Archaeological, Architectural and Cultural Heritage conditions of the surrounding environment for the Proposed Development was completed, in order to determine any significant impacts that may arise as a result of the development and highlight any potential effects this may have on these resources.

The assessment involved a desktop study / paper survey which considered all available archaeological, architectural, historical and cartographic sources, as well as the original Environmental Impact Statement completed in 2004 by EssGee Consultants for the original quarry development. This information was used in order to assess any potential impact on the receiving environment and to identify measures to ensure the conservation of any monuments or features.

There are no records of any recorded monuments within the Site boundary of the Proposed Development. There are 15 No. recorded Monuments and Places within the 2km study area. These comprise of 5 Enclosures (KD040-050----, CW001-001----, KD040-016----, WI026-013----, CW001-004----), 4 Ringfort – rath (CW001-002----, KD040-017----, KD038-050----, CW003-001----), 1 House – 17th century (KD040-037----), 1 Standing stone (KD040-040----), 1 Children's burial ground (KD038-049----), 1 Burnt Mound (CW001-003003-), 1 Church (CW001-003001-), 1 Graveyard (CW001-003002-). A search in the topographical files in the National Museum of Ireland produced no results for the development lands and surrounding areas. There are no features of architectural interest in the area of development.

Archaeological and historical sources were investigated as part of the EIS which was compiled for the existing quarry (EssGee Consultants, August 2004) and this investigation found that no recorded archaeological monuments were present within the Site; as a result of this, it was

predicted that the development would not have an impact on the Archaeology and Cultural Heritage of the area. No archaeological records were found during activities at the Site, therefore, the outcome was as predicted as the Unauthorised Development had no impact on the Archaeology and Cultural Heritage of the area.

4.9 Material Assets: Traffic

Transport Insights has been commissioned by Enviroguide Consulting, on behalf of Mr. Mark Phelan, to prepare a rEIAR Traffic and Transport Chapter in respect of an application to An Bord Pleanála for Substitute Consent for a currently unauthorised quarry at Maplestown, Co.Carlow.

The existing conditions on the surrounding road network were further informed by classified junction turning count surveys undertaken on Thursday 05 August 2021 at the following junctions;

- 3-arm L8097/ Site Access priority-controlled junction; and
- 4-arm L4016/ L8097 staggered priority-controlled junction.

Due to temporary changes in traffic volumes arising as a result of the Covid-19 pandemic, a local TII traffic counter on the N81 to the north of the site was used to grow 2021 traffic to pre-covid levels (i.e. 2019, the most recent representative year for traffic).

The results of the traffic surveys were then used to establish a baseline (adjusted to reflect potential impacts of COVID-19) with which to predict background traffic growth on the local road network for the Year of Opening (YoO, 2022), Year of Opening+5 (2027) and Year of Opening + 10 years (YoO +15 2032). The YoO+5 and YoO +10 adjusted baseline years establish the Do-Nothing scenario (the scenario in which the proposed development does not proceed). This will then be followed by the Do Something scenario which applies the potential development traffic to the local road network in the YoO+5 and YoO +10 assessment years.

As this application constitutes a Substitute Consent application supported by a rEIAR, the assessment is also informed by the previous EIS Traffic and Transportation Chapter.

Daily HGV movements associated with the 40,000 tonnes per annum input of infill material (during the first 5 years) and 30,000 tonnes per annum output of quarry material (over lifetime of the facility) indicate a maximum of 17 no. daily HGV movements associated with the input and output of materials to the site and 12 no. daily LV movements associated with staff during the first 5 years.

Traffic volumes on L8097 appears to be high, however the development traffic generated a small level of additional traffic and exiting background traffic is very low. For this reason, the unauthorised development is not expected to have had a material impact on the operation of the local road network.

The EIS Traffic Chapter set out the impacts of the development via a traffic model. The traffic model was the PICADY software package that is commonly used for assessment of priority junctions. The model was undertaken for the identified AM and PM peak hours. The results of the model indicated a maximum ratio of flow to capacity (RFC) of 0.3 in the 2016 assessment year. The maximum RFC during the PM peak hour was recorded as 0.167. The

maximum queue length in both time periods was 0.2 vehicles. The traffic modelling results therefore indicate that the junction would have operated satisfactorily in all scenarios assessed in the 2016 assessment year.

4.10 Material Assets: Utilities and Waste

This Chapter of the remedial Environmental Impact Assessment Report r(EIAR) provides an assessment of the potential impacts of the Historic (Permitted and Unauthorised) and on Material Assets. Material Assets are the physical resources in the environment, including built services and infrastructure comprising local settlements, electricity supply, gas supply, telecommunications/ICT, surface water/stormwater drainage, water supply, the foul water network and waste management infrastructure. In 2004, when the Environmental Impact Statement (EIS) was prepared for the Historic Development, there was no requirement to address Material Assets as part of an EIS. Hence, this Chapter will retrospectively assess the impact of the Historic Development on the Material Assets as much as is reasonably practical.

The Historic Development comprised of the permitted development and operation of a sand and gravel pit, including all ancillary operations. There were no built structures proposed for the site, as such, the Construction Phase entailed site development works and the installation of plant and equipment. Planning was granted for the Historic Development from 2007 to 2012. However, there was unauthorised development at the Site and quarrying continued after 2012. The area of the unauthorised development, which was quarried after 2012, was subsequently restored during 2018, using overburden from the quarried areas.

Chapter 4 and Chapter 10 of this rEIAR detail the impacts of the Historic and the Proposed Developments on the surrounding Population and Human Health, and Landscape, respectively. No known effects on local settlement or property prices have been identified as a result of the Historic Development.

There was no requirement for an electricity supply or a gas supply, or any telecommunications/ICT infrastructure as part of the Historic Development. As such, there are no impacts identified which have occurred, are occurring or will occur on these Material Assets as a result of the Historic Development.

Specific issues relating to Hydrology associated with the Historic Development and the Proposed Development are set out in Chapter 7 of this rEIAR. There was no requirement for a connection to a mains water supply or a foul water sewer system as part of the Historic Development. As such, there are no impacts identified which have occurred, are occurring or will occur on these Material Assets as a result of the Historic Development.

Water supply requirements on-site for the Historic Development was from an on-site well. Self-contained chemical toilets were used onsite for the duration of the Historic Development. The toilets were emptied as required by an authorised contractor in compliance with waste management legislation.

Waste produced during the activities of the Historic Development was minimal, as topsoil and overburden were used for infilling and restoring part of the excavated quarry. It is not considered there will be any significant long-term impacts on waste management as a result of the Unauthorised Development.

Overall, it is considered that there are no impacts identified which have occurred, are occurring or will occur on Material Assets as a result of the Unauthorised Development.

4.11 Risk Management

Risk is one of the most important elements to be considered as part of a development. It is critical that any project is screened against potential risks which it might encounter and/or impose on the nearby environment during its construction and operational phase. An assessment of the vulnerability of the Site of the Unauthorised Development to risks of major accidents and/or disasters was completed as part of this rEIAR.

The Environmental Impact Statement (EIS) which was prepared for the Historic Development under the previous planning permission, Reg. Ref. PL01.221741, followed the requirements of the Planning and Development Act, 2000, and the Planning and Development Regulations, 2001, which established a standard list of areas of the environment that were to be addressed by an EIS at that time. There was no requirement at the time to assess the vulnerability of the Historic Development to major accidents and/or disasters, or the potential for the project to cause risks to human health, cultural heritage and/or the environment.

Site surveys and desktop studies indicate that no natural disasters or environmental incidents occurred on the Site of the Unauthorised Development during either the periods of authorised or unauthorised activities.

The assessment of the Proposed Development reviewed:

- The vulnerability of the project to major accidents or disasters.
- The potential for the project to cause risks to human health, cultural heritage and the environment, as a result of that identified vulnerability.

A methodology was used including the following phases:

- Phase 1 – assessing the hazards
- Phase 2 – screening the hazards
- Phase 3 – mitigating the hazards and evaluating the residual hazards

4.12 Interactions

Interrelationships between various environmental aspects must be considered when assessing the impact of the Unauthorised Development, as well as individual significant impacts. The significant impacts of the Unauthorised Development and the proposed mitigation measures have been detailed in the relevant chapters of this report. However, as with all developments that poses potential environmental impacts, there also exists potential for interactions/interrelationships between the impacts of different environmental aspects. The results may exacerbate or ameliorate the magnitude of impacts. This chapter of the rEIAR addresses the interactions between the various environmental factors of the Unauthorised Development.

When considering interactions, the assessor has been vigilant in assessing pathways – direct and indirect – that can magnify effects through the interaction. In practice many impacts have

slight or subtle interactions with other disciplines. However, the rEIAR concludes that most inter-relationships are neutral in impact when the mitigation measures proposed in the original EIS have been incorporated into the operation of the Unauthorised Development.

4.13 Mitigation and Monitoring Measures

This rEIAR has assessed the impacts and effects likely to occur as a result of the Unauthorised Development on the various aspects of the receiving environment. No further mitigation or monitoring measures are proposed.

Volume 2

Remedial Environmental Impact Assessment Report

FOR

QUARRY

AT

MAPLESTOWN, CO. CARLOW

NOVEMBER 2021

ON BEHALF OF

Mark Phelan

Prepared by
Enviroguide Consulting

Dublin
3D Core C, Block 71, The Plaza,
Park West, Dublin 12

Kerry
19 Henry Street
Kenmare, Co. Kerry

Wexford
M10, Wexford Enterprise
Centre, Strandfield Business
Park, Rosslare Road, Wexford

www.enviroguide.ie
info@enviroguide.ie
+353 1 565 4730

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

4 INTRODUCTION AND METHODOLOGY

1.1 Introduction

This Remedial Environmental Impact Assessment Report (**rEIAR**) has been commissioned by the applicant, Mr. Mark Phelan, in respect of an application to An Bord Pleanála for Substitute Consent for the currently unauthorised quarry at Maplestown, Co. Carlow. This will allow for the regularisation of the unauthorised development, while allowing the works being retrospectively environmentally assessed by means of a remedial Environmental Impact Assessment Report.

This rEIAR has been compiled in accordance with all current legislation and best practice guidance. This Chapter describes the methodology by which the Environmental Assessment was carried out and the rEIAR was completed. The methodology used is broadly consistent across all chapters in order to ensure the rEIAR is clear and easy to navigate.

The Development (as defined in Chapter 2) comprises of:

- Application to An Bord Pleanála for Substitute Consent for the currently unauthorised use of the quarry at Maplestown, Co. Carlow over and above what was permitted by Planning Reference 221741.

1.2 Definition of EIA and EIAR

EIA is a systematic examination of the potential impacts of a Development on the environment. In assessing the environmental impacts this (r)EIAR will retrospectively assess the environmental impacts of the Unauthorised Development. This (r)EIAR has been prepared in support of an application to An Bord Pleanála by Mr. Mark Phelan for substitute consent in respect of a quarry development at Maplestown, Rathvilly, Co. Carlow. Hence, the Chapters in the EIAR will also retrospectively discuss the details of the environment as they existed prior to the initial extraction and infilling activities which historically took place on the Unauthorised Developed Site lands. This follows a notice issued under Section 261A to submit a Substitute Consent application to An Bord Pleanála, requiring a remedial Environmental Impact Statement (EIS).

Under Schedule 5 of the Planning and Development Regulations 2001, as amended (the **Planning Regulations**), an EIAR (formerly an EIS) is required to accompany certain planning applications for specified projects as part of the EIA process.

The rEIAR describes the outcomes of the iterative EIA process which was progressed in parallel with the project design process. In doing so, it forms the first part of the EIA process that will be completed by An Bord Pleanála, as the competent authority, which in turn will be required to examine, analyse and evaluate the direct and indirect effects of the development on the various factors listed in Directive 2011/92/EU, as amended by 2014/52/EU (the **EIA Directive**).

> *"The EIAR should be prepared at a stage in the design process where changes can still be made to avoid adverse effects. This often results in the modification of the project to avoid or reduce effects through redesign" (EPA, 2017)*

Where significant and likely environmental effects are identified that are unacceptable, the EIA process aims to quantify and minimise the effects of the impact that the specified development has on the environment through appropriate mitigation measures and where necessary, subsequent monitoring.

This process is illustrated in Fig 1-1.

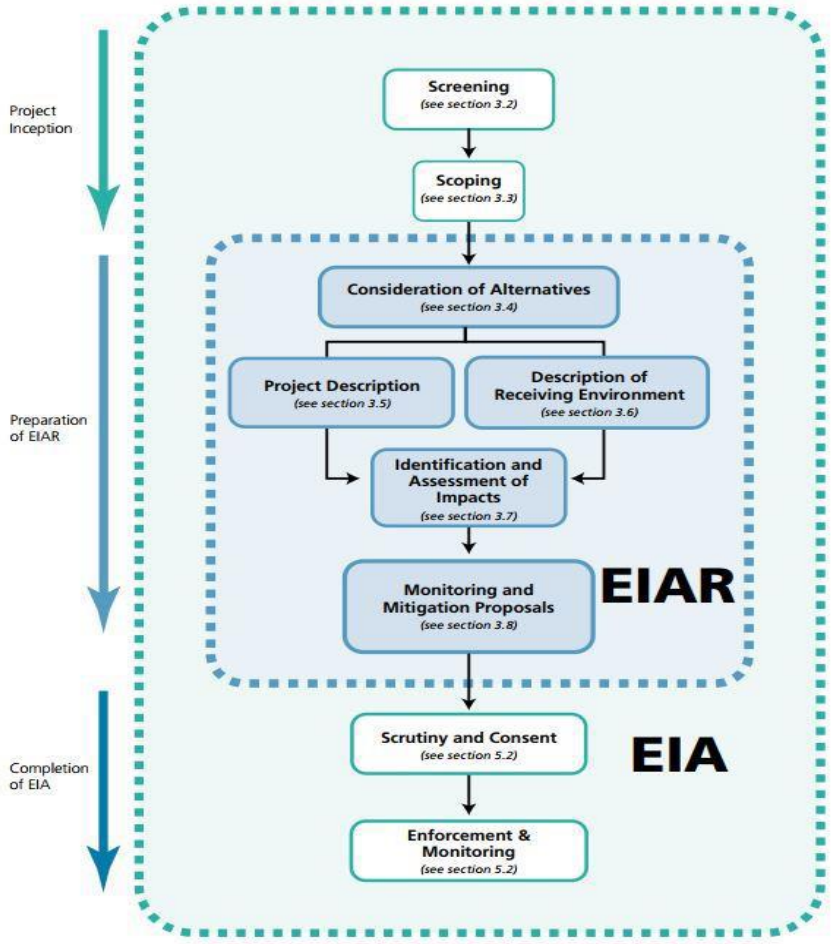


Figure 4-1: EIA Process

The purpose of the (r)EIAR is to provide the Planning Authority with information on the likely and significant effects on the environment by the Development (that requiring substitute consent). This (r)EIAR was prepared in parallel with the project design process and reflects the potential cumulative impact of other developments.

1.3 Remedial EIAR Methodology

Section 177F (1) of the Planning and Development Acts 2000-2010 states that a remedial Environmental Impact Statement (now rEIAR) shall contain the following information:

(a) A statement of the significant effects, if any, on the environment, which have occurred, or which are occurring or which can reasonably be expected to occur because the development the subject of the application for substitute consent was carried out.

(b) Details of:

- *(i) Any appropriate remedial measures undertaken or proposed to be undertaken by the applicant for substitute consent to remedy any significant adverse effects on the environment.*
- *(ii) The period of time within which any proposed remedial measures shall be carried out by or on behalf of the applicant.*

(c) Such information as may be prescribed under section 177N.

1.4 rEIA Guidelines

This rEIAR has been prepared in accordance with all relevant guidance. The documents listed below are common to all chapters. Additional specific guidelines will be referred to in each specific chapter.

- Guidelines on the Information to be contained in Environmental Impact Statements (EPA 2002).
- Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA 2003).
- Draft Advice Notes for Preparing Environmental Impact Statements (EPA draft September 2015a).
- Draft Revised Guidelines on the Information to be Contained in Environmental Impact Statements (EPA draft September 2015b).
- Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA draft August 2017).
- Environmental Assessments of Plans, Programmes and Projects – Rulings of the Court of Justice of the European Union (European Union 2017).
- Environmental Impact Assessment of Projects – Guidance on Scoping (Directive 2011/92/EU as amended by 2014/52/EU) (European Union 2017).
- Guidance of Integrating Climate Change and Biodiversity into Environmental Impact Assessment (European Union 2013).
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Union 2017).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Environment, Community and Local Government 2013).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Government of Ireland 2018).

- Key Issues Consultation Paper on the Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems; (Department of Housing, Planning, Community and Local Government 2017).

- Circular PL 05/2018 -Transposition into Planning Law of Directive 2014/52/EU amending Directive 2011/92/EU on the effects of certain public and private projects on the environment (the EIA Directive) And Revised Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government 2018).

- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Communities 1999); and

- Implementation of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (European Communities 2003).

- Appropriate Assessment Screening for Development Management; OPR Practice Note PN01(Office of the Planning Regulator March 2021).

The EIA Directive defines EIA as a process. Article 1(2)(g) states that EIA means:

> *"(i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2).*
>
> *(ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7.*
>
> *(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7.*
>
> *(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point.*
>
> *(iii) and, where appropriate, its own supplementary examination; and*
>
> *(v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a".*

The EIA Directive requires the (r)EIAR to identify, describe and assess, in an appropriate manner and in light of each individual case, the direct, indirect and cumulative significant effects of the Proposed Development on factors of the environment including:

- Population and human health

- Biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC (respectively, the Habitats Directive and the Birds Directive)

- Land, soil, water, air, and climate
- Material assets, cultural heritage, and the landscape
- The interaction between the factors referred to in points (a) to (d)

1.5 Screening for EIA

'Screening' is the term used to describe the process for determining whether a proposed development requires an EIA by reference to mandatory legislative threshold requirements or in the case of sub threshold development, by reference to the type and scale of the proposed development and the significance or the environmental sensitivity of the receiving baseline environment.

Annex 1 of the EIA Directive requires as mandatory an EIA for all development projects listed therein.

Schedule 5, Part 1, of the Planning Regulations transposes Annex 1 of the EIA Directive directly into Irish planning legislation. An EIAR is required to accompany a planning application for development of a class set out in Schedule 5, Part 1 of the Planning Regulations which exceeds a limit, quantity or threshold set for that class of development.

Schedule 5, Part 2 of the Planning Regulations defines projects that are assessed on the basis of set mandatory thresholds for each of the project classes including:

> *Schedule 5, Part 2 - Extractive Industry*
>
> *2(b) Extraction of stone, gravel, sand or clay, where the area of extraction would be greater than 5 hectares.*

This Development will result in an extraction area of greater that the 5Ha threshold. As a result, a mandatory EIA is required in this instance.

1.6 Scope of the rEIAR

'Scoping' is a process of deciding what information should be contained in an EIAR and what methods should be used to gather and assess that information. It is defined in EC Guidance on EIA Scoping 2001[1] as:

> *'Determining the content and extent of the matters which should be covered in the environmental information to be submitted in the EIAR'*

The content of this (r)EIAR was informed by a scoping process carried out by the applicant, design team and (r)EIAR consultants to identify the core issues likely to be most important during the EIA process.

[1] Guidance on EIA Scoping European Commission June 2001

The (r)EIAR prepared for the Unauthorised Development has endeavoured to be as thorough as possible and therefore all of the issues listed in Schedule 6, Sections 1 and 2 of the Planning Regulations have been addressed in the EIAR.

The scope of this (r)EIAR has had regard to the documents listed in Section 1.4 above, together with:

- The requirements of Part X of the Planning Act and also Part 10 of the Planning Regulations.
- The requirements of the Carlow County Development Plan 2015 - 2021.
- Relevant Regional and National Planning Policy Documents.
- The receiving environment and any vulnerable or sensitive local features and current uses.
- Previous relevant planning history and applications that have been submitted on the subject and adjoining lands.
- The likely and significant impacts of the Proposed Development on the environment; and
- Available mitigation measures for reducing or eliminating any potentially significant undesirable impacts.

In addition, the individual chapters of this (r)EIAR should be referred to for further information on the documents consulted by each individual consultant.

1.7 Purpose and Objectives of the (r)EIAR

The purpose of this (r)EIAR is to assist in the EIA process, by identifying likely significant environmental impacts resulting from the Historic Development, to describe the means and extent by which they can be reduced or mitigated, to interpret and communicate information about the likely impacts and to provide an input into the decision making and planning process.

The fundamental principles to be followed when preparing an (r)EIAR are:

- Anticipating, avoiding, and reducing significant effects.
- Assessing and pursuing preventative action.
- Maintaining objectivity.
- Ensuring clarity and quality.
- Providing relevant information to decision makers; and
- Facilitating public and stakeholder consultation.

EIA is an iterative process. The (r)EIAR captures this assessment process and describes its outcomes. The (r)EIAR documents the consideration of environmental effects and provides transparent, objective and replicable documentary evidence of the EIA evaluation and decision-making processes.

The (r)EIAR provides information on any identified effects arising as a consequence of the Unauthorised Development and which:

- Are environmentally based.
- Are likely to have occur; and
- Have (had) significant and adverse effects on the environment.

It also documents how the design of the Development incorporates measures for the purposes of impact avoidance, reduction or amelioration; as well as to explain how significant adverse effects will be avoided/addressed.

The key objective of this (r)EIAR is to inform the Planning Authority on the acceptability of the Historic Development, in carrying out an EIA, in order to reach a decision in the full knowledge of the Unauthorised Development's likely significant impacts on the environment, if any.

1.8 Format and Structure of this rEIAR

The formation of an (r)EIAR necessitates the co-ordination and collation of associated, yet diverse specialised areas of assessment. The EIA approach involves the examination of each environmental factor, describing the historic baseline environment, the Historic Development, its likely impacts and direct and indirect significant effects pertaining to that environmental factor and mitigation measures, where appropriate.

The topics examined in this (r)EIAR are categorised under the environmental factors prescribed under the EIA Directive:

- Population and Human Health
- Biodiversity
- Land & Soils
- Water
- Air
- Climate
- Material Assets
- Cultural Heritage
- Landscape

The expected effects deriving from the vulnerability of the Historic Development to risks of major accidents and/or disasters must also be examined.

The structure of the (r)EIAR is set out in Table 1-1 below.

Table 4-1: Structure of the rEIAR

Chapter	Title	Content
1	Introduction and Methodology	Chapter 1 sets out the purpose, methodology and scope of the document.
2	Description of the Proposed Development & Assessment of Alternatives	As required under Article 5(1)(a), Chapter 2 provides a description of the site, design and scale of Historic and Proposed Development, and as required under Article 5(d), an evaluation of the reasonable alternative design approaches.
3	Planning and Development Context	Chapter 3 sets the national, regional and local policy framework for the Historic and Proposed Development.
4	Population and Human Health	Chapter 4 covers the requirement for assessment on potentially significant effects to population and human health as required under Article 3(1)(a).
5	Biodiversity	Chapter 5 covers the requirement of Article 3(1)(b) to assess potentially significant effects on biodiversity (which previously referred only to 'fauna and flora'), having particular attention to species and habitats protected under the Habitats Directive and the Birds Directive.
6	Land and Soils	Chapter 6 covers the requirement under Article 3(1)(c) on Land and Soil to assess the type of soil and geology in the area of the Historic and Proposed Development and identifies any potentially significant effects.
7	Hydrology	Chapter 7 covers the requirement under Article 3(1)(c) to assess potentially significant effects to water quality arising from the Historic and Proposed Development. This chapter will assess any potential effects from pollution and discharges to surface water.
8	Air Quality and Climate	Chapter 8 covers the requirement under Article 3(1)(c) on Air and Climate to assess potentially significant effects to air quality in the surrounding environment.
9	Noise and Vibration	Chapter 9 covers the requirement to assess potentially significant effects from airborne noise and vibration as required under Article 3(1)(a) on Human Health.
10	Landscape and Visual Amenity	Chapter 10 covers the requirement under Article 3(1)(d) to assess potentially significant effects on the landscape. This chapter will assess any potential visual impacts to landscape caused by the Historic and Proposed Development.
11	Archaeology and Cultural Heritage.	Chapter 11 covers the requirement under Article 3(1)(d) to assess potentially significant effects on cultural heritage.

12	Material Assets _Traffic, Utilities and Waste Management	Chapter 12 covers the requirement under Article 3(1)(d) to assess potentially significant effects on material assets. This chapter will identify impacts to existing utilities and infrastructure from the development of the Historic and Proposed Development. Article 5(1), Annex IV, point 1(d) requires estimates of quantities and types of waste produced during the operation phase. Chapter 12 will also present an assessment of how resources and waste have/will be managed for the Historic and Proposed Development.
13	Risk Management	Chapter 13 covers the requirement under Article 3(2) to include the expected effects deriving from the vulnerability of the Historic and Proposed Development to risks of major accidents and/or disasters.
14	Interactions	As required under Article 3(1)(e), Chapter 14 provides an assessment of the interaction between all of the environmental aspects referred to in this (r)EIAR/EIAR.
15	Mitigation and Monitoring	Chapter 15 describes mitigation and monitoring as required under Article 5(1) in order to avoid, prevent, reduce, or if possible, offset any identified significant adverse effects on the environment and, where appropriate, describes any proposed monitoring arrangements.

This approach employs standard descriptive methods, replicable prediction techniques and standardised impact descriptions to provide an appropriate evaluation of each environmental topic under consideration.

1.9 Methodology Used to Produce this (r)EIAR

The methodology employed to produce this (r)EIAR is detailed in Table 1-2. The objective is to evaluate each environmental topic, both individually and collectively, in a systematic and objective manner.

The methodology will outline the methods used to describe the historic baseline environmental conditions as well as the predicted likely impacts (as outlined in the original Environmental Impact Statement prepared as part of the original planning application) on the environment, and a retrospective assessment of the environmental impacts of the Unauthorised Development. The data and survey requirements for each chapter will vary depending on the environmental topic and will be chosen by the particular specialist based on relevant legislation, best practice guidance, policy requirements, and professional judgement. Similarly, the study area is also defined for each environmental topic based on professional judgement and experience.

All environmental topics require desktop reviews of all relevant data at a minimum. These desktop studies are then supplemented by field studies and consultations with relevant stakeholders, for example interested parties, statutory bodies and local authorities, as required for each environmental topic.

An outline of the methodology employed consistently in each chapter of the rEIAR to examine each environmental topic is provided below:

Table 4-2: Methodology Employed to Produce each (r)EIAR Chapter

Introduction	Provides an overview of the specialist area and specifies the specialist who prepared the assessment.
Study Methodology	This subsection outlines the method by which the relevant impact assessment has been conducted within that chapter.
The Existing Receiving Environment (Baseline Situation)	This section will describe and assess the receiving environment, the context, character, significance and sensitivity of the baseline receiving environment into which the Proposed Development will fit. This analysis also takes account of any other proposed developments that are likely to proceed in the immediate surroundings.
Characteristics of the Proposed Development	Consideration of the '*Characteristics of the Proposed Development'* allows for a projection of the '*level of impact'* on any particular aspect of the environment that could arise. For each chapter those characteristics of the Proposed Development which are relevant to the area of study are described; for example, the chapter on landscape and visual impact addresses issues such as height, design and impact on the surrounding landscape.
Potential Impact of the Proposed Development	This section provides a description of the specific, direct and indirect, effects that the Proposed Development may have. This analysis is provided with reference to both the Existing Receiving Environment and Characteristics of the Proposed Development sections, while also referring to the: (i) magnitude and intensity, (ii) integrity, (iii) duration and (iv) probability of impacts. The assessment addresses whether the impacts are direct, indirect, secondary or cumulative in nature. It also looks at the timescale of such impacts e.g., are they short, medium, long-term, and are they of a temporary, permanent, continuous or intermittent nature, and are they positive or negative impacts. The impact interactions are also addressed.
Do Nothing Impact	In order to provide a qualitative and equitable assessment of the Proposed Development, this section considers the Proposed Development in the context of the likely impacts upon the receiving environment should the Proposed Development not take place.
Avoidance, Remedial and Mitigation Measures	This section of each chapter describes the mitigation measures which are required. The requirement to describe mitigation measures is laid out in the EIA Directive, as implemented by the Planning Act and the Planning Regulations. Avoidance, remedial and mitigation measures describe any corrective or mitigative measures that are either practicable or reasonable, having regard to the potential impacts of the Proposed Development. This includes avoidance, reduction and remedy measures as set out in Section 4.7 of the Development Management Guidelines 2007, to reduce or eliminate any significant adverse impacts identified.
Residual Impacts of the Proposed Development	This section allows for a qualitative description of the resultant specific direct, indirect, secondary, cumulative, short, medium and long-term, temporary, permanent, continuous, or intermittent, positive and negative effects as well as impact interactions which the Proposed Development may have, assuming all mitigation measures are fully and successfully applied.
Monitoring	This involves a description of monitoring in a post-development phase, if required. This section addresses the effects that require monitoring, along with the methods and the agencies that are responsible for such monitoring.

Reinstatement	While not applicable to every aspect of the environment considered within the EIAR, certain measures may need to be proposed to ensure that in the event of the proposal being discontinued, there will be minimal impact to the environment.
Interactions	This section provides a description of impact interactions together with potential indirect, secondary and cumulative impacts.
Difficulties Encountered in Compiling Information	The EIA Directive requires that the EIAR includes *'details of difficulties (for example technical deficiencies or lack of knowledge) encountered compiling the required information, and the main uncertainties involved'* (EIA Directive, Annex IV, Part 6). Each chapter that contains an environmental baseline and assessment contains a section outlining any difficulties encountered in compiling that chapter.

1.10 rEIAR Project Team

Table 4-3: rEIAR Project Team

Chapter	Consultant Name and address	Specialist Area
1.0 Introduction and Methodology including Non-Technical Summary	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Mairead Foran	Multidisciplinary Environmental Consultants
2.0 Project Description and Alternatives Examined	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Nikita Coulter	Multidisciplinary Environmental Consultants
3.0 Planning & Policy Context	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Mairead Foran	Multidisciplinary Environmental Consultants
4.0 Population and Human Health	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Kamala Yagubova	Multidisciplinary Environmental Consultants
5.0 Biodiversity	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Bryan Thompson	Multidisciplinary Environmental Consultants
6.0 Land and Soils	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Claire Clifford	Multidisciplinary Environmental Consultants
7.0 Hydrology & Water	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Claire Clifford	Multidisciplinary Environmental Consultants

Chapter	Consultant Name and address	Specialist Area
8.0 Air Quality & Climate	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Aoife Grogan	Multidisciplinary Environmental Consultants
9.0 Noise and Vibration	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Laura Griffin	Multidisciplinary Environmental Consultants
10.0 Landscape & Visual Amenity	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Mairead Foran & Dara Hillard	Multidisciplinary Environmental Consultants
11.0 Archaeology, Architectural, and Cultural Heritage	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Laura Griffin	Multidisciplinary Environmental Consultants
12.0 Material Assets: Traffic, Waste, and Utilities	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Nikita Coulter Transport Insights Ltd, Suite 30, 21 Baggot Street Lower, Dublin 2, D02 X658 Transport Insights Ltd	Multidisciplinary Environmental Consultants Traffic and Transportation Specialists.
13.0 Risk Management	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Nikita Coulter	Multidisciplinary Environmental Consultants
14.0 Interactions	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Laura Griffin	Multidisciplinary Environmental Consultants
15.0 Mitigation and Monitoring Measures	Enviroguide Consulting, 3D Core C, The Plaza, Park West, D12F9TN Laura Griffin	Multidisciplinary Environmental Consultants

1.11 Non-Technical Summary

A Non-Technical Summary of the (r)EIAR has also been prepared. The EIA Directive states that one of the objectives of the EIA process is to ensure that the public are fully aware of the environmental implications of any decisions. EPA Guidelines note that the non-technical summary of the (r)EIAR should facilitate the dissemination of the information contained in the (r)EIAR and that the core objective is to ensure that the public is made as fully aware as possible of the likely environmental impacts of projects prior to a decision being made by An Bord Pleanála. A Non-Technical Summary of the (r)EIAR has therefore been prepared which summarises the key environmental impacts and is provided as a separately bound document.

1.12 Links between rEIAR and Appropriate Assessment

A Screening Report for Appropriate Assessment (AA) has been carried out for the Development to determine if there is a risk of effects to any Natura 2000 site. Upon examination of the relevant information including in particular the nature of the Historic/ Unauthorised Development and the likelihood of significant effects on European Sites, the AA Screening Report concluded that the possibility may not be excluded that the Historic Development will have a likely significant effect on River Barrow and River Nore SAC. Accordingly, a remedial Natura Impact Statement has been prepared for the Historic/ Unauthorised Development and is included under separate cover.

While AA is required by the proposer of any plan or project likely to have an adverse effect on a Natura 2000 site, EIA is required for projects listed in Annex I of the EIA Directive. The requirement for EIA relative to projects listed in Annex II of the EIA Directive is determined on a case by case. While these two different types of assessment are independent and are required by separate legislation, namely the Birds and Habitat Directives (i.e., AA) and the EIA Directive (i.e., EIAR) there is a degree of overlap, particularly in the biodiversity chapter of the EIAR.

1.13 Availability of (r)EIAR Documents.

A copy of this (r)EIAR document and Non-Technical Summary is available for purchase at the offices of An Bord Pleanála at a fee not exceeding the reasonable cost of reproducing the document.

1.14 Statement of Difficulties Encountered

No exceptional difficulties were experienced in compiling the necessary information for the Unauthorised Development. Where any specific difficulties were encountered these are outlined in the relevant chapter of the (r)EIAR.

1.15 Quotations

The application is also accompanied by a Non-Technical Summary of the rEIAR, which is laid out in a similar, but condensed format to the main (r)EIAR. The structure, presentation and the Non-Technical Summary of the (r)EIAR, as well as the arrangements for public access, all facilitate the dissemination of the information contained in the (r)EIAR. The core objective is to ensure that the public and local community are aware of the likely environmental impacts of the Development prior to the granting of consent.

However, it is important to acknowledge that the (r)EIAR by its nature contains statements about the Historic/Unauthorised Development, some of which are positive and some less than positive. Selective quotation or quotations out of context can give a very misleading impression of the findings of the study. Therefore, the study team urge that quotations should, where reasonably possible, be taken from the conclusions of specialists' sections or from the Non-Technical Summary and not selectively.

5 PROJECT DESCRIPTION & DESCRIPTION OF ALTERNATIVES

5.1 Introduction and Terms of Reference

This chapter has been prepared in support of an application to An Bord Pleanála by Mark Phelan for substitute consent in respect of the existing quarry development at Maplestown, Rathvilly, Co. Carlow. In accordance with Article 5(1)(a) of the EIA Directive, the description of the project should comprise:

'Information on the site, design, size and other relevant features of the project'.

A description of the unauthorised development and its surroundings is provided in this Chapter This description sets the basis against which the specialist assessments presented in this rEIAR have been undertaken.

The rEIAR must contain information in relation to the environmental impact of both the Unauthorised Development and all other "reasonable" alternatives studied. An indication of the main reasons for the option chosen must be given, taking into account the effects of the Unauthorised Development on the environment.

Additionally, this Chapter of the rEIAR will also retrospectively discuss the details of the environment as they existed prior to the initial extraction and infilling activities which historically took place on the Site lands. This follows a notice issued under Section 261A to submit a Substitute Consent application to An Bord Pleanála, requiring a remedial Environmental Impact Statement (EIS).

5.2 Site Location and Description

2.2.1 Site Location

2.2.1.1 Historic extraction and infill (Permitted and unauthorised, i.e., that requiring substitute consent)

The Site of the Historic Development consisted of a rural farm property in Maplestown, Co. Carlow. The townland of Maplestown is located in the northern part of Co. Carlow bordering Co. Kildare and Co. Wicklow. The Site was bound to the West by a country road (L-8097), and to the South, East and North by agricultural lands. Refer to Figure 2-1 for the Site Location Map.

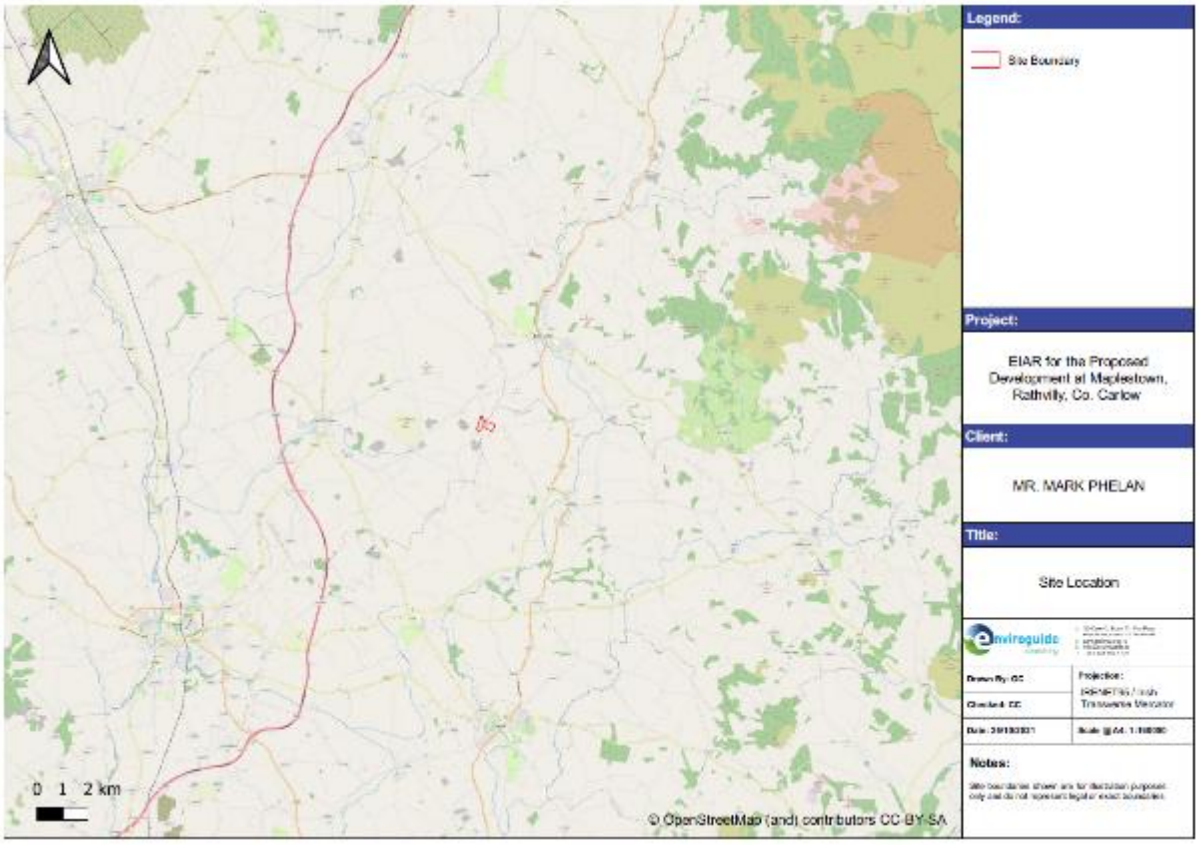


Figure 5-1: Site Location Map

The surrounding land use was predominantly rural agricultural land use including livestock and arable farming, as well as forestry plantation. A small stream lies in the South of the property and a broadleaf birch dominated woodland lies to the West of the property. The surrounding landscape was undulating, characterised by low ridges and knolls.

The landcover was predominately permanent pasture. Field patterns were irregular with boundaries defined by ditches or hedgerow belts. Residential properties in the vicinity of the Site of the Historic Development were primarily concentrated along the L-8097 to the West of the site. There were some 8 dwellings (including the landowners), a school and a hall within ¼ km of the site boundary. The 2 dwellings nearest to the extraction area were each approximately 38 m from the western boundary of the site and 62m of the extraction area. The next nearest dwellings were 24 m and 36 m from the Site boundary and 96 m and 185 m from the extraction area respectively. The landowner's house was 91 m from the site boundary and 101 m from the extraction area. All other dwellings were in excess of 220 m from the site boundary. The School and the Hall were 209 m and 225 m from the site boundary and 281 m and 287 m from the extraction area, respectively.

2.2.2 Site Description

The overall Site area is 15.21 hectares (ha) and is shown on Figure 2-2 outlined in Red which contains an area of land which was quarried and infilled outside of the granted planning permission period (4.18 ha) for which substitute consent is being sought (refer to Figure 2-3).

Figure 5-2: Overall Site Layout (Drawing No. P-01)

2.2.2.1 Historic extraction and infill

The proposed area of extraction occupied an inverted L-shaped area measuring approximately 454 m east to west by 355m and 255 m north to south at its maximum and minimum respectively. The area is shown in Fig. 2-3 below outlined in Cyan:

Figure 5-3: Area of Unauthorised Development for which Substitute Consent is Required (Drawing No. P-02)

The subject site comprised approximately 15.21 hectares of agricultural grassland bounded to the West by the Kildare County Road L-8097; to the East by a fence and a farmhouse occupied by the Landowner and agricultural land; to the South by small west-flowing stream, fences and agricultural land, and to the North by fences, agricultural land and thin hedgerows. The high ground at the centre of the extraction area sloped steeply to the North and to the South toward a low-lying area of boggy ground, which was occupied by mature coniferous copse.

The proposal for the Historic Development was to excavate 700,000 tonnes to 900,000 tonnes of sand and gravel site at an average rate of 90,000 tonnes per annum up to a maximum of 100,000 tonnes per annum over a period of 10 years. Planning was granted for the extraction from 2007 to 2012, there was however unauthorised development at the Site and quarrying continued after 2012.

The unauthorised development comprised of the quarrying of an area of approximately 4.18 hectares in the eastern part of the Site. It has been estimated by Enviroguide Consulting that the total tonnage excavated from the unauthorised development after 2012 was approximately 192,240 tonnes of material (included in this total figure is 75,060 tonnes of overburden). The area of the unauthorised development which was quarried after 2012 was subsequently restored during 2018 using overburden from the quarried areas. This area is defined in Figure 2-3 with a dotted cyan line and Cyan hatching.

The quarrying and restoration activities which took place at the Site were all permitted in 2007 under Ref. Reg. PL01.221741. The area of unauthorised development, which requires Substitute Consent, comprises of an area of quarry and a previously infilled quarry which has been restored for agricultural use.

5.3 Site History / Background

Historical mapping and aerial photography available from the Ordnance Survey of Ireland website (OSI, 2021) were reviewed. OSI maps from 1837 until 1930 show the site as agricultural fields bordered by ditches or hedgerows. The OSI maps compiled from surveys conducted between 2005 and 2012 show the early stages of the permitted quarrying activity.

5.4 Project Overview

2.4.1. Historic extraction and infill

The Historic Development comprised of the development and operation of a sand and gravel pit, including a washing/rinsing plant, a dry screener; 3 no. settlement lagoons, one bunded fuel storage tank, a wheel wash, areas of stockpiling, landscaping and all other site development works, including the restoration works of the final pit void (extractive area).

This was described in the 2004 EIS as '*The proposed extraction area comprises approximately 11.78 hectares and measures between 384 m and 245 m in width, 450 m in length, and 10m in depth. The extraction will focus on a high glacial feature standing approximately up to 10.00m - 12.00m higher at its peak than the immediately surrounding pasturage. The extractive area at its highest point is approximately 130 m AOD at present and is proposed to be work to a depth of 119.55 m AOD. The proposed pit is to be used for the excavation and processing of sand and gravel only. There will be no blasting operations, and it is not proposed to excavate below the existing recorded ground water level. Following extraction, it is proposed to revert the site back to agricultural use. Further details regarding the construction, operation, and restoration of the proposed sand and gravel pit are provided below.*

Based on initial site investigations, it is estimated that there are approximately 700,000 to 950,000 tonnes of saleable sands and gravels to be extracted. It is proposed to extract approximately 70,000 to 95,000 tonnes per annum, depending on market demand (note that the worse-case scenario extraction rate of 95,000 tonnes per annum is used in the assessment of impacts). Based on this rate of extraction, the pit would have a lifespan of up to ten years.

Extraction of sand and gravel necessarily entails the extraction of topsoil and overburden as well as saleable materials.

It is proposed that the entire development, construction to restoration, will span approximately 12 years. Sand and gravel would be extracted in five overlapping phases, with approximately equal amounts of aggregate being extracted during each phase.

The pit will generally be worked from south to north and from west to east during each phase. However, the precise direction of working may alter to meet varying customer specifications and to ensure safe operation. Overall, this will largely be dependent on specific ground conditions as encountered on-site''.

The quarrying and restoration activities which took place at the Site were all permitted in 2007 under Ref. Reg. PL01.221741. Planning was granted for the Historic Development from 2007 to 2012, there was, however, unauthorised development at the Site and quarrying continued after 2012.

The area of unauthorised development, which requires Substitute Consent, comprises of an area of quarry and a previously infilled quarry which has been restored for agriculture. The unauthorised quarrying, which continued after 2012, comprised of the extraction of approximately 192,240 tonnes of material (included in this total figure is 75,060 tonnes of overburden) from an area of approximately 4.18 hectares in the eastern part of the Site. The unauthorised quarry area was subsequently restored using overburden from the quarried areas. This area is defined in Figure 2-3 with a dotted cyan line and Cyan hatching.

The applicant, Mr. Mark Phelan now wishes to apply to An Bord Pleanála for Substitute Consent for the currently unauthorised quarry at Maplestown, Co. Carlow.

2.4.3 Site Infrastructure

2.4.3.1 Historic extraction and infill

There were no built structures proposed for the previously permitted development. All infrastructure that was installed at the Site was permitted and authorised under previous permission Reg. Ref. 221741), the appropriate period of which expired on 24th July 2012. The infrastructure that was installed at the Site included:

- Site access roads
- Settlement lagoons
- Staff facilities & carparking
- Well water supply
- Truck parking
- Boundary Walls
- Plant area
- Wheel wash facilities
- Drainage
- Bunded fuel storage tank

It should be noted that this permitted infrastructure was used during the unauthorised operation of the quarry, but no additional infrastructure was required.

2.4.4 Site Plant and Equipment

2.4.4.1 Historic extraction and infill

Details of all plant and equipment that were operational on the Site associated with the historically permitted activities are listed below and described in Table 2-1. All plant and equipment that was installed and used at the Site was permitted and authorised under previous permission Reg. Ref. 221741).

2.4.4.1.1 Plant and Equipment specific to the Historical Activities

- Front-end loading shovel (Volvo)
- Standby front-end loading shovel
- Back Hoe Excavator (Komatsu 400 40-tonne or similar)
- 2 no. 25-tonne dumper trucks (Volvo A25C or similar)
- 8 x 4 Dry Screener (of the type manufactured by Powerscreen, Finlay, or a similar manufacturer)
- Dozer (Cat or similar)
- Low Loaders
- Washing Plant (l0 x 5 screens with dewaterer) (of the type manufactured by Powerscreen, Finlay, or a similar manufacturer)

Table 5-1: Description of Plant and Equipment associated with Historically Permitted Activities

Plant/Machinery Item	Description
Front-end Loading Shovel	This is a heavy equipment machine used in the quarry to load aggregate into storage or transport receptacles e.g., dumper trucks, lorries etc. The machine is a wheeled front-end loader, sometimes fitted with an extendable boom, which makes it suitable for loading materials in a quarry environment.
Back Hoe Excavator	A hydraulic excavator is a heavy machine that has various sizes, a hydraulic arm with a blade at the tip, designed to move on wheels or chains and also has the ability to rotate 360 degrees on its own axis. Its functions in a quarry environment are to excavate, rotate, move and load aggregate.
Dumper Truck	The Volvo A25 Dumper Truck is a 6-wheeled vehicle that has its cab in front of the dump box which contains the load. A dumper truck is designed for transporting and unloading loads of bulk material around the quarry environment. The dump box is raised using hydraulic pistons in order to release the load through the tail gate.
Dry Screener	A screener is a large, fixed machine that is used to separate mixed aggregates and sand into different grades. These machines are at the core of most construction and quarrying operations and are one of the most used pieces of equipment onsite. They work after an excavator, which feeds material into the screener for sorting. Screeners have vibrating meshes which are stacked in tiers, and the mixed aggregate is dumped on top. As the screens shake, smaller material falls through the holes in the mesh, leaving larger pieces on top. Any material that doesn't fall through each tier can tumble onto a conveyor to be carried away.
Bulldozer/Dozer	A bulldozer or dozer is a large, motorized machine that travels on continuous tracks or large tires and is equipped with a metal blade to the

Plant/Machinery Item	Description
	front for pushing material: soil, sand, snow, rubble, or rock during construction or conversion work.
Low Loader	A low loader is a semi-trailer with two drops in deck height: one right after the hitch and one right before the wheels. This allows the deck to be extremely low compared with other trailers. It offers the ability to carry legal loads up to 12 ft tall, which other trailers cannot. They are often used on sites for equipment transport.
Washing Plant	A washing plant is designed to remove silt/clay impurities by washing, tumbling, or scrubbing, as well as size and dewater sand before drying, sizing and blending it into final products.

2.4.4.1.2 Plant and Equipment ancillary to the Historical Activities

- Diesel generator
- Fuel storage tank (600 gallon)
- Fuel bowser (for refuelling machinery in pit)
- Water bowser
- Tractor
- 3 - 4 no. Heavy Goods Vehicles (HGVs) (20-tonne rigid-body Note: HGVs may be contract haulers and not vehicles owned and operated by the Applicant)

5.5 Construction Phase

2.5.1 Permitted and unauthorised extraction and infill

There were no built structures proposed for the site, as such the Construction Phase entailed site development works including Site access roads, car and truck parking, staff welfare facilities (chemical toilets), a well water supply, drainage, settlement ponds, boundary walls, and the installation of fixed plant in the plant area, closed loop wheel wash facilities and a bunded fuel storage tank.

5.6 Operational Phase

2.6.1 Permitted and unauthorised extraction and infill

The Operational Phase of the permitted and unauthorised development commenced with topsoil stripping, followed by the extraction, processing, and transport of sands and aggregates to delivery points. The topsoil was stored for reinstatement at a later stage.

Aggregates were excavated and transported to the processing area using a front-end loading shovel. The extracted materials were then fed into the hopper that conveyed them into a dry screener, which separated the aggregate by size. Following screening, the materials were conveyed to a product stockpile.

The screened materials were then conveyed to a washing plant, which rinsed the materials to remove fine silt and clay particles in order to meet product specifications. Following washing, a conveyor transported chippings to a product stockpile and two grades of sand were also produced.

The washing plant used water pumped from the sump and silt-laden wastewater produced by the wash plant was fed by gravity to settlement lagoons where the clay and silt settled out. The cleaned water was returned by gravity to the sump for reuse in the wash plant. The aggregates were removed from the site daily by HGVs.

The operational hours of the unauthorised development were

Monday to Friday (excluding Bank Holidays) 08:00 - 18:00hrs

Saturday 08:00 - 13:00hrs

Sunday Closed

The proposed hours of transport of sand and gravel products off-site were as follows:

Monday to Friday (excluding Bank Holidays) 07:00 - 18:00hrs

Saturday 07:00 - 13:00hrs

Sunday Closed

5.7 Statutory Planning Context

2.7.1 Permitted and unauthorised extraction and infill

The subject quarry at Maplestown, Rathvilly, Co. Carlow was granted permission for a 95,000 tonnes per annum facility by An Bord Pleanála Reg. Ref 221741 on 24th July 2007.

In the original application, permission was sought for 10 years of extraction in five phases. However, the Planning Authority granted permission for 5 years after which time the quarry was to be decommissioned. The applicant believed that the 10-year permission had been granted and continued to operate past the expiry date of the permission. The applicant has been issued a notice under Section 261A to submit a Substitute Consent application to An Bord Pleanála, requiring a remedial Environmental Impact Statement (EIS).

This section will not address in detail the original planning permission relevant to the Historic Development or the requirement for leave to apply for Substitute Consent. These are addressed in Chapter 3 (Planning and Policy Context) of this rEIAR.

The site of the Development is subject to National, Regional and Local level planning policy. The following outlines the key planning policy documents of relevance to the Development.

This section will not address in detail the policies and objectives contained in the various plans / policies that are relevant to the Unauthorised Development. These are addressed in Chapter 3 (Planning and Policy Context) of this EIAR.

2.7.2.1 National

- Planning and Development Act 2000-2020
- The National Planning Framework (NPF): Project Ireland 2040 (Government of Ireland, 2018).

2.7.2.2 Regional

- Regional Planning Guidelines

2.7.2.3 Local

- Carlow County Development Plan 2015 – 2021.

5.8 Description of Alternatives

2.8.1 Introduction

Consideration of reasonable alternatives is an important aspect of the EIA process and is necessary to evaluate the likely environmental consequences of a range of development strategies for the site of the Development within the constraints imposed by environmental and planning conditions. This section provides a description of the reasonable alternatives that have been considered.

Article 5 of the EIA Directive requires that that the EIAR contain:

"*A description of the reasonable alternatives (for example in terms of project design, technology, location, size and scale) studied by the developer, which are relevant to the Proposed Development and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects*."

This section of the rEIAR provides an explanation of the reasonable alternatives examined throughout the design and consultation process. This serves to indicate the main reasons for choosing the Development, taking into account and providing a comparison of the environmental effects. The alternatives may be described at four levels:

- Alternative locations
- Alternative designs
- Alternative layouts
- Alternative processes

Pursuant to Section 3.4.1 of the Draft Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017), the consideration of alternatives also needs to be cognisant of the fact that "*in some instances some of the alternatives described below will not be applicable - e.g., there may be no relevant 'alternative location'…*"

In accordance with Draft EPA Guidelines (EPA, 2017), different types of alternatives may be considered at several key phases during the process. As environmental issues emerge during the preparation of the rEIAR, alternative designs may need to be considered early on in the process or alternative mitigation options may need to be considered towards the end of the process.

The Draft EPA Guidelines (EPA, 2017) states:

"*The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account is deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required*."

Thus, the consideration and presentation of the reasonable alternatives studied by the project design team is an important requirement of the EIA process.

2.8.2 Alternative Locations

2.8.2.1 Permitted and unauthorised extraction and infill

The Environmental Impact Statement for the Permitted Development stated that potential sites for the location of sand and gravel pits were limited, due to both the fact that aggregates must be worked where they naturally occur and to the location requirements of sand and gravel pits, including the following:

- A location near to market demand due to aggregate's low value-to-weight ratio, which makes their transport over long distances economically unfeasible and unsustainable.
- Access to a good road network.
- A location at which residential, environmental, and tourism amenity will not be adversely affected.

It was deemed within the Environmental Impact Statement for the Historic Development that the subject Site ranked well on each of the location requirements relative to alternative locations. It is deemed that the same logic can be applied to the unauthorised development as it was part of the footprint covered by this EIS.

2.8.3 Alternative Uses

2.8.3.1 Permitted and unauthorised extraction and infill

If the development of the permitted sand and gravel quarry was not advanced, the site would have remained for other uses such as agriculture, forestry or development.

2.8.4 Alternative Design & Layouts

2.8.4.1 Permitted and unauthorised extraction and infill

The 2004 EIS stated: "*Alternative design considerations during the design process included alternative pit design, haul road location, plant location, and haul routes. The proposed pit design was modified to allow for the retention of mature trees in a hedgerow on the northern edge of the pit. The proposed location of aggregate processing plant and diesel generator (to southwest of the pit area) was selected due to its screening from residential properties and its proximity to a naturally occurring source of water. The proposed plant location also takes maximum advantage of topographical screening to the west.*

From the site there are a number of routes available to the surrounding areas. Due to the size of the vehicles transporting sand and gravel to and from the development, the widest and best quality roads have been proposed as haul routes to maximise the safety and speed of haulage."

2.8.5 Alternative Process

2.8.5.1 Permitted and unauthorised extraction and infill

The 2004 EIS stated: *"Alternative processes for the aggregate extraction from a pit of this size are limited; thus, the Proposed Development would employ standard processes for aggregate extraction, in compliance with Quarries and Ancillary Activities: Guidelines for Planning Authorities ("Quarries Guidelines"). issued by the Department of the Environment. Heritage, and Local Government in April 2004*".

5.9 The Existence of the Project

2.9.1 Permitted and unauthorised extraction and infill

The 2004 EIS stated: "The alternative to the proposed development is for the subject site to remain in agricultural use and for aggregates to be provided by alternative sources. However, as established below, there is a strong regional demand for aggregates over the medium term and an inability to meet this demand with recycled aggregate alone.

A clear national need for aggregates for major infrastructural and housing projects to fulfil National Spatial Strategy and National Development Plan is established in Quarries Guidelines (DOEHLG, April 2004):

"*The medium-term outlook, therefore, is for a sustained level of demand for aggregates to facilitate the provision of the infrastructure required to support continuing economic and social development, and to maintain Ireland's international competitiveness as a location for attracting inward foreign investment in the manufacturing and service sectors*." (p. 5)

The National Spatial Strategy (2002) forecasts that it will be necessary to provide some 500,000 additional dwellings to meet likely housing demand in the period up to 2010. Based on forecasts in the Regional Planning Guidelines for the Greater Dublin Area (adopted April 2004). over 130.000 of these new households will form in the Greater Dublin Area, some 30,000 of which will be located in Counties Carlow, Kildare and Wicklow. Considering that over 300 tonnes of aggregates are consumed in the construction of an ordinary single house (DOEHLG Quarries Guidelines, p. 4). the need for aggregates is evident.

Some demand for aggregate can be met through the recycling of construction and demolition waste. However, as established in the Quarries Guidelines (p. 5), there will still be a need for additional aggregate extraction operations to meet regional and local requirements."

As this statement applied to the 10-year assessment contained within the EIS it is relevant to the unauthorised development requiring substitute consent.

3 PLANNING AND POLICY

The planning and policy context gives an overview of the relevant legislation that supports the Development at a local, regional and national level.

Section 57 of the Planning and Development (Amendment) Act 2010 inserted 2 additional parts into the Planning and Development Act 2000 (as amended) i.e., Parts XA and XAB.

Part XA (inserted by section 57 of the Planning and Development (Amendment) Act 2010) deals with the issue of substitute consent. The concept of substitute consent derives from a European Court of Justice finding to the effect that permission for the retention of development affected by the EU Directive on Environmental Impact Assessment may be granted only in exceptional circumstances.

Section 177B: A planning authority may direct a person who has carried out development to apply to An Bord Pleanála for substitute consent in circumstances where it becomes aware of a court decision setting aside an existing planning permission in a case involving Environmental Impact Assessment, a determination as to whether or not EIA is required or a requirement for Appropriate Assessment under the EU Habitats Directive.

Section 177C: A person who has carried out development or an owner or occupier of land where development has been carried out in any case type referred to in the previous paragraph may apply to the Board for leave to apply for substitute consent where the person considers that the permission may be flawed, or the permission has been set aside by a court.

A person who has carried out development or the owner or occupier of the land, in any of the case types referred to in the note on section 177B, may apply to An Bord Pleanála for leave to apply for substitute consent where the person considers that exceptional circumstances arise which would justify such an application.

3.1.1 Introduction and Requirements for leave to apply for substitute consent:

The subject quarry at Maplestown, Rathvilly, Co. Carlow was granted permission for a 95,000 tonnes per annum facility by An Bord Pleanála ref 221741 on 24th July 2007. It had previously been granted permission by the planning authority Carlow County Council reference 06/842 subject to 16 conditions. This was appealed by third parties.

In the original application, permission was sought for 10 years of extraction in five phases. In granting permission, the Planning Authority granted permission for 6 years after which time the quarry was to be decommissioned. This issue is addressed in the Board Inspector's report section 10.8 where he states:

''*The subject application seeks permission for 10 years of extraction in 5 phases, based on an annual extraction rate of up to 100,000 tonnes. The application does not provide any break-down of the extent of extraction proposed within each phase. Condition no. 6 restricts the life of the permission to 6 years after which time the development shall be decommissioned. The condition does not require any amendment to the phasing of the development and is therefore understood that the permission relates to phases 1 – 3 inclusive. The basis for applying a six-year life is unclear, particularly as this would allow for development in closest proximity to*

adjoining houses, rather than phases 4 and 5, which would provide increased separation from, and give rise to reduced impacts on, adjoining residential properties.

As noted above, an increase in separation from adjoining residential properties is regarded as appropriate. While there is no objection to the proposed ten-year life of the permission, revisions to the phasing plan to provide 100m separation would reduce the extent of extraction somewhat. I would therefore recommend that a condition requiring a revised phasing be appended to any decision to grant permission in this instance.''

In recommending that permission be granted for the Development the Inspector recommended *inter alia* Condition 2 which requires that:

''*No extraction or processing activities shall be carried out within 100 metres of adjoining residential properties. Prior to the commencement of development, the extent of extraction activities and a revised phasing plan for the development in this regard shall be submitted to and agreed in writing with the planning authority''.*

In accepting the Inspector's recommendation to grant permission the Board adopted Condition 2 verbatim in its Decision:

Condition 2: No extraction or processing activities shall be carried out within 100 metres of adjoining residential properties. Prior to the commencement of development, the extent of extraction activities and a revised phasing plan for the development in this regard shall be submitted to and agreed in writing with the planning authority.

The Decision to Grant was silent on the Life of the Permission.

Therefore, the applicant believed that a 10-year permission had been granted. That the applicant could have reasonably believed that a 10-year permission had been granted is based on the following:

1. The applicant applied for a 10-year permission in the first instance
2. The planning authority addressed this in the original grant and restricted it to a 6-year permission
3. An Bord Pleanála's Inspector re-examined this decision of the planning authority and recommended a 10-year grant.
4. An Bord Pleanála's Inspector recommended a specific condition (Condition 2) to address this issue and the inconsistency in relation to the phasing plan by virtue of the 6-year timeline granted by the planning authority.
5. In accepting the Inspector's recommendation to grant the Decision to Grant included Condition 2 which was recommended for the purpose of a 10-year grant.
6. Otherwise, the Decision to Grant was silent on the lifetime of the permission.

As a result, the applicant believed that he had a 10-year permission and continued to operate past the 24th of July 2012, the expiry date of a -5year permission. At all times the applicant acted in good faith.

The ownership of the lands changed hands on 10th April 2019 and the new owner Mr. Mark Phelan was advised and was of the belief that planning permission for the quarrying activity was in place until 24th July 2019 with a further 90 days to wind down operations or to apply for additional consents.

In October 2019 Mick Smith Haulage and Sons Ltd at the request of the owner applied for permission to remediate the quarry with imported greenfield soil and stone as the quarry was coming to the end of extraction (Planning Reference 19/403). The remediation was to comply with Condition 17 of the Board's Decision to Grant, which required:

Condition 17: Restoration operations shall be carried out in a progressive manner throughout the life of the Development. One year prior to the cessation of extraction operations, a full final landscaping/restoration scheme shall be agreed with the planning authority and shall be implemented within two years of the cessation of extraction activities. No materials shall be imported onto the site for the purpose of site restoration unless a further grant of permission has been obtained.

During this process clarification was sought from the Board regarding the term relating to PL01.221741 extractive development at Maplestown, Co. Carlow by William J Smyth, Planning and Strategic Management Consultant to the Extractive Industry on behalf of the leaseholder Doyle Concrete (Hugginstown) Co. Kilkenny, who leased the land from Mr. Mark Phelan. This letter was dated 1st September 2019 and was stamped by the Board as received on 4th October 2019.

The Board responded in a letter dated 1st November that ''the duration of a permission is normally five years however if permission is granted for more than five years it is specified as a condition in the Board's Order.

Permission for this proposed development was subsequently refused by Carlow County Council on 4th December 2019 for 6 reasons which include *inter alia*:

1. The site of the proposed development comprises an operational quarry development the subject of previous permission reg. ref. 06/842 (An Bord Pleanála Ref. PL 01.221741), the appropriate period of which expired on 24th July 2012. For these reasons, the underlying quarry development comprising the site on which the proposed development would take place is not authorised. Accordingly, the proposed development would represent works to an unauthorised development, would consolidate and facilitate this unauthorised development, and therefore to permit the proposed development would set an undesirable precedent and would not be appropriate having regard to the proper planning and sustainable development of the area.

It is contended here that this reason for refusal is not valid and will be addressed later in this document. The main point here is that this was the first time the owner had any indication that the development (i.e., the quarry) did not have planning permission and was unauthorised.

Following on from this decision and the owner becoming aware that the activity does not have permission, the quarrying activity was subsequently ceased, and the only activity currently being carried out is the removal of stockpiled material from the site.

3.1.1.1 Part XA Section 177C of the Planning and Development Act 2000-2020

The applicant, Mr. Mark Phelan wishes to apply to An Bord Pleanála for Substitute Consent for the currently unauthorised quarry at Maplestown, Co. Carlow.

It should be noted here that following An Bord Pleanála's decision in case number PL27.249167 - Appeal by Austin Stephenson care of Declan Brassil and Company Limited of Lincoln House, Phoenix Street, Smithfield, Dublin against the decision made on the 4th day of August, 2017 by Carlow County Council to refuse permission to the said Austin Stephenson for the proposed development, it can be concluded that remediation of an unauthorised quarry, where quarrying has ceased is not consolidation of unauthorised development and can be permitted. However, it is deemed that the approach of seeking substitute consent for the unauthorised development and a future consent for proposed remediation development and consent for proposed additional quarrying makes for proper environmental assessment.

Does this case fulfil the criterial set out in Section 177D?

It is contended here that exceptional circumstance exist that will allow the Board to permit the applicant the opportunity to regularise the unauthorised development due to the confusion that existed until late 2019 regarding the duration of the permission.

In order to assist the Board in reaching a decision the following information is provided in relation to the criteria as set out in S. 177D (2):

(a)whether regularisation of the development concerned would circumvent the purpose and objectives of the Environmental Impact Directive or the Habitats Directive.

The unauthorised development is unauthorised by virtue of the time duration of a previously permitted development. This permitted development was accompanied by an Environmental Impact Statement (EIS) at application and appeal stage. As the original application was for a ten-year permission this EIS assessed the operation of the facility over a period of ten years (up to July 2020) and therefore it can be concluded that it has been assessed and there was no attempt to circumvent the Environmental Impact Assessment Directive and that the application for substitute consent will not circumvent the EIA Directive by virtue of the fact that all pre-existing and proposed activities will be environmentally assessed.

The requirement for "Appropriate Assessment" is set out in Articles 6(3) and 6(4) of the Habitats Directive (92/43/EEC). The Habitats Directive is transposed into Irish law by the European Communities (Birds and Natural Habitats) Regulations 2011 as amended (hereafter referred to as the Habitats Regulations).

European Sites are defined in Regulation 2(1) of the Habitats Regulations and comprise Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), at all stages of designation commencing with the Minister's notice of intention to designate. Regulation 42 of the Habitats Regulations requires the EPA to undertake Stage 1 Screening for Appropriate Assessment (AA) and where necessary Stage 2 Appropriate Assessment of any plan or project for which an application for consent is received.

While the requirement for Appropriate Assessment was a legal requirement before the Habitats Regulations it only became enforced by these Regulations and was therefore not supplied or sought by the planning authority or An Bord Pleanála in 2006 when this case was under consideration. Therefore, there was no issue of circumventing the requirements of the Habitats Directive. The proposed application affords an opportunity to carry out a screening

for Appropriate Assessment on the entire project and prepare a Natura Impact Statement if deemed necessary.

In summary by regularising the development the Board would not be assisting the applicant in circumventing the requirements of the EIA Directive or the Habitats Directive but would be enabling him to update the previous EIA (now EIAR) and allowing him to carry out an Appropriate Assessment.

(b)whether the applicant had or could reasonably have had a belief that the development was not authorised.

This is discussed in detail above where it has been demonstrated that the applicant believed that a ten-year permission was in place for the facility for the following reasons (repeated from above):

1. The applicant applied for a 10-year permission in the first instance
2. The planning authority addressed this in the original grant and restricted it to a 6-year permission
3. An Bord Pleanála's Inspector re-examined this decision of the planning authority and recommended a 10-year grant.
4. An Bord Pleanála's Inspector recommended a specific condition (Condition 2) to address this issue and the inconsistency in relation to the phasing plan by virtue of the 6-year timeline granted by the planning authority.
5. In accepting the Inspector's recommendation to grant the Decision to Grant included Condition 2 which was recommended for the purpose of a 10-year grant.
6. Otherwise, the Decision to Grant was silent on the lifetime of the permission.

The applicant became the owner in April 2019 and no issues with the planning were identified during this change of ownership. It is understood that the previous owner believed, in good faith, that a ten-year permission was in place for the facility. Therefore, the applicant/owner only became aware that the development was unauthorised following the receipt of the letter from An Bord Pleanála dated 1st November 2019 to his Consultant Mr. William Smyth and subsequent refusal of permission for remediation of the site by Carlow County Council dated 4th December 2019.

In view of the above it can be concluded that the applicant could not reasonably had a belief that the development was not authorised.

(c)whether the ability to carry out an assessment of the environmental impacts of the development for the purpose of an environmental impact assessment or appropriate assessment and to provide for public participation in such an assessment has been substantially impaired.

The original application (06/842 Carlow County Council and PL01.221741ABP) was accompanied by an EIS which assessed a ten-year operation of the facility. The Board's Inspector commented as follows:

''10.8.5 Adequacy of the EIS – The significant impacts of the proposed development are considered above and difficulties arising are identified. In addition, I note that section 10.0 of the copy of the Non-Technical Summary received – Noise, is blank. This would appear to be a

clerical error rather than a deficiency in the EIA process. The consideration of alternatives in the EIS is limited and those alternative sites, layouts or process, referred to in the document are not identified.

Notwithstanding the identified deficiencies in the document, I generally regard the EIS as being in compliance with the requirements of Article 94 of the 2001 Regulations and can be considered to be adequate.''

Given the above and given that a new EIAR (remedial) will be prepared as part of the application for substitute consent, it is not considered that the ability to carry out an assessment of the environmental impacts has been impaired.

In addition, the previous planning application and subsequent appeal of the decision to ABP received a number of submissions and observations from members of the public and these were taken into account by both the planning authority and the Board in making their decision. The Board's decision specifically referred to ''such matters included any submissions and observations received by it (the Board) in accordance with statutory provisions.

Therefore, the provision for public participation has not been *substantially impaired*.

There was no Appropriate Assessment carried out as it was not a requirement at the time. However, the proposed application for substitute consent will involve a Screening for Appropriate Assessment and if required a remedial NIS. This will allow for the assessment to be carried out and the appropriate public participation take place.

This will ensure that the provision for public participation in relation to the Habitats Directive will not have been *substantially impaired*.

(d)the actual or likely significant effects on the environment or adverse effects on the integrity of a European Site resulting from the carrying out or continuation of the development.

There are currently no known significant impacts on the environment or adverse effects on the integrity of a European Site as a result of the existing development. This was determined in the EIS originally submitted with the application in 2006. If leave to apply for substitute consent is granted by the Board this EIS will be used as a baseline and will provide valuable metrics upon which to base any remedial EIAR or assessment of future impacts.

In addition, the application for Substitute Consent will be accompanied by a Remedial NIS and that would be expected to confirm that the existing and proposed developments have had or will have no significant impact on a European Site.

(e)the extent to which significant effects on the environment or adverse effects on the integrity of a European site can be remediated.

There are no known significant effects on a European Site.

In order to identify potentially affected Natura 2000 sites using the guidelines set out by DEHLG (2009), the precautionary principle was adopted and all SPAs and SACs within a 15km distance radius of the proposed development were included in the zone of influence (ZOI). Natura 2000 sites located outside of this 15km radius are considered to be either one, or a combination, of the following; (a) located at such a distance to be beyond the influence of potential negative impacts associated with the proposed development; (b) separated by a

substantial marine buffer; (c) located within different surface water catchment zones to the proposed development; and/or (d) located at such a distance that the proposed development site is considered to be outside the natural range of any qualifying species.

No known effects have been identified as a result of the existing (now unauthorised) development. A full screening report and likely a remedialNIS will be carried out to identify if the historic activity, will or is likely to have a significant effect on a European site.

(f) whether the applicant has complied with previous planning permissions granted or has previously carried out an unauthorised development.

The applicant has no history of non-compliance with previous planning permissions and as previously stated he only acquired this property in 2018 and now wishes to regularise it.

(*g*) such other matters as the Board considers relevant.

All parties involved with this development acted in good faith in believing that the quarry development was authorised for a period of 10 years and that once they discovered that this was not the case, took steps to regularise it by having discussions with the Planning Authority who advised that they need to seek leave to apply for substitute consent from the Board. They also ceased quarrying operations and the only activity on site currently is the removal of previously quarried material.

The Board granted leave to apply for substitute consent under section 177D of the Planning and Development Act 2000, as amended, on 16th June 2021. Having regard to section 177C and 177D of the Act, as amended, as well as the planning history of the site, the Board considered is appropriate to consider an application from the applicant for the regularisation of the development by means of an application for substitute consent, with consideration to the following reasons.

- The development is one where an Environmental Impact Assessment and /or Appropriate Assessment are required and were carried out satisfactorily and no additional works have taken place that would require amendment or reconsideration or the Environmental Impact Assessment or Appropriate Assessment.
- The permission granted for a quarry under An Bord Pleanála appeal reference number PL 01.221741, subject to 25 number conditions, was sufficiently ambiguous that the owner had reasonable grounds for considering that the operations could extend beyond 10 years form the grant of permission, and that this constitutes exceptional circumstance to allow leave to apply for substitute consent.

It is furthermore considered that exceptional circumstances exist by reference, in particular, to the fact that:

- The regularisation of the development would not circumvent the purpose or objectives of the Environmental Impact Assessment Directive or of the Habitats Directive.
- The applicant could reasonably have had a belief that the development was not unauthorised; and
- The ability to carry out an Environmental Impact Assessment and Appropriate Assessment, and provide for public participation in such assessments, has not been substantially impaired

3.1.2 Regional Planning Guidelines

Regional Planning Guidelines (RPGs) were first adopted in March 2004 as a key implementation mechanism of the Government's overall framework for achieving more balanced regional development and more strategic physical and spatial planning. The RPG were developed directly from the Governments 2002 National Spatial Strategy (NSS). The principal function for RPGs is to link national strategic spatial planning policies to the planning process at City and County Council level by co-ordinating the Development Plans through the Regional Planning Guidelines. The current RPG's run from 2010 to 2022.

In terms of extractive industries, the RPG's state:

'Extractive industries are essential to the economy in terms of supply of aggregate materials for the construction sector, delivering transport infrastructure projects, and for the export market. There is, however, potential for conflict in the operation of these industries with wider environmental considerations. The role of the planning system is therefore to regulate, promote or control the exploitation of natural resources taking into account these other issues. Preventing and Recycling Waste – Delivering Change (March 2002) calls for the re-use or recycling of 85% Construction and Demolition (C and D) waste by 2013 and if achieved, this together with other national level sustainable development objectives, and a levelling off of construction activity, is likely to have a steadying influence on the rate of extraction of aggregates in the future.

In planning policy terms and in order to strategically plan for future needs, there is a need to take stock of existing aggregate resources and other valuable minerals/ores and identifying potential sources which have major deposits of regional and county importance. Local Authorities should engage with GSI, in so far as feasible, in mapping exercises designed to identify aggregate potential within their respective county and across a wider regional scale. Suitable protection measures for such sites should be considered to ensure their potential may be realised. Planning, heritage and environmental guidance together with legislative requirements should be used to frame policies for extractive industries. In assessing applications for extractive industries, considerations and impacts as they relate to the objectives of the Water Framework Directive (and therefore River Basin Management Plans) and other EU Directives (such as those regarding wildlife and habitats) should be central to the decision-making process. Secondary impacts such as increased HGV traffic on adjoining communities and screening are key issues, and the use of levies to compensate the surrounding areas through investment in local social and other infrastructure is supported'.

This project is consistent with these objectives as stated above and the purpose of this EIAR is to consider all environmental issues in this context.

3.1.3 Carlow County Development Plan 2015 - 2021

The Carlow County Council Development Plan is the statutory planning policy document for the County and sets out the policies and objectives for the proper planning and sustainable development of the County from 2015 to 2021. The Plan recognises that The County has a rich base of mineral resources which are of strategic importance to the local and regional economy and therefore outlines a specific policy to support and protect this resource.

E.D.- Policy 13

It is the policy of Carlow County Council to:

- Provide for quarry and extractive development where it can be demonstrated that the development would not result in a reduction of the visual amenity of designated scenic area, to residential amenities or give rise to potential damage to areas of scientific, geological, botanical, zoological and other natural significance including all designated European Sites
- Ensure compliance with the overall objectives of the Water Framework Directive in the context of quarries, mining and extractive development.

The Development directly supported this policy and helped to achieve the objectives outlined in the Development Plan as developed the natural resource while at the same time protecting the environment. The Plan outlines factors that should be considered in assessing an application for development (whether for a new or extension to an existing quarry or mine). These factors include:

Developments, including associated processes, which would have a negative impact on existing / established rights of ways, walking routes or tourist, natural or recreational amenities will not be looked upon favourably

- Nature and quantity of aggregate(s) to be extracted, including total and annual tonnage of excavated aggregate(s)
- Location – relative to dwellings or other developments, aquifers and groundwater
- Environmentally sensitive areas, protected structures, special amenity areas and areas of archaeological potential
- Impact on the environment, agriculture, tourism, recreational activities in the area, landscape and residential amenities
- Noise generation and control
- Dust generation and control
- Impact on water table: minimisation of disturbance to the existing surface and subsurface hydrological regime shall be ensured on site and in proximity to the quarry
- Ecology: due consideration shall also be given to sites of ecological value and designated species which lie outside designated sites
- Transportation arrangements for products and road network in the area
- Effects on amenity of the area and in particular residential, visual amenity
- Natural and proposed screening of site
- Restoration and aftercare with particular emphasis on protecting and facilitating biodiversity.

This rEIAR will assess the above factors in detail.

3.2 The EIA Directive

The EIA Directive (85/337/EEC) is in force since 1985 and applies to a wide range of defined public and private projects. The EIA Directive was amended in 1997, 2003, 2009, 2011 and 2014 by Directives 97/11/EC; 2003/35/EC, 2009/31/EC, 2011/92/EU and 2014/52/EU. The EIA Directive requires environmental impact assessments to be carried out for certain projects as listed in Annex I of the Directive. The EIA Directive, and amendments, are transposed into Irish law through the Planning and Development Acts 1996 to 2019 in particular S.I. No. 296 of 2018.

Draft "*Guidelines on the Information to be contained in Environmental Impact Assessment Reports"* published by the Environmental Protection Agency (EPA) in August 2017 detail the key changes made by the amended 2014 EIA Directive. This document has also been used in the preparation of this rEIAR. In August 2018 the Department of Housing, Planning and Local Government published a document entitled '*Guidelines for Planning Authorities and An Bord Pleanála*' on carrying out Environmental Impact Assessment. That document has also been used in the preparation of this rEIAR.

The Revised EIA Directive defines EIA as a process. Article 1(2) (g) states that EIA means:

"(i) the preparation of an environmental impact assessment report by the developer, as referred to in Article 5(1) and (2).

(ii) the carrying out of consultations as referred to in Article 6 and, where relevant, Article 7.

(iii) the examination by the competent authority of the information presented in the environmental impact assessment report and any supplementary information provided, where necessary, by the developer in accordance with Article 5(3), and any relevant information received through the consultations under Articles 6 and 7.

(iv) the reasoned conclusion by the competent authority on the significant effects of the project on the environment, taking into account the results of the examination referred to in point

(iii) and, where appropriate, its own supplementary examination; and

(v) the integration of the competent authority's reasoned conclusion into any of the decisions referred to in Article 8a".

The Revised EIA Directive requires the EIA to identify, describe and assess, in an appropriate manner and in light of each individual case, the direct and indirect significant effects of the Proposed Development on factors of the environment including:

(a) population and human health.
(b) biodiversity, with particular attention to species and habitats protected under the Habitats and Birds Directives.
(c) land, soil, water, air and climate.
(d) material assets, cultural heritage and the landscape.
(e) the interaction between the factors referred to in points (a) to (d).

The requirements of the Revised EIA Directive in relation to each chapter are addressed in this rEIAR as follows.

- Chapter 2: Description of Development and Consideration of Alternative Developments
- Chapter 3: Planning and Policy Context
- Chapter 4: Population and Human Health
- Chapter 5: Biodiversity.
- Chapter 6: Land and Soils.
- Chapter 7: Hydrology.

- Chapter 8: Air Quality and Climate.
- Chapter 9: Noise and Vibration.
- Chapter 10: Landscape and Visual Amenity.
- Chapter 11: Archaeology and Cultural Heritage.
- Chapter 12: Material Assets including Traffic.
- Chapter 13: Risk Management.
- Chapter 14: Interactions.
- Chapter 15: Mitigation and Monitoring Measures

4 POPULATION AND HUMAN HEALTH

4.1 Introduction

This chapter of the (remedial) Environmental Impact Assessment Report (rEIAR) considers the potential effects of the Historic Development on human beings, living, working and visiting in the vicinity of the site of the Unauthorised Development at the Townland of Maplestown, in the Electoral Division of Rahill County Carlow.

The Site of the Proposed Development currently consists of an existing sand and gravel quarry. This was extended beyond the permitted timeframe and therefore Substitute Consent is required. This (r)EIAR assesses the following:

- Application to An Bord Pleanála for Substitute Consent for the currently unauthorised use of the quarry at Maplestown, Co. Carlow over and above what was permitted by Planning Reference PL01.221741.
- .

The aim of this Chapter is to retrospectively assess the Population and Human Health impacts of unauthorised extraction activities which took place after 2012. Secondly, this chapter aims to assess the existing baseline Population & Human Health conditions of the surrounding environment for the Unauthorised Development, in order to determine if any significant impacts have arisen as a result of the Unauthorised Development and highlight any potential direct and indirect effects of the Unauthorised Development on population and human health.

Human beings are one of the most significant elements of the environment to be considered, therefore any potential impact on the status of human beings by a development proposal must be comprehensively addressed. One of the principal concerns in any development is that the local population experiences no reduction in the quality of life as a result of the development on either a permanent or temporary basis. This chapter also examines the socio-economic impacts of the Unauthorised Development focusing on pertinent issues such as residential amenity, economic activity, tourism, population levels, and agriculture.

The section on Population and Human Health is broad ranging and covers the existence, wellbeing, and activities of people through the format of considering people as ‘groups’ or ‘populations’. The assessment of impacts on human beings involves the identification of relevant key populations that may be affected by the proposal and quantifiable documentary research.

Key populations have been identified as persons residing and engaging in activities near the development site, persons with a stake in the general economy of the local and regional area, and persons enjoying the recreational and cultural amenities of the area.

4.2 Study Methodology

4.2.1 Scope of the Evaluation

A desk-based study was undertaken to assess information regarding population, age structure, economic activity, employment and unemployment within the vicinity of the Unauthorised Development.

The original Environmental Impact Statement (EIS) completed in 2006 by EssGee Consultants for the original quarry development was also reviewed and assessed as part of the desk-based study.

The scope of the evaluation is based on a review of data available from the Central Statistics Office (CSO), legislation, guidance documents and other relevant EIARs. The aim of the study was to assess the historical and current population environment.

The potential impact of the Historic Development on the local population is assessed in this rEIAR in relation to:

- Population;
- Settlement patterns;
- Socio Economic impacts;
- Tourism and Amenity;
- Air quality;
- Water;
- Noise; and
- Traffic.

4.2.2 Information Sources

The principal sources of information are as follows;

- Environmental Impact Statement completed in 2006 by EssGee Consultants for the original quarry development.
- Census and employment information published by the Central Statistics Office (CSO). Available at https://www.cso.ie/en/databases/
- Carlow Town Biodiversity Strategy & Action Plan 2021-2025
- The Carlow County Development Plan 2015 - 2021
- Rathvilly Local Area Plan 2010 - 2016
- Regional Planning Guidelines of the Greater Dublin Area 2010-2022, and
- Ordinance Survey Ireland (OSI) mapping and aerial photography.

In line with the EPA Guidelines (EPA, 2017), the following terms are defined when quantifying the quality of effects. See table 4.1.

Table 3-1: Definition of Quality of Effects.

Quality	Definition
Positive Effects	A change which improves the quality of the environment
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
Negative/adverse Effects	A change which reduces the quality of the environment

In line with the EPA Guidelines (EPA, 2017), the following terms are defined when quantifying the significance of impacts. See Table 4.2.

Table 3-2: Definition of Significance of Effects

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

In line with the EPA Guidelines (EPA, 2017), the following terms are defined when quantifying duration and frequency of effects. See Table 4.3.

Table 3-3: Definition of Duration of Effects

Quality	Definition
Momentary Effects	Effects lasting from seconds to minutes
Brief Effects	Effects lasting less than a day
Temporary Effects	Effects lasting less than a year
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years
Permanent Effects	Effects lasting over sixty years
Reversible Effects	Effects that can be undone, for example through remediation or restoration

4.3 The Existing and Receiving Environment (Baseline Situation)

The Site consists of a rural farm property in Maplestown, Co. Carlow. The townland of Maplestown is located in the northern part of Co. Carlow bordering Co. Kildare and Co. Wicklow. It is located approximately 5 km northwest of the town of Rathvilly, Co. Carlow, and 4.5 km southwest of Baltinglass, Co. Wicklow. The larger urban centres of Carlow Town, Co. Carlow and Naas, Co. Kildare are situated approximately 15 km and 35 km away, respectively. The sites are bound to the west by a country road (L-8097), and to the South, East and North by agricultural lands. The surrounding land use is predominantly rural agricultural land uses including livestock and arable farming, as well as forestry plantation. A small stream lies approximately 0.07 km to the South of the Sites and a broadleaf birch dominated woodland lies to the West of the Sites. The surrounding landscape is undulating, characterised by low ridges and knolls. The overall Site size is approximately 15.21 hectares and it currently consists of an existing sand and gravel quarry and surrounding agricultural grassland with several private dwellings also occurring within the vicinity.

Key populations potentially affected by the unauthorised quarry have been identified and assessed as part of the EIS which was compiled for the original quarry. The assessment on Population and Human Health, prepared by Tom Phillips + Associates in 2004, established the key issues affecting human beings and considered what potential impacts the proposed quarry could have on them.

The land surrounding the Unauthorised Development site was historically and remains to be predominantly agricultural in nature with a number of quarries also present in the area. See Figure 4-1 and 4-2 for site location and layout.

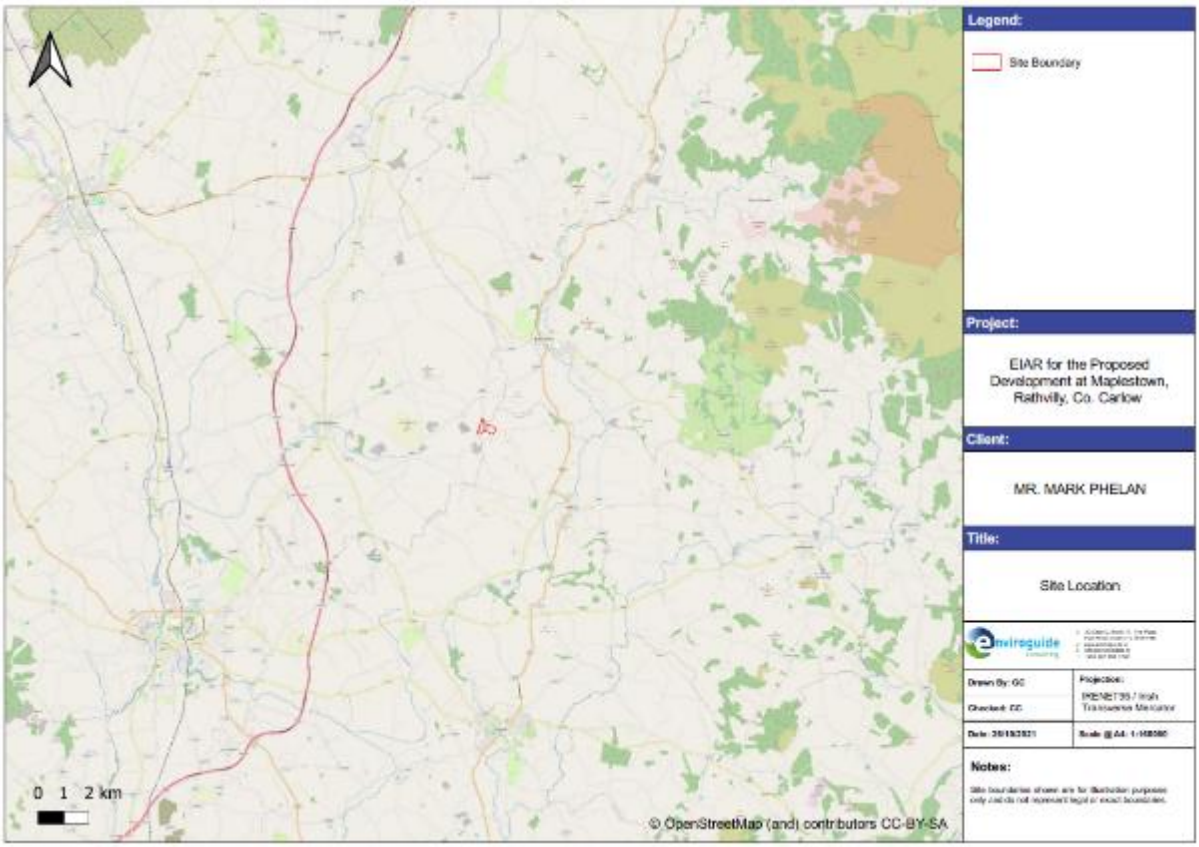


Figure 3-1: Location of the Development

Figure 3-2: Site Layout

4.3.1 The Unauthorised Development

The overall Site area is 15.21 hectares (ha) which contains an area of land which was quarried and infilled outside of the granted planning permission period (4.18 ha) for which substitute consent is being sought. The townland of Maplestown is located in the northern part of Co. Carlow bordering Co. Kildare and Co. Wicklow. The Site was bound to the West by a country road (L-8097), and to the South, East and North by agricultural lands.

The surrounding land use was predominantly rural agricultural land use including livestock and arable farming, as well as forestry plantation. A small stream lies in the South of the property and a broadleaf birch dominated woodland lies to the West of the property. The surrounding landscape was undulating, characterised by low ridges and knolls.

The landcover was predominately permanent pasture. Field patterns were irregular with boundaries defined by ditches or hedgerow belts. Residential properties in the vicinity of the Site of the Historic Development were primarily concentrated along the L-8097 to the West of the site. There were some 8 dwellings (including the landowners), a school and a hall within ¼ km of the site boundary. The 2 dwellings nearest to the proposed extraction area were each approximately 38 m from the western boundary of the site and 62m of the proposed extraction area. The next nearest dwellings were 24 m and 36 m from the Site boundary and 96 m and 185 m from the proposed extraction area respectively. The landowner's house was 91 m from the site boundary and 101 m from the proposed extraction area. All other dwellings were in excess of 220 m from the site boundary. The School and the Hall were 209 m and 225 m from the site boundary and 281 m and 287 m from the proposed extraction area, respectively.

4.4 Characteristics of the Development

The applicant, Mr. Mark Phelan wishes to apply to An Bord Pleanála for Substitute Consent for the currently unauthorised quarry at Maplestown, Co. Carlow.

The existing development entailed the development and operation of a sand and gravel pit in the Townland of Maplestown and its environs in the northern part of County Carlow, located off County Road L-8097. The pit had a proposed lifespan of ten years. It should be noted that while permission was only granted for 5 years a 10-year lifespan was assessed in the Essgee EIS.

The proposed hours of operation of the pit were as follows:

Monday to Friday (excluding Bank Holidays) 08:00 - 18:00hrs

Saturday 08:00 - 13:00hrs

Sunday Closed

The proposed hours of transport of sand and gravel products off-site were as follows:

Monday to Friday (excluding Bank Holidays) 07:00 - 18:00hrs

Saturday 07:00 - 13:00hrs

Sunday Closed

The following equipment was proposed to be used for the excavation and stockpiling of aggregate and for the stripping and stockpiling of topsoil and overburden:

- excavator
- aggregate processing plant (8 x 4 dry screener and lOx 5 washing/rinsing plant)
- 2 dump trucks, (25 tonne) or equivalent
- tracked dozer/loader

Staffing requirements included 3 part-time staff for topsoil stripping (which is proposed to occur 1 - 2 times annually for ten years); one permanent and one-part time staff for normal operations (proposed to last ten years); and the employment of a transport company making an average of 12 - 16 daily collections during a full operating day.

4.4.1.1 Population and Demographic Analysis

The original Environmental Impact Statement (EIS) completed in 2004 by EssGee Consultants for the original quarry development defined the District Electoral Divisions (DEDs) of Rahill and Rathvilly as the Primary Study Areas of the existing quarry. The study area was identified having regard to both data availability and the location of the subject site.

Based on census data, 1093 persons resided in the Study Area in 2002. Approximately 46% (500) of persons in the area resided in the village of Rathvilly including a part located in the Rahill ED. The remaining residents in the area (approximately 422 residents in 168 house-holds) lived in rural one-off houses and farmhouses throughout the area. 7 no. of these houses were located within 0.25 km of the subject site.

Compared to the State and the County as a whole, the Study Area had a higher proportion of persons over 65+ and a lower proportion of persons 14 and younger. This was a typical pattern across North Carlow as compared to the southern part of the County, where there were more young families living within commuting distance of Dublin. The significantly higher proportion of persons aged 65+ in the Study Area resulted in a higher dependency rate for the Study Area (35%) compared to the County (32%) and the State (32%) as a whole. The higher-than average number of empty nesters and retirees also contributed to a smaller-than average household size, 2.90 in 2002 for the Study Area compared to 3.0 and 2.94 for the County and State as a whole, respectively.

From 1996 to 2002 the Study Area experienced population growth, growing at annual rate of 2% and gaining 82 new residents. This rate of growth was significantly higher than that experienced by both the Baltinglass No.2 Rural District (1.1%), and by the County as a whole (1.76%). Based on estimated net migration rates and settlement policies as established in the County Development Plan, more than moderate population growth was expected in the Study Area over the medium term.

4.4.1.2 Economic Activity & Employment

In 2002 the Study Area had a labour participation rate of 50.07%, slightly below the participation rates of the County (51.01%) and the State (53.13%) as a whole. The lower participation rate was deemed to be a result of both the higher percentage of persons engaged

in "household duties" (16.81% in the Study Area compared to 15.42% and 14.21% in the state and County and State, respectively) and the slightly higher percentage of retirees (10.9% in the Study Area compared to 10.0.2% and 10.8% in the County and State, respectively). It should also be noted that the Study Area had a very low rate of unemployment (4.55%) both on an absolute scale and relative to the County and State as a whole.

The Study Area's economy strong agricultural base was evident in 2002 census data. Whereas agriculture accounted for less than 6% of the State's employment in 2002, some 22% of working residents in the Study Area were employed in the agricultural sector. Correspondingly, a significantly lower percentage of the working population was employed in industry (14% in the Study Area, compared to 25% in the state as a whole).

4.4.1.3 However, agriculture's declining role was also evident upon examining the shifts in employment by sector that occurred between 1996 and 2002. The number of Study Area residents employed in the agricultural sector between 1996 and 2002 decreased by 28%, while the number employed in building and construction, commerce, and sectors classified as "other" increased markedly. In addition to declines in the agricultural sector there was also a noticeable decline in the number of residents employed in the professional services sector. ***Travel and Commuting***

4.4.1.4 The original EIS stated that there were no major employers within the Study Area. Census data indicated that 17% of residents in the Study Area travelled at least 48 km to work in 2002, three times the percentage (5%) making the same journey in 1996.***Tourism and Amenities***

The original EIS stated that although tourism played some role in the local economy of the area, it was not as significant in the study area as it was in other parts of the County. The primary attraction in the immediate area was Lisnevagh House, a gothic revival house west of Rathvilly village. Based on the area's location west of the scenic Wicklow Mountains, tourist activities in the areas focused on outdoor pursuits, including angling, shooting, and hillwalking. There were no designated walks in close proximity to the subject site; the Wicklow Way lies 11 km east of the site. The Echo Equestrian Centre at Rahill provided a riding centre with 18 stables situated on 48 acres, catering for both adults and children.

4.4.1.5 Landscape and Visual

The setting of the Development was predominantly rural with surrounding land uses of agriculture and residential dwellings. The landscape is predominantly rolling pastureland. Field patterns were irregular with boundaries defined by ditches or hedgerow belts.

Residential properties in the vicinity of the Site of the Historic Development were primarily concentrated along the L-8097 to the West of the site. There were some 8 dwellings (including the landowners), a school and a hall within ¼ km of the site boundary. The 2 dwellings nearest to the proposed extraction area were each approximately 38 m from the western boundary of the site and 62m of the proposed extraction area. The next nearest dwellings were 24 m and 36 m from the Site boundary and 96 m and 185 m from the proposed extraction area respectively. The landowner’s house was 91 m from the site boundary and 101 m from the proposed extraction area. All other dwellings were in excess of 220 m from the site boundary.

The School and the Hall were 209 m and 225 m from the site boundary and 281 m and 287 m from the proposed extraction area, respectively.

The impacts on the visual amenity of the surrounding area are not likely to be significant (refer to Chapter 10 Landscape and Visual of this EIAR for a more detailed discussion of the visual impact of the Development).

4.4.2 Current Population and Demographic Analysis

The current population and demography have been assessed using the CSO data from 2016 Census. The presentation of the demographic analysis is intended to provide statistical information on the population after the unauthorised activities took place, i.e., from 2012 onwards. This up-to-date population data is detailed in Sections 4.4.2.1 to 4.4.2.8 below.

In terms of the County, Region and the State, population structure and change are more strongly influenced by migration and emigration rates than by birth and death rates. The mid to late 1980s in Ireland was a period of heavy population outflow, mainly due to the poor economic and employment situation in the country at that time. The most recent population estimates (April 2017) published by the Central Statistics Office (CSO) indicate that the combination of a net inward migration and high birth rates have resulted in the largest annual population increase since 2008. Population projections for Ireland up to 2046 anticipate a population of approximately five million under the most pessimistic scenario and over 6.7 million under the most optimistic scenario. Population projections for Northern Ireland up to 2034 anticipate a population of approximately two million.

The Development site is situated in Co. Carlow, with Baltinglass, Co. Wicklow identified as the closest large town. CSO data for 2016 was available and used for Co. Carlow and Baltinglass, Co. Wicklow respectively.

According to Census 2016, the total population of Co. Carlow is 56,932.

- Between 2006 and 2016 the population increased by 6,583 or 13.1% compared to an average for the State of 12.3%.
- Relatively speaking, there are high levels of young people and fewer older people in Carlow as detailed in Table 4-4 below.

4.4.2.1 Population and Age

CSO data for 2016, recorded 56,932 persons in living in Co. Carlow and 2,137 persons living in Baltinglass, the closest town to the Development.

Table 4-4 shows the breakdown of the population of Baltinglass based on their age range during the 2016 Census against the Carlow County and State average. This table is further broken down into percentages of the population within these age ranges.

Table 3-4: Town, County and National Population Categorisation by Age

Age Range	Town (Baltinglass)		County Carlow		Ireland	
	No. of People	% Of Peo-ple	No. of People	% Of People	No. of Peo-ple	% Of People
0-4 years	142	6.6	4,056	7.1	331,515	7
5-24 years	638	29.9	15,565	27.3	1,251,489	26.3
25-34 years	274	12.8	7,524	13.2	659,410	13.8
35-44 years	342	16.0	8,795	15.4	746,881	15.7
45-54 years	302	14.1	7,525	13.2	626,045	13.1
55-64 years	184	8.6	6,110	10.7	508,958	10.7
65-74 years	139	6.5	4,355	7.6	373,508	7.8
75 years and over	116	5.4	3,002	5.3	264,059	5.5
Total	**2,137**		**56,932**		**4,761,865**	

As evident from Table 4-4, the population of Baltinglass is comparable to the demographic age profile of Carlow and Ireland. The largest portion of the population ranges between 5 to 24 years in the town of Baltinglass (29.9% in total). 5.4% of the population in Baltinglass are over 75 years whilst 5.3% of the population of Carlow County are over 75. This is comparable to the State average of 5.5% of over 75 years old. Children ranging from 0-4 years in the town of Baltinglass comprise 6.6%, slightly lower than the State average of 7%. Young people ranging from 25-34 years make up 12.8% of the population of Baltinglass, slightly lower than the national average of 13.8%.

4.4.2.2 Economic Activity & Employment

The labour force is defined by number of people above the legal working age that are available to work. The labour force participation rate is the number of people who are employed and unemployed but looking for a job, divided by the total working-age population.

In 2016, there were 2,304,037 persons in the labour force in Ireland. This represented an increase of 71,834 (3.2%) on 2011 statistics. The substantial increase in retired persons (up 19.2% to 545,407) has impacted on the labour force participation rate, which fell to 61.4%. Table 4-5 shows the percentage of the total population aged 15+ who were in the labour force during the 2016 Census. This figure is further broken down into the percentages that were at work or unemployed. It also shows the percentage of the total population aged 15+ who were not in the labour force, i.e., those who were students, retired, unable to work or performing home duties.

Table 3-5: Economic Status of the Population Aged 15+ in 2016 (Source: CSO)

	Status	Baltinglass		Carlow		Ireland	
% Of population aged 15+ who are in the labour force		**No. of People**	**% Of People**	**No. of People**	**% Of People**	**No. of People**	**% Of People**
% Of which are:	Employer or own account worker	103	6.3	3,669	8.3	313,404	8.3
	Employee	680	41.6	18,251	41.2	1,688,549	45.0
	Unemployed looking for first regular job	20	1.2	434	1.0	31,434	0.8
	Unemployed having lost or given up previous job	192	11.7	4,073	9.2	265,962	7.1
	Assisting relative	1	0.1	53	0.1	4,688	0.1
Total population aged 15+ who are in the labour force		**996**	**60.9**	**26,480**	**59.7**	**2,304,037**	**61.4**
% Of population aged 15+ who are not in the labour force		**No. of People**	**% Of People**	**No. of People**	**% Of People**	**No. of People**	**% Of People**
% Of which are:	Student or pupil	192	11.7	5,077	11.5	427,128	11.4
	Looking after home/family	164	10.0	4,111	9.3	305,556	8.1
	Retired	205	12.5	6,043	13.6	545,407	14.5
	Unable to work due to permanent sickness or disability	71	4.3	2,467	5.6	158,348	4.2
	Other economic status	8	0.5	143	0.3	14,837	0.4
Total of population aged 15+ who are not in the labour force		**640**	**39.1**	**17,841**	**40.3**	**1,451,276**	**38.6**

When assessing the percentage of people in the labour force, it is noted that 60.9% of the population in the Baltinglass area are in the labour force. This reflects a high number of people of a working profile living within the area. This is comparable to the national percentage of 61.4%. The percentage of people in the labour force in County Carlow (59.7%) is also comparable to the national percentage of 61.4%.

The percentage of people who are retired in the Baltinglass area is 12.5% which is lower than the percentage for the State of 14.5%. The percentage of people in the Baltinglass area that are unable to work due to permanent sickness or disability is 4.3% which is similar to the percentage for the State of 4.2%.

Table 4-6 below shows the number of people based in County Carlow that are over the age of 15 years and have received a third level education and what area of study that qualification is in.

Table 3-6: Population Aged 15 Years and Over with a Third Level Qualification in County Carlow (Source CSO Census 2016)

Population Aged 15 Years and Over with a Third Level Qualification in Co. Carlow	No. of People
Social sciences, business and law	3,507
Engineering, manufacturing and construction	2,573
Health and welfare	2,023
Education	1,398
Science, mathematics and computing	1,120
Services (incl. other subjects)	970
Not stated (including unknown)	705
Agriculture and veterinary	668
Humanities	550
Arts	477
Total persons	13,991

Table 4-7 below shows the broad range of industries that people in the Baltinglass area are employed in according to the 2016 Census figures.

Table 3-7: Population Aged 15+ in the Labour Force Baltinglass by Broad Industrial Group (Source CSO 2016)

Broad Industrial Group of Employment in Baltinglass	Total No. of People
Total in labour force	996
Unemployed, having lost or given up previous job	192
Wholesale and retail trade; repair of motor vehicles and motorcycles	113
Industry not stated	75
Human health and social work activities	73
Manufacturing	71
Construction	50
Education	50
Accommodation and food service activities	47
Professional, scientific and technical activities	46
Public administration and defence; compulsory social security	44
Agriculture, forestry and fishing	38
Transportation and storage	38
Other service activities	32

Broad Industrial Group of Employment in Baltinglass	Total No. of People
Administrative and support service activities	30
Financial and insurance activities	22
Information and communication	22
Unemployed looking for first regular job	20
Arts, entertainment and recreation	13
Electricity, gas, steam and air conditioning supply	7
Real estate activities	5
Water supply; sewerage, waste management and remediation activities	5
Mining and quarrying	2
Activities of extraterritorial organisations and bodies	1
Activities of households as employers producing activities of households for own use	0

Table 4-5 and 4-7 above show that 20 people based in Baltinglass and 434 people in County Carlow are looking for their first job. In addition to this Tables 4-5 and 4-7 shows that 192 people based in Baltinglass and 4,073 people based in County Carlow are unemployed having lost or given up their previous job.

The most recent publication of monthly unemployment statistics was issued by the CSO in October 2021 for reference month September 2021. The monthly unemployment release contains a series of monthly unemployment rates and volumes. These series are based primarily on the Labour Force Survey and are compiled in accordance with agreed international practice. These statistics are the definitive measure of monthly unemployment. The Live Register is used to provide a monthly series of the numbers of people (with some exceptions) registering for Jobseekers Benefit or Jobseekers Allowance or for various other statutory entitlements at local offices of the Department of Social Protection. The most recent information available from the CSO from September 2021 records 1,623 people on the Live Register in the Co. Carlow and 972 people on the Live Register in Wicklow Town (Wicklow Town Social Welfare Office includes catchment of Wicklow Town, Rathdrum, Rathnew, Ashford, Glenealy and Glendalough).

Table 3-8: Number of People on Live Register in September 2021

Number of Persons on Live Register, May 2020	County	Social Welfare Office
	Carlow	Wicklow Town*
		*(The Wicklow Social Welfare Office covers the following areas: Wicklow, Rathdrum, Rathnew, Ashford, Glenealy, Glendalough)
Both sexes	1,623	972
Male	917	558
Female	706	414

As with employment, the number of persons in the labour force is also influenced by changes in the size of the working age population (demographic effect). Up to the start of 2008 this demographic effect had been adding at least 30,000 to the labour force, nationally, on an annual basis, primarily driven by net inward migration. The decline in inward migration saw the positive demographic effect starting to fall in the second half of 2007. Inward migration continued to decline throughout 2008 and 2009 before becoming negative in Q3 2009. The negative demographic effect continued for each quarter until Q1 2014. The demographic effect has been positive since Q2 2014 and in Q1 2019 a positive demographic effect contributed an increase of 36,000 to the overall change in the labour force nationally.

The Development will allow for the creation of direct employment. It is proposed that 6 jobs will be created during the Operational Phase of this development having a positive impact, both directly and indirectly to the local economy and employment.

4.4.2.3 Travel and Commuting

Tables 4-10 and 4-11 below show commuter information from Baltinglass, the closest town to the Development, including duration of commute, time of commute and means of transport.

Table 3-9: Duration of Commute from Baltinglass (Source CSO Census 2016)

Duration of Travel Times	No. of People (Total)	No. of children at school aged between 5 and 12 years	No. of students at school or college aged be-tween 13 and 18 years	No. of students at school or college aged 19 years and over	No. of People aged 15 years and over at work
< ¼ hour	598	226	154	12	206
¼ hour - < ½ hour	152	29	25	6	92
½ hour - < ¾ hour	140	4	10	18	108
¾ hour - < 1 hour	85	0	2	6	77
1 hour - < 1½ hours	174	1	9	10	154
1½ hours and over	60	0	0	7	53
Not stated	95	20	8	4	63

Table 4-10 shows that 598 people (45.9% of people) travel for less than 15 minutes on their commute to school or work. A total of 152 people (11.7% of people) travel between 15 minutes and 30 minutes and the remaining 459 people (35.2% of people) travel for longer than 30 minutes on their commute to work or school.

Table 3-10: Time Leaving Home, Baltinglass (Source CSO Census 2016)

Time of Travel	No. of People (Total)	No. of children at school aged between 5 and 12 years	No. of students at school or college aged between 13 and 18 years	No. of students at school or college aged 19 years and over	No. of people aged 15 years and over at work
Before 06:30	134	0	4	5	125
06:30 - 07:00	129	1	1	3	124
07:01 - 07:30	83	2	2	3	76
07:31 - 08:00	165	10	11	18	126
08:01 - 08:30	136	10	46	8	72
08:31 - 09:00	439	209	136	17	77
09:01 - 09:30	89	29	4	6	50
After 09:30	64	0	0	1	63
Not stated	65	19	4	2	40
*Excludes those who work mainly at or from home					

The majority of people (33.7% of people) leave home to travel to school or work between 8:31 and 09:00. A total of 511 people (39.2% of people) leave home before 08:00. A further 136 people (10.4% of people) leave home between 08:01 and 08:30.

Table 3-11: Means of Travel from Baltinglass (Source CSO Census 2016)

Means of Travel	Total Number of People	No. of children at school aged between 5 and 12 years	No. of students at school or college aged between 13 and 18 years	No. of students at school or college aged 19 years and over	No. of people aged 15 years and over at work
Motor car: Driver	516	0	1	28	487
On foot	416	174	146	10	86
Motor car: Passen-ger	169	90	39	9	31
Van	75	0	1	0	74
Not stated	58	15	7	1	35
Bus, minibus or coach	53	1	12	13	27
Work mainly at or from home	24	0	0	1	23
Bicycle	9	0	1	0	8
Other, incl. lorry	4	0	0	1	3
Motorcycle or scooter	2	0	0	0	2
Train, DART or LUAS	2	0	1	1	0

Means of Travel	Total Number of People	No. of children at school aged between 5 and 12 years	No. of students at school or college aged between 13 and 18 years	No. of students at school or college aged 19 years and over	No. of people aged 15 years and over at work
Total	**1,328**	**280**	**208**	**64**	**776**

Table 4-12 shows that car is the most popular means of transport.

This Unauthorised Development employed people directly and indirectly during the operational phase in the Baltinglass area. Even though there is a high level of employment in the area, the Historic and Unauthorised Development created more local jobs which will resulted in a negligible impact on commuter flows.

4.4.2.4 Tourism and Amenities

The scenic and natural landscape coupled with the rich cultural heritage places County Carlow as an attractive location for recreation and tourism. The range of country roads and winding lanes, of towpaths and waterways, of mountain trails and forest tracks, scenic landscapes, vast woodlands, recreational amenities, and tourism attractions are important for both the social and economic well-being of the county. The River Barrow and the Blackstairs Mountains are the cornerstone natural outdoor recreation resources in County Carlow, and they are complemented by a variety of forests, rivers, farmland and urban green and blue spaces throughout the county. Other sites such as the proposed adventure hub in Carlow town and the five outdoor recreation nodes are also valuable outdoor recreation development opportunities.

The Unauthorised Development site also borders with Co. Wicklow. Tourism and recreation make a positive contribution to the economic and social wellbeing of County Wicklow. In 2013, income from tourists and visitors to Wicklow was in the region of €105m, with over 65% of this income coming from overseas visitors. The increase in income from domestic visitors rose by over 15% between 2010 and 2014, the highest rate of increase in the region. Wicklow is also a particularly attractive location for day-trippers from the city and surrounding areas.

Fáilte Ireland, the national tourism development authority, aims to guide and promote tourism as a leading indigenous component of the Irish economy. Its current strategy for Wicklow is encompassed in the 'Ireland's Ancient East' programme. This programme presents a significant opportunity for Wicklow to promote and harness the potential of cultural tourism.

According to Fáilte Ireland's Survey of Visitor Attractions, Glendalough, which attracted 732,824 visitors in 2018, was third on Ireland's top ten 'free to enter' attractions for 2018. Powerscourt House Gardens and Waterfall were ninth on the top ten fee-charging attractions during 2018 attracting a total of 472,523 visitors.

Maplestown and the local area have important historical attractions that provide amenities and tourism interest in the area which includes Humewood Castle, Baltinglass Abbey, Baltinglass Hill and Wicklow Mountains.

A full assessment of the retrospective impact of the Development on the heritage sites and surrounding areas is carried out under Chapter 10 (Landscape and Visual) and Chapter 11 (Archaeology and Cultural Heritage) of the EIA Report.t.

4.4.2.5 Landscape and Visual

The setting of the Unauthorised Development is predominantly rural with surrounding land uses of agriculture, forestry and one-off housing and farm properties. The landscape is predominantly rolling pastureland, and areas of forestry. The site is predominately agricultural grassland with an arable crop planted within the field on the western side. Field patterns are irregular with boundaries defined by ditches or hedgerow belts. The physical pattern and scale of the landscape is largely influenced by the presence of Humewood Castle and Highpark demesnes with their extensive tracts of woodland. Linear belts of woodland extend beyond the current boundaries of the estates and give an overall enclosed wooded character to the area. The closest settlements, Kiltegan Village, can be found approximately 2km to the south-west of the Site. The Development is shielded from view by undulating landform and landcover tend to enclose views.

Access to the site is provided via a private road running along the western boundary with the entrance located on the northern boundary. There are two residential properties beyond the north boundary of the pit associated with the existing farm and a cluster of farm buildings in the northwest corner.

4.4.2.6 The retrospective and existing impacts on the visual amenity of the surrounding area are not likely to be significant (refer to Chapter 10 Landscape and Visual of this rEIAR for a more detailed discussion of the visual impact of the Development).

Human Health

Health, as defined by the World Health Organization (WHO), is "*a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity*". The Healthy Ireland Framework 2013-2025 defines health as '*everyone achieving his or her potential to enjoy complete physical, mental and social wellbeing. Healthy people contribute to the health and quality of the society in which they live, work and play'*. This framework also states that health is much more than an absence of disease or disability, and that individual health, and the health of a country affects the quality of everyone's lived experience.

A healthy population is a major asset for society and improving the health and wellbeing of the nation is a priority for Government. Healthy Ireland Framework 2013-2025 is a collective response to the challenges facing Ireland's future health and wellbeing.

Table 3-12: Health Status of County Carlow & Baltinglass, 2016 (Source CSO)

	Co. Carlow		Baltinglass	
	No. of People	% Of People	No. of People	% Of People
General health - Very good	33,050	58.1%	1,279	59.9%
General health – Good	16,128	28.3%	596	27.9%
General health – Fair	4,989	8.8%	181	8.5%
General health – Bad	792	1.4%	27	1.3%
General health - Very Bad	144	0.3%	4	0.2%
Not stated	1,829	3.2%	50	2.3%

Table 4-13 above shows that the majority of people in County Carlow (86.4%) and Baltinglass (87.7%) have self-identified themselves in the 2016 Census as having 'very good health' or 'good health'.

4.4.2.7 Social Health

According to the World Health Organisation, poor social and economic circumstances affect health throughout life. Good health involves reducing levels of educational failure, reducing insecurity and unemployment and improving housing standards.

Health is influenced, either positively or negatively, by a variety of factors. Some of these factors are genetic or biological and are relatively fixed. 'Social determinants of health' arise from the social and economic conditions in which people live. They are not so fixed; such as type of housing and environments, access to health or education services, incomes generated and the type of work people do, can all influence a person's health, and the lifestyle decisions people make.

A range of factors have been identified as social determinants of health, these generally include the wider socio-economic context, inequality; poverty, social exclusion, socio-economic position, income, public policies, health services, employment, education, housing, transport, the built environment, health behaviours or lifestyles, social and community support networks and stress.

People who are less well off or who belong to socially excluded groups tend to fare badly in relation to these social determinants. Being at work on the other hand provides not only an income, but also access to social networks, a sense of identity and opportunities for development or progression.

Figure 4-3 presents the social determinants of health adapted from Dalghren and Whitehead (1991) and Grant and Barton (2006) as presented in Healthy Ireland.

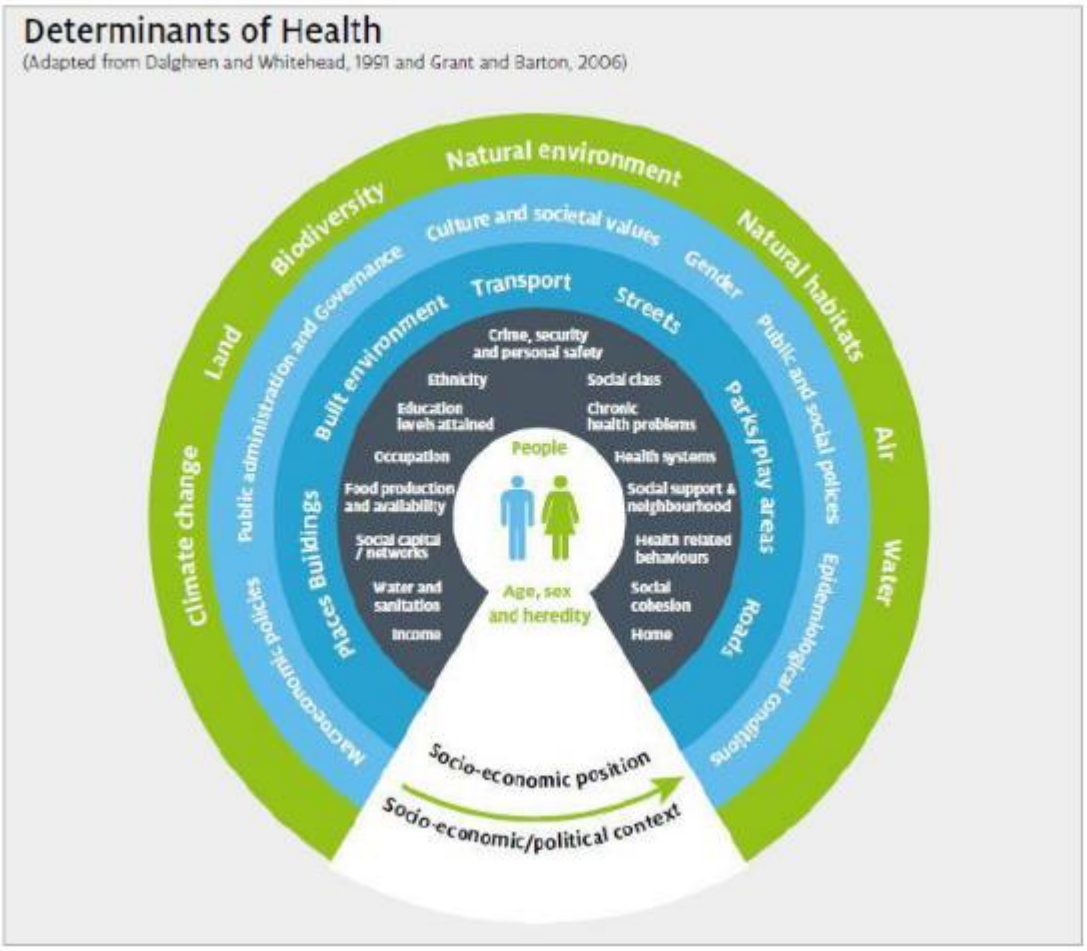


Figure 3-3: Social Determinants of Health (Healthy Ireland, DOH 2013)

Section 4.4.2.3 of this Chapter states that 60.9% of the population in the Baltinglass area are in the labour force. This reflects the high number of people of a working profile living within the area.

The Historic Development allowed for the creation of employment which had both a direct and indirect positive impact on the local economy and employment over the lifetime of the development.

As detailed in Table 4-13, the majority of people in County Carlow (86.4%) and Baltinglass (87.7%) have self-identified themselves in the 2016 Census as having ‘very good health’ or ‘good health’. The high employment levels, coupled with the self-identification of health status in both Baltinglass and County Carlow, indicating that positive social health conditions exist and that the Unauthorised Development did not have any adverse impact on the health of the population.

4.5 Potential Impact of the Unauthorised Development

The population in the vicinity of the Site of the Development has been assessed in terms of demography, economic activity and employment, tourism and amenity, landscape and visual, human health and social health.

No known effects have been identified as a result of the Unauthorised Development.

Employment was created in the area during the Operational Phase of the Historic and Unauthorised Development. The Development required transport of materials from the facility. This also created additional indirect employment for example drivers delivering materials to and from the Site. Therefore, the proposed facility had a slight positive effect in terms of additional direct and indirect employment and on the local socio-economic environment.

This section is a Remedial Environmental Impact Assessment Report (rEIAR) which will retrospectively examine the potential impacts of the Unauthorised Development and assess if there would have been any impacts from the unauthorised quarrying and what remedial measures would have been employed.

Since 2012 unauthorised extraction activities took place at the site. This section is to retrospectively assess the ecological impact of unauthorised extraction activities which took place during this period.

Environmental impacts that may impinge, directly or indirectly, on human beings have been identified as follows:

- Dust emissions (air quality)
- Noise
- Traffic
- Water Supply
- Visual Amenity
- Heritage (archaeological, architectural, and natural)

Impacts are considered below under the general classifications of residential amenity, settlement patterns, employment and economy, community facilities, recreation and sport, and heritage.

4.5.1.1 Dust

Potential sources of dust associated with the operation of a sand and gravel pit result from both the extraction and processing of material and the movement of trucks along the haul road and public roads. As detailed in the air quality chapter of previous EIS prepared by AWN Consulting Limited (*August 2004*), (Sections 9.4.1 and 9.4.2), "worst-case scenario" modelling of cumulative dust impacts at residences proximate to the Development meets both health-related emissions standards established by the

Air Quality Standards Regulations 2002 and nuisance-related emissions standards as measured by TA-Luft. Chapter 9 of the 2004 EIA establishes that there would not be significant negative dust emissions impacts associated with the Development.

4.5.1.2 Noise

Potential sources of noise impacts related to the operation of a sand and gravel pit are associated with equipment and machinery operating on the site and heavy vehicles on local roads, specifically:

- Noise during topsoil stripping
- Aggregate removal
- Vehicles at the site entrance
- Vehicle movements on public roads.

As detailed in the noise chapter of previous EIS prepared by AWN Consulting Limited (*August 2004*), (Section 10.4.5), predicted noise levels resulting from "worst-case scenario" modelling of pit operations (topsoil stripping, aggregate removal, and vehicles movements) would all be below noise limits established by the Environmental Protection Agency. As detailed in Chapter 10 of the previous EIA, there would not be significant negative noise impacts associated with the development.

4.5.1.3 Water

As detailed in the Water and Hydrology Chapter 6 of previous EIS prepared by AWN Consulting Limited (*August 2004*), (Section 6.5.2), no emissions to the groundwater environment will take place during the normal operation of the development within the site. Provided the mitigation measures outlined in Chapter 6 of the previous EIA, there will be no negative impacts on the water environment due to the operations at the site.

4.5.1.4 Traffic

Traffic associated with the proposed sand and gravel pit would result from both the removal of sand and gravel from the site, staff commuting, monthly deliveries, and the delivery of plant for topsoil stripping one to two times per year; this would result in a worst-case scenario maximum of 42 total two-way traffic trips (Le. 21 trips in and 21 trips out) during an operating day. As detailed in the traffic chapter of previous EIS prepared by AWN Consulting Limited (*August 2004*), (Section 8.0) there would be no significant negative traffic impacts associated with the proposed development.

4.5.1.5 Visual Amenity

As detailed in the landscape and visual impact assessment chapter of previous EIS prepared by AWN Consulting Limited (*August 2004*), (Section 11.0), the Development would have no negative or long-term impact on either the landscape or visual character.

4.5.1.6 Employment

The development would have resulted in a slight positive medium-term impact on employment in the Study Area, providing one permanent and one part-time position during the operational

phase (10 years). The development would also result in contracts for 3 part-time workers for soil stripping (1 - 2 times per year for ten years) and a haulage contract (3 - 4 HGVs for ten years).

The development would also provide a moderate, positive medium-term impact as an alternative source of non-farm income for the Applicant.

4.5.1.7 Tourism

Potential impacts to tourism relate to impacts on attractions (including scenery) and accommodation. As detailed in the landscape and visual assessment chapter of previous EIS prepared by AWN Consulting Limited (*August 2004*), (11.4.3) the development would have no impact on views of "Special Amenity Value" (as identified in the County Development Plan).

The operational phase of Development would have a slight short-term impact on the view from the L8097, as the topsoil stripping phase of operations may be visible from the road (two weeks per year for twelve years). Visual impacts would be negligible following decommissioning. There would also be a slight, medium-term impact resulting from increased traffic (see previous EIS, Section 8.0, Traffic and Transportation).

The Existing (now unauthorised) Development would have no impact on other attractions or accommodation in the area.

As such it is deemed that there is no potential for significant impacts as a result of the unauthorised Development as it was a continuation of what was permitted and assessed.

4.5.2 Potential Cumulative Impacts

A review of other off-site developments and Developments was completed as part of this environmental assessment. There were no cumulative impacts associated with the Development.

4.5.3 “Do Nothing” Impact

If the quarry were to remain undeveloped, this would have been an under-utilisation of quarry lands from a sustainable planning and development perspective. It may have negatively impacted on local employment in the Maplestown, Carlow areas and surrounds. There would be no jobs created, including those directly employed and indirectly employed. This would result in a slight impact on the existing population, and economic activity for residents living in the area.

4.6 Avoidance, Remedial & Mitigation Measures

4.6.1 The Unauthorised Development

Proposed mitigation measures to ameliorate any adverse effects of the Existing (now unauthorised) Development on human beings are described in detail in the remaining chapters of previously prepared EIS (*AWN Consulting Ltd, August 2004*) as follows:

- Dust and other emissions: Section 9.5
- Noise: Section 10.5
- Traffic: Section 8.7
- Visual Amenity & Landscape Heritage: Section 11.6
- Natural Heritage
    - Flora & Fauna: Section 7.5
    - Water: Section 6.7
    - Soils: Section 5.7
- Archaeological Heritage: Section 12.9

These proposed measures have been incorporated into the operational plan and pit design for the Existing (now unauthorised) Development as described in Chapter 3 of previously prepared EIS.

4.6.2 "Worst Case" Scenario

In one of the "worst case scenarios" untreated water from the attenuation ponds or Site itself would enter the waterway abounding the Site to the South. Sediment and pollutants would enter the stream and cause negative effects downstream and contaminating water. There is no evidence of this occurrence during the operational phase of the Unauthorised Development.

4.7 Residual Impacts

Residual Impacts are defined as '*effects that are predicted to remain after all assessments and mitigation measures*. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts. Potential residual impacts from the Unauthorised Development were considered as part of this environmental assessment. No negative residual impacts in the context of population and human health were identified regarding this Unauthorised Development.

4.8 Monitoring

4.8.1 The Unauthorised Development

Monitoring to ensure there are no adverse effects on human beings are described in detail in the remaining chapters of previously prepared EIS as follows:

- It was proposed to monitor water in the sump to ensure there are no negative impacts on groundwater (see Section 6.8)

4.9 Interactions

As noted above, there are numerous inter-related environmental topics described in detail throughout this rEIAR document which are of relevance to human health.

During the operational phase noise, air, water, traffic and landscape and visual were the key environmental factors that had potential to have an impact on population and human health.

4.9.1 Noise and Vibration

During the operational phase, the outward noise impact to the surrounding environment was limited to any additional traffic on surrounding roads and the operation of on-site machinery and equipment. The impact assessment of noise and vibration has concluded that additional noise associated with the operation of on-site machinery was intermittent and did not create any major negative impacts beyond the Site boundary. Noise is fully assessed in Volume 2, chapter 9.

4.9.2 Air Quality

Interactions with air quality during operational phase, had the potential to cause dust nuisance issues. However, the predicted impact was not significant with a neutral effect on human health. Air quality is discussed further in Volume 2, chapter 8.

4.9.3 Traffic

There is potential for interaction with Traffic during the operational phase. The traffic assessment carried (as detailed in Chapter 12 of this rEIAR), concluded that there would be a marginal increase in traffic volumes. However, this did not result in a negative impact on human health.

4.9.4 Hydrology

Hydrology has been fully assessed in Volume 2, Chapter 8 of this rEIAR. No public health issues associated with the water (hydrology and hydrogeology) conditions at the Site have been identified for the Unauthorised Development.

4.9.5 Landscape and Visual

The visual assessment shows that the subject Site is well screened due to existing hedgerows, field boundaries, local topography, and the setback distance from the public road. There are no protected views within this area that could be affected by the operation of the Unauthorised Development. Overall, it is considered that the Unauthorised Development did have an ‘imperceptible’ visual impact on nearby sensitive receptors.

Therefore, it is considered that the Unauthorised Development did not cause any issues for the residential local population.

4.10 Difficulties Encountered When Compiling

No difficulties were encountered in the preparation of this Chapter of the rEIAR.

4.11 References

The Central Statistics Office (CSO)

Wicklow County Development Plan 2016 - 2022

Regional Spatial and Economic Strategy 2019 – 2031

The Regional Planning Guidelines of the Greater Dublin Area 2010-2022

Ordinance Survey Ireland (OSI)

WHO. Ottawa Charter for Health Promotion First International Conference on Health Promotion Ottawa, 21 November 1986 - WHO/HPR/HEP/95.1. 1986.

WHO. Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19-22 June 1946; signed on 22 July 1946 by the representatives of 61 States (Official Records of the World Health Organization, no. 2, p. 100) and entered into force on 7 April 1948. 1946.

Healthy Ireland Framework 2013-2025

Farrell, C., McAvoy, H., Wilde, J. and Combat Poverty Agency (2008), Tackling Health Inequalities – An All-Ireland Approach to Social Determinants. Dublin: Combat Poverty Agency/Institute of Public Health in Ireland.

Wilkinson, Richard; Marmot, Michael, eds. (2003). The Social Determinants of Health: The Solid Facts (PDF) (2nd ed.). World Health Organization Europe.

Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Communities 1999)

Fáilte Ireland (2017). Tourism Facts 2016. Research and Evaluation, Fáilte Ireland.

Fáilte Ireland (2017). Regional Tourism Performance in 2016. Research and Evaluation, Fáilte Ireland.

Understanding the Links between the Environment, Human Health and Well-Being, Prepared for the Environmental Protection Agency by Centre for Environmental Research, University of Limerick, 2010

Assessment of Health Impacts within National Environmental Regulation Process. Report commissioned by Environmental Protection Agency. Golder Associates. April 2015.

5 BIODIVERSITY

5.1 Introduction

This Chapter describes the Biodiversity of the Site of the Unauthorised Development and surrounding environs, with emphasis on habitats, flora and fauna, and details the methodology of assessment used in each case. It provides a retrospective assessment of the potential impacts of previous development on the site, on habitats and flora and fauna utilising the previous Environmental Impact Statements as a reference.

The Chapter has been completed having regard to the *Guidelines for Ecological Impact Assessment in the UK and Ireland*, by the Chartered Institute of Ecology and Environmental Management (CIEEM, 2018), together with the guidance outlined in the Environmental Protection Agency documents *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (Draft, August 2017) and *Advice Notes for Preparing Environmental Impact Statements* (Draft, September 2015). The value of the ecological resources, the habitats and species present or potentially present, was determined using the ecological evaluation guidance given in the National Roads Authority's (NRA) *Ecological Assessment Guidelines* (NRA, 2009).

5.1.1 Quality assurance and competence

Synergy Environmental Ltd., T/A Enviroguide Consulting, is a wholly Irish Owned multi-disciplinary consultancy specialising in the areas of Environment, Waste Management and Planning.

Enviroguide Consulting as a company remains fully briefed in European and Irish environmental policy and legislation and all of our consultants carry professional qualifications.

Professional memberships include the Chartered Institution of Wastes Management (CIWM), the Irish Environmental Law Association and Chartered Institute of Ecology and Environmental Management (CIEEM).

All surveying and reporting have been carried out by qualified and experienced ecologists and environmental consultants. The Chapter has been written by Bryan Thompson, Graduate Ecologist with Enviroguide Consulting. Bryan has a B.Sc. in Environmental Biology (Hons) and a PhD in Marine Ecology from University College Dublin, and a wealth of experience in desktop research, literature scoping-review, and report writing, as well as practical field experience (Habitat surveys, intertidal surveys, bird surveys, fresh water macro-invertebrates etc.). Bryan has experience in compiling Biodiversity Chapters of EIARs, AA screening and NIS reports, and in the overall assessment of potential impacts to ecological receptors from a range of developments.

5.1.2 Relevant Legislation

5.1.2.1 National Legislation

5.1.2.1.1 Wildlife Act 1976 and amendments

The Wildlife Act 1976 was enacted in order to provide protection to birds, animals and plants in Ireland and to control activities which may have an adverse impact on the conservation of wildlife. In regard to the listed species, it is an offence to disturb, injure or damage their

breeding or resting place wherever these occur without an appropriate licence from National Parks and Wildlife Service (NPWS). This list includes all birds along with their nests and eggs. Intentional destruction of an active nest from the building stage up until the chicks have fledged is an offence. This includes the cutting of hedgerows from the 1st of Match to the 31st of August. The act also provides a mechanism to give statutory protection to Natural Heritage Areas (NHAs). The Wildlife Amendment Act 2000 widened the scope of the Act to include most species, including the majority of fish and aquatic invertebrate species which were excluded from the 1976 Act.

5.1.2.1.2 EU Habitats Directive 1992 and EC (Birds and Natural Habitats) Regulations 2011

The EU Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive 1992) provides protection to particular species and habitats throughout Europe. The Habitats Directive has been transposed into Irish law through the EC (Birds and Natural Habitats) Regulations 2011.

Annex IV of the EU Habitats Directive provides protection to a number of listed species, wherever they occur. Under Regulation 23 of the Habitat Directive any person who, in regard to the listed species; “Deliberately captures or kills any specimen of these species in the wild, Deliberately disturbs these species particularly during the period of breeding, rearing, hibernation and migration, Deliberately takes or destroys the eggs from the wild, or Damages or destroys a breeding site or resting place of such an animal shall be guilty of an offence.”

5.1.2.1.3 Flora (Protection) Order, 1999

The Flora (Protection) Order grants protection to 86 species of plant in Ireland (56 vascular plants, 14 mosses, 4 liverworts and 2 stoneworts). This Act makes it illegal for anyone to uproot, cut or damage any of the listed plant species and it also forbids anyone from altering, interfering or damaging their habitats. This protection is not confined to within designated conservation sites and applies wherever the plants are found.

5.1.2.2 International Legislation

5.1.2.2.1 EU Birds Directive

The Birds Directive constitutes a level of general protection for all wild birds throughout the European Union. Annex I of the Birds Directive includes a total of 194 bird species that are considered rare, vulnerable to habitat changes or in danger of extinction within the European Union. Article 4 establishes that there should be a sustainable management of hunting of listed species, and that any large scale non-selective killing of birds must be outlawed. The Directive requires the designation of Special Protection Areas (SPAs) for: listed and rare species, regularly occurring migratory species and for wetlands which attract large numbers of birds. There are 25 Annex I species that regularly occur in Ireland and a total of 153 Special Protection Areas have been designated.

5.1.2.2.2 EU Habitats Directive

The Habitats Directive aims to protect some 220 habitats and approx. 1000 species throughout Europe. The habitats and species are listed in the Directives annexes where Annex I covers habitats and Annex II, IV and V cover species. There are 59 Annex I habitats in Ireland and 33 Annex IV species which require strict protection wherever they occur. The Directive

requires the designation of Special Areas of Conservation for areas of habitat deemed to be of European interest. The SACs together with the SPAs from the Birds Directive from a network of protected sites called Natura 2000.

5.1.2.2.3 Bern and Bonn Convention

The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention 1982) was enacted to conserve all species and their habitats. The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1979, enacted 1983) was introduced in order to give protection to migratory species across borders in Europe.

5.1.3 Description of the Historic Development

The unauthorised development took place since 2012 with unauthorised extraction and infill activities occurring at the site. This chapter will retrospectively assess the ecological impact of unauthorised extraction and infill activities which took place during this period.

5.1.4 Construction Phase

The permitted development did not require the construction of permanent buildings. Instead, construction at the site was limited to the installation of mobile and/or temporary equipment and structures including importation infrastructure such as washing/rinsing plant, a dry screener, one bunded fuel storage tank, a wheel wash, a weighbridge, Portacabin, chemical toilet, portable generator and water supply. The construction phase for the permitted development also involved the excavation of 3 no. settlement lagoons, stockpiling area, truck and plant parking area and site access. The unauthorised development utilised all of the existing on-site infrastructure and therefore there was no construction phase associated with the historic (unauthorised) development.

5.1.5 Operational Phase

The operational phase of the historic (unauthorised) development involved the extraction of approximately 192,240 tonnes of sand and gravel from the site. A total of 75,060 tonnes of overburden were removed and set aside for re-use in the restoration of the area. Material was to be extracted in five phases, starting from the western portion of the extraction area and moving eastwards for the remaining phases. Topsoil was to be stripped,1.0 hectares at a time as the pit face advanced. The machinery used in stripping was brought on site and removed off site as needed by means of low loaders. Phase I was progressively restored using the topsoil stripped from Phase II (once work on Phase Two had commenced) and so on until the final phase. Silts extracted from the settlement lagoons were also used in the restoration process.

5.2 Study Methodology

This section details the steps and methodology employed to undertake the Ecological Impact Assessment of the Site of the Historic Development.

5.2.1 Scope of assessment

The specific objectives of the study were to:

- Retrospectively assess the direct, indirect and cumulative ecological implications or impacts of the Historic quarrying and infill activities which took place between after 2012.

5.2.2 Desk Study

A desktop study was carried out to collate and review available information, datasets and documentation sources pertaining to the site's natural environment. The desk study, completed in August 2021, relied on the following sources:

- Information on species records [2] and distributions, obtained from the National Biodiversity Data Centre (NBDC) at www.*maps.biodiversityireland.ie* ;
- Information on waterbodies, catchment areas and hydrological connections obtained from the Environmental Protection Agency (EPA) at www.gis.epa.ie*;*
- Information on bedrock, groundwater, aquifers and their statuses, obtained from Geological Survey Ireland (GSI) at *www.gsi.ie* ;
- Information on the network designated conservation sites, site boundaries, qualifying interests and conservation objectives, obtained from the National Parks and Wildlife Service (NPWS) at *www.npws.ie* ;
- Satellite imagery and mapping obtained from various sources and dates including Google, Digital Globe, Bing and Ordinance Survey Ireland;
- Information on the existence of permitted development, or developments awaiting decision, in the vicinity of the Historic Development from Carlow County Council, available at https://www.wicklow.ie/Living/Services/Planning/Planning-Applications/Online-Planning
- Information on the extent, nature and location of the Historic Development, provided by the applicant and/or their design team;
- Information on the proposed works to be followed as part of the Historic Development, taken from the Final Project description provided by the Applicant along within an EIAR conducted for the Historic works in 2006 (EssGee Consultants, 2006).

A comprehensive list of all the specific documents and information sources consulted in the completion of this report is provided in Section 5.12 - References.

5.2.3 Field Surveys

5.2.3.1 Habitat surveying, mapping and evaluation

Habitat surveys for the Historic development were conducted on 13th May 2006 by EssGee Consultants using methodology outlined in the Joint Nature Conservancy Council's Phase I Habitat Survey Techniques (JNCC, 1993). The principal habitats present within the site were identified and classified using the Heritage Council's A Guide to Habitats in Ireland (Fossitt,

[2] The Site of the Historic/Proposed Development lies within the 10km grid square S88 and the 2km grid square S88M. Records from the last 30 years from available datasets are given in the relevant sections of this report.

2000). The dominant species were noted, and a species list compiled for each habitat represented. Floral nomenclature follows An Irish Flora (Webb, Parnell & Doogue, 1996) for Latin names and the Census Catalogue of the Flora of Ireland (Scannell & Synnott, 1987) for common names. Nomenclature for horticultural species follows the Royal Horticultural Society's Encyclopaedia of Garden Plants (Brickell, 1998).

Habitat surveys of the Site were carried out by an Enviroguide Consulting ecologist on the 17th of August 2021. Habitats were categorised according to the Heritage Council's '*A Guide to Habitats in Ireland'* (Fossitt, 2000) to level 3. The habitat mapping exercise had regard to the 'Best Practice Guidance for Habitat Survey and Mapping' (Smith *et al.*, 2010) published by the Heritage Council. Habitat categories, characteristic plant species and other ecological features and resources were recorded on field sheets. Habitats within the surrounding area of the Site were classified based on views from the Site and satellite imagery where necessary (Google Earth, Digital Globe and OSI).

5.2.3.2 Bird Surveys

A bird survey for the Historic development was carried out on 13th May 2006 by EssGee Consultants. The survey relied on sightings during the site walkover. Bird identifications were confirmed using the following sources:

- The Complete Guide to Ireland's Birds, Dempsey E. & O' Cleary M (1993)
- Collins Bird Guide, (Harper Collins 2001)

A bird survey of the Site was carried out on the 17th of August 2021 by an Enviroguide Consulting Ecologist. The survey methodology followed the British Trust for Ornithology's (BTO) *Common Bird Census* (CBS) technique (2nd edn) (Bibby *et al.*, 2000), and the equipment used was Opticron Natura BGA 8 x 42 Binoculars. A pre-determined transect was walked and all bird species encountered were recorded on field sheets as well as location (on 1:500 field maps), behaviour and numbers.

5.2.3.1 Mammal surveys

Mammal surveys for the Historic development determined the presence of fauna through the detection of field signs such as tracks, habitats, markings, feeding signs, and droppings, as well as by direct observation. likely species were assessed in relation to the habitats present within the site.

Mammal surveys for the site of the Historic Development were carried out on August 17th, 2021, in conjunction with other field surveys. The site was searched for tracks and signs of mammals. The habitat types recorded throughout the survey area were used to assist in identifying the fauna considered likely to utilise the area. During this survey, the site was searched for tracks and signs of mammals as per Bang and Dahlstrom (2001).

5.2.3.1 Other fauna

During the course of the habitat surveys undertaken at the Site of the Historic Development on August 17th, 2021, other species of fauna were noted, and these are included in the report where applicable.

5.2.4 Assessment

The value of the ecological resources – the habitats and species present or potentially present was determined using the ecological evaluation guidance given in the National Roads Authority's Ecological Assessment Guidelines (NRA, 2009). This evaluation scheme, with values ranging from locally important to internationally important, seeks to provide value ratings for habitats and species present that are considered ecological receptors of impacts that may ensue from a proposal. The NRA (2009a) defines key ecological receptors as those ecological features which are evaluated as Locally Important (higher value) or higher, that are likely to be impacted significantly by the future restoration development. Internationally important receptors would include Special Areas of Conservation (SAC) or Special Protected Areas (SPA) while those of national importance would include Natural Heritage Areas (NHA).

This evaluation scheme has been adapted here to assess the value of habitats and fauna within the Site of the Unauthorised Development. This evaluation scheme was also applied to the habitats and species which were identified in the original EIS for the permitted development from 2006. The value of habitats is assessed based on the condition, size, rarity, conservation and legal status. The value of fauna is assessed on its biodiversity value, legal status and conservation status. Biodiversity value is based on its national distribution, abundance or rarity, and associated trends.

Using the evaluation criteria as described above, some of the habitats and species identified as being present were assessed. Any of those selected that were evaluated as being of Local Importance (higher value) and higher in this study were selected as potential key ecological receptors and the impact significance on each of these receptors was assessed.

5.2.4.1 Value of Ecological Resources

The ecological features identified within the Site of the Historic/Unauthorised Development and the wider area are evaluated based on their value. These values are detailed in Table 5-1 below and are taken from the Guidelines for Assessment of Ecological Impacts of National Road Schemes published by the NRA (2009b), now Transport Infrastructure Ireland (TII).

Table 5-1: Description of values for ecological resources based on geographic hierarchy of importance (NRA, 2009b).

Importance	Criteria
International Importance	- 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. - Proposed Special Protection Area (pSPA). - Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). - Features essential to maintaining the coherence of the Natura 2000 Network - Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive.

Importance	Criteria

	- Resident or regularly occurring populations (assessed to be important at the national level) of the following:
	  o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or
	  o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive
	- Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971).
	- World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972).
	- Biosphere Reserve (UNESCO Man & The Biosphere Programme)
	- Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).
	- Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979).
	- Biogenetic Reserve under the Council of Europe.
	- European Diploma Site under the Council of Europe.
	- Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).

National Importance	- Site designated or proposed as a Natural Heritage Area (NHA).
	- Statutory Nature Reserve.
	- Refuge for Fauna and Flora protected under the Wildlife Acts.
	- National Park.
	- Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
	- Resident or regularly occurring populations (assessed to be important at the national level) of the following:
	  o Species protected under the Wildlife Acts; and/or
	  o Species listed on the relevant Red Data list.
	  o Site containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive

County Importance	- Area of Special Amenity.
	- Area subject to a Tree Preservation Order.
	- Area of High Amenity, or equivalent, designated under the County Development Plan.
	- Resident or regularly occurring populations (assessed to be important at the County level) of the following:
	  o Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive;
	  o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive;

Importance	Criteria
	○ Species protected under the Wildlife Acts; and/or ○ Species listed on the relevant Red Data list. ○ Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. - County important populations of species; or viable areas of semi-natural habitats; or natural heritage features identified in the National or Local BAP; if this has been prepared. - Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. - Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (higher value)	- Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; - Resident or regularly occurring populations (assessed to be important at the Local level) of the following: ○ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; ○ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; ○ Species protected under the Wildlife Acts; and/or o ○ Species listed on the relevant Red Data list. ○ Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; - Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.
Local Importance (lower value)	- Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; - Sites or features containing non-native species that is of some importance in maintaining habitat links.

5.2.4.2 Impact Assessment Criteria

Once the value of the identified Key Ecological Receptors (KERs) was determined, the next step was to assess the potential effect or impact of any proposed future restoration development on these KERs. This was carried out with regard to the criteria outlined in various impact assessment guidelines (NRA, 2009b; CIEEM, 2018) that set down a number of parameters such as quality, magnitude, extent and duration that should be considered when determining which elements of the proposal could constitute impact or sources of impacts. Once impacts are defined, their significance was categorised using EPA Guidelines (EPA, 2017).

Identification of a risk does not constitute a prediction that it will occur, or that it will create or cause significant impact. However, identification of the risk does mean that there is a possibility of ecological or environmental damage occurring, with the level and significance of the impact depending upon the nature and exposure to the risk and the characteristics of the ecological receptor.

5.2.4.2.1 Criteria used to Define Quality of Effects

In line with the EPA Guidelines (EPA, 2017), the following terms are defined when quantifying the quality of effects. See Table 5-2 below.

Table 5-2: Definition of Quality of Effects.

Quality	Definition
Positive Effects	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error
Negative/adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).

5.2.4.2.2 Criteria used to Define Significance of Effects

In line with the EPA Guidelines (EPA, 2017), the following terms are defined when quantifying the significance of impacts. See

Table *5-3*, below.

Table 5-3: Definition of Significance of Effects.

Significance of Effects	Definition
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.

Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Profound Effects	An effect which obliterates sensitive characteristics

5.2.4.2.3 Criteria used to Define Duration of Effects

In line with the EPA Guidelines (EPA, 2017), the following terms are defined when quantifying duration and frequency of effects. See Table 5-4, below.

Table 5-4: Definition of Duration of Effects.

Quality	Definition
Momentary Effects	Effects lasting from seconds to minutes
Brief Effects	Effects lasting less than a day
Temporary Effects	Effects lasting less than a year
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years
Permanent Effects	Effects lasting over sixty years
Reversible Effects	Effects that can be undone, for example through remediation or restoration

5.3 The Existing and Receiving Environment (Baseline Situation)

5.3.1 Historic extraction and infill (since 2012)

5.3.1.1 Site Overview

The site of the Historic development consisted of a farm property in Maplestown, Co. Carlow. The site was bounded to the west by a country road, and to the South, East and North by agricultural lands. The surrounding lands was characterised by rural agricultural land uses

including livestock and arable farming, as well as forestry plantation. A small stream lies in the south of the property and a broadleaf birch dominated woodland lies to the west of the property.

The study area for the ecology assessment carried out in 2006 was approximately 16.76 hectare application area within the farm property. The study area for this assessment took in lands which may be considered for future development.

The site is 15.21 hectares (ha) in area and contains an area of land of 4.18 ha which was quarried and infilled outside of the granted planning permission period for which substitute consent is being sought.

The overall site which contains the above area is situated on the New Ross groundwater body, which has a WFD status of *Good* and is *Not at Risk* of not meeting its WFD objectives. The groundwater vulnerability to contamination via human activities is classed as *High*. The Site is on a moderately productive aquifer, namely Ll, *bedrock which is moderately productive only in Local Zones*. The groundwater rock units underlying the aquifer are classified as *Pale, fine to coarse-grained granite*. (GSI, 2021). The subsoil beneath the Site is classified as *Limestone sands and gravels (Carboniferous)* (EPA,2021).

The site is located within the River Barrow Water Framework Directive (WFD) Catchment, the Lerr sub-catchment (Lerr_SC_010), the Graney (Lerr) River Sub-basin (Graney (Lerr_010)) and the Barrow Hydrometric Area (EPA, 2021). The BROADSTOWN stream (EPA code: 14B54) is located 0.07km south of the southern site boundary and is mapped by the EPA as flowing in a westerly direction for approx. 0.6 km before joining the Graney (Lerr) River (EPA code: 14G07), which flows in a south westerly direction for approx. 8.9 km before entering the River Barrow and River Nore SAC. There are currently no EPA monitoring stations along the BROADSTOWN stream. However, the Graney (Lerr) (IE_SE_14G070310) and Lerr (IE_SE_17L010155) waterbodies which receive the BROADSTOWN stream are listed as "*At Risk"* and have a Water Framework Directive (WFD) status of *"Poor" and "Good"* and respectively based on the nearest monitoring data to the development (EPA,2021).

5.3.2 Designated Sites

Table 5-5 below presents details of the key ecological features of designated sites with 15km of the Historic Development and gives their distance from the Site of the Historic Development. None of the Natura 2000 sites outside the 15km distance are considered to be linked by a hydrological pathway, or any other possible pathway, to the Historic Development. Natura 2000 sites outside of this 15km radius are deemed to be either; located a considerable physical distance inland; separated by a significant marine buffer; and/or located within different catchment zones to the Historic Development. Table 5-5 below details the Natura 2000 sites within a 15km radius of the Historic Development.

Table 5-5: Designated sites located within a 15km radius of the Site of the Historic Development.

Site Code	Site Name	Qualifying Interests	Distance to Site
Special Areas of Conservation (SAC)			
000781	Slaney River Valley SAC	- Estuaries [1130] - Mudflats and sandflats not covered by seawater at low tide [1140] - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] - Mediterranean salt meadows (*Juncetalia maritimi*) [1410] - Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] - Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] - Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] - *Margaritifera margaritifera* (Freshwater Pearl Mussel) [1029] - *Petromyzon marinus* (Sea Lamprey) [1095] - *Lampetra planeri* (Brook Lamprey) [1096] - *Lampetra fluviatilis* (River Lamprey) [1099] - *Alosa fallax* (Twaite Shad) [1103] - *Salmo salar* (Salmon) [1106] - *Lutra lutra* (Otter) [1355] - *Phoca vitulina* (Harbour Seal) [1365]	c.a 3.2 km S
002122	Wicklow Mountains SAC	- Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] - Natural dystrophic lakes and ponds [3160] - Northern Atlantic wet heaths with *Erica tetralix* [4010] - European dry heaths [4030] - Alpine and Boreal heaths [4060] - Calaminarian grasslands of the *Violetalia calaminariae* [6130] - Species-rich Nardus grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] - Blanket bogs (* if active bog) [7130] - Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) [8110] - Calcareous rocky slopes with chasmophytic vegetation [8210] - Siliceous rocky slopes with chasmophytic vegetation [8220] - Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] - *Lutra* (Otter) [1355]	c.a 14.9 km NE
002162	River Barrow and River Nore SAC	- Estuaries [1130] - Mudflats and sandflats not covered by seawater at low tide [1140] - Reefs [1170] - Salicornia and other annuals colonising mud and sand [1310] - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) [1330] - Mediterranean salt meadows (*Juncetalia maritimi*) [1410]	c.a 12.9 km SW

		- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation [3260] - European dry heaths [4030] - Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels [6430] - Petrifying springs with tufa formation (*Cratoneurion*) [7220] - Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] - Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) [91E0] - *Vertigo moulinsiana* (Desmoulin's Whorl Snail) [1016] - *Margaritifera* (Freshwater Pearl Mussel) [1029] - *Austropotamobius pallipes* (White-clawed Crayfish) [1092] - *Petromyzon marinus* (Sea Lamprey) [1095] - *Lampetra planeri* (Brook Lamprey) [1096] - *Lampetra fluviatilis* (River Lamprey) [1099] - *Alosa fallax* (Twaite Shad) [1103] - *Salmo salar* (Salmon) [1106] - *Lutra* (Otter) [1355] - *Trichomanes speciosum* (Killarney Fern) [1421] - *Margaritifera durrovensis* (Nore Pearl Mussel) [1990]	
001757	Holdenstown Bog SAC	- Transition mires and quaking bogs [7140]	c.a 3 km E
Special Protection Areas (SPA)			
There are no SPAs within the 15km ZOI for the Development.			
National Heritage Area (NHA)			
There are no NHAs within the 15km ZOI for the Development.			
Proposed National Heritage Area (pNHA)			
000788	Ardristan Fen	**No official qualifying interests exist for this site.** **NPWS Official Site Synopsis:** The site has been noted as having an interesting calcareous flora with Broad-leaved Cottongrass (*Eriophorum latifolium*), Great Fen-sedge (*Cladium mariscus*), Black Bog-rush (*Schoenus nigricans*), Lesser Clubmoss (*Selaginella selaginoides*), Narrowleaved Marsh-orchid (*Dactylorhiza traunsteineri*), Fragrant Orchid (*Gymnadenia conopsea*) and Autumn Gentian (*Gentianella amarella*). Common Reed (*Phragmites australis*) was quite common, while Bogbean (*Menyanthes trifoliata*) was recorded where the water was deeper. Water Mint (*Mentha aquatica*) and Mare's-tail (*Hippuris vulgaris*) were also found. Two species of bladderwort, Greater Baldderwort (*Utricularia vulgaris*) and Lesser Bladderwort (*U. minor*), have been recorded from the site. Part of the remaining area of fen is covered by wet woodland consisting of mostly alder (*Alnus spp*.) and birch (*Betula spp*.). This site is of interest as it is a remnant of an area that was formerly known for its rich calcareous flora.	13.8 km S
000792	Baggot's Wood	**No official qualifying interests exist for this site.**	7.8 km E

000810	Oakpark	**No official qualifying interests exist for this site.** **NPWS Official Site Synopsis:** The site is a shallow artificial pond, bounded almost completely by woodlands. There are eight small islands bearing coniferous and deciduous trees within the lake. Much of the open water has been colonised by Common Reed (*Phragmites australis*). A drainage channel was cut through the reed-bed in 1973 to ensure circulation of freshwater. Marginal vegetation includes Bulrush (*Typha latifolia*) and Reed Sweet-grass (*Glyceria maxima*). Vegetation along the banks includes Rosebay Willowherb (*Epilobium angustifolium*), Hemp-agrimony (*Eupatorium cannabinum*), Common Nettle (*Urtica dioica*) and Bramble (*Rubus fruticosus agg*.). Bladderwort (*Utricularia spp.*) is found in the water and willow (*Salix spp.*) scrub occurs on the wooded banks. The scarce Myxomycete fungus, *Licea marginata* has been recorded from woodland in the site. The site attracts a variety of birds and records have been kept since 1966. Breeding species include Little Grebe, Grey Heron (17 occupied nests in 1993), Mute Swan, Mallard, Water Rail, Coot, and many passerine species. Wintering waterfowl include Mallard (24), Golden Plover (125) and Lapwing (125) (figures are one count during 1984/85-1986/87 period). Many other species occur in winter, such as Wigeon, Teal, Shoveler, Tufted Duck and Pochard. Oakpark is the largest area of still water in the county and is of regional and local value to birds.	11.8 km SW
000858	Barrow Valley At Tankardstown Bridge	**No official qualifying interests exist for this site.**	*14.3 KM W*
001389	Corballis Hill	**No official qualifying interests exist for this site.** **NPWS Official Site Synopsis:** The main habitats are woodland and heath. The wood is mostly of oak (*Quercus spp*.), which in places is an almost pure stand. Grey Willow (*Salix cinerea*) and Hazel (*Corylus avellana*) are frequent in places. Some of the Hazel are very old individuals, with diameters of 23cm. On lower slopes the trees are more varied, with Ash (*Fraxinus excelsior*), Sycamore (*Acer pseudoplatanus*) and Horse-chestnut (*Aesculus hipposcastanum*). The herbaceous layer of the wood contains the following – Bluebell (*Hyacinthoides non-scripta*), Great Wood-rush (*Luzula sylvatica*), Wood, Anemone (*Anemone nemorosa*), Bilberry (*Vaccinium myrtillus*), Herb-Robert (*Geranium robertianum*), Wood-sorrel (*Oxalis acetosella*), Red Campion (*Silene dioica*), Lesser Celandine (*Ranunculus ficaria*) and Pignut (*Conopodium majus*). Mosses include *Polytrichum formosum, Dicranum majus* and *Plagiothecium undulatum*. Heath areas with gorse (*Ulex europaeus, U. gallii*), Heather (*Calluna vulgaris*),Bracken (*Pteridium aquilinum*) and Heath-grass (*Danthonia decumbens*) occur in places. A wide range of passerine bird species were recorded from the site, as well as Sparrowhawk, Kestrel, Woodcock and Stock Dove. The eastern parts of the site, as identified by An Foras Forbatha, have been planted with conifers and are now of little interest. This is a good example of fairly intact, deciduous woodland. Similar sites in Co. Kildare are rare.	*3.3 km NW*

001751	Ballycore Rath	**No official qualifying interests exist for this site.** **NPWS Official Site Synopsis:** Ballycore Rath is located about 10km north-west of Baltinglass. The site is a steepsided body of moraine, which was deposited during the last glaciation. It is crowned by a rath which commands fine views to the west and south-west over Co. Kildare. The southern side of the site is bounded by the Bolhoge River. The vegetation of the slopes of the moraine is rich in species, many of which are typical of a calcicole (alkaline) substrate. It is dominated by grasses which include Crested Dog's-tail (*Cynosurus cristatus*). Among the other plants are Field Woodrush (*Luzula campestris*), Common Dog-violet (*Viola riviniana*) and Cowslip (*Primula veris*). Other plants indicative of base-rich conditions are Yellow-wort (*Blackstonia perfoliata*) and the scarce Salad Burnet (*Sanguisorba minor*). There are many rabbit burrows on the slopes of the moraine. Additional habitats on the site include a small wooded area on the southern slopes. This is dominated by Ash (*Fraxinus excelsior*), with a diverse shrub layer of Hawthorn (*Crataegus monogyna*), Elder (*Sambucus nigra*), Holly (*Ilex aquifolium*) and Blackthorn (*Prunus spinosa*). The ground flora is variable and poached in places, but includes Ivy (*Hedera helix*), Wood Speedwell (*Veronica montana*), Wild Strawberry (*Fragaria vesca*) and Primrose (*Primula vulgaris*). There is a small plantation of mature European Larch (*Larix decidua*) on the northern slopes. This has a very open canopy with a grass dominated ground flora. There is an area of marsh adjacent to the river which is rich in sedges (*Carex spp*.), rushes (*Juncus spp*.) and other species including Yellow Iris (Iris pseudacorus), Meadowsweet (*Filipendula ulmaria*) and Common Valerian (*Valeriana officinalis*). This site is important as a good example of calcicole grassland, rich in many of the species that typically occur in such situations. The presence of the woodland, river and marsh adds to the diversity of the site.	9.4 km N
001757	Holdenstown Bog	**No official qualifying interests exist for this site.**	*3 km E*
001764	Lowtown Fen	**No official qualifying interests exist for this site.** **NPWS Official Site Synopsis:** Lowtown Fen is an overgrown kettle hole, situated approximately 5km north-west of Baltinglass. The fen is flanked by sloping grazed pasture and is dissected by wet channels derived from attempts at draining the area. A concentric zonation of fen vegetation occurs. In the centre, where the ground becomes flatter and very wet, is a dense Common Reed (*Phragmites australis*) swamp with occasional plants of Water Mint (*Mentha aquatica*). Around the reed swamp Whorl-grass (*Catabrosa aquatica*), Lesser Spearwort (*Ranunculus flammula*), Fool's Water-cress (*Apium nodiflorum*) and Creeping Forget-me-not (*Myosotis secunda*) were recorded. On the drier marginal areas of the swamp, there is a greater diversity of vegetation, including Marsh Cinquefoil (*Potentilla palustris*), Meadowsweet (*Filipendula ulmaria*), Common Cottongrass (*Eriophorum angustifolium*), various grasses (*Festuca spp*.) and at least nine sedge species (*Carex spp.*). Several species of orchid also occur – Fragrant Orchid (Gymnadenia conopsea), Frog Orchid (*Coeloglossum viride*), two species of marsh-orchid (*Dactylorhiza spp*.) and the	7.1 km N

		scarce Marsh Helleborine (*Epipactis palustris*). Attempts have been made in the past to drain the fen. These, however, seem to have been ineffective and have had little effect on the flora. The old ditches are now bordered by Rusty Willow (*Salix cinerea subsp. oleifolia*). In spite of drainage attempts the area is still botanically diverse and is a very good example of fen/reed swamp development. The presence of some scarce orchids adds to the site's scientific importance.	

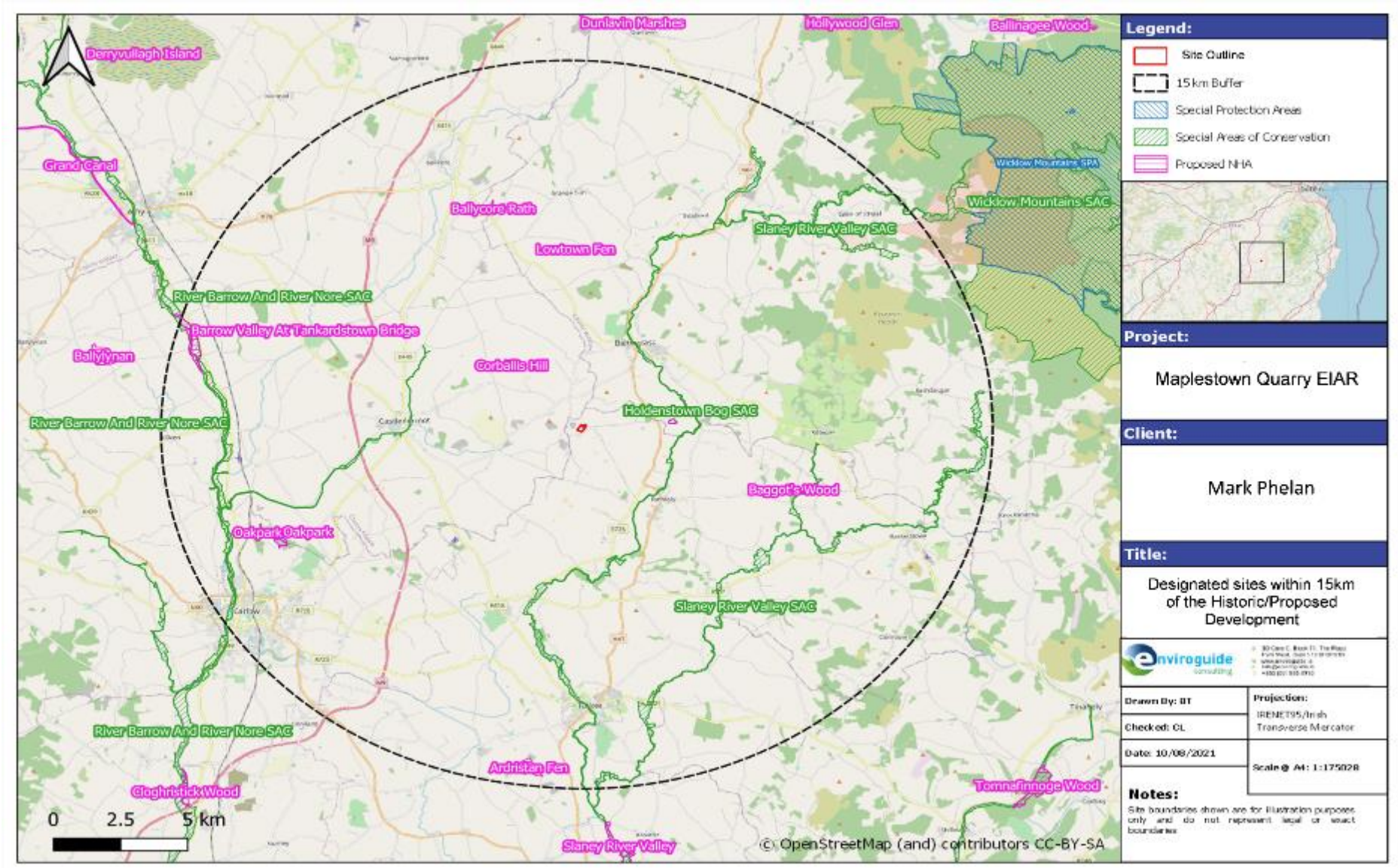


Figure 5-1: Designated Sites within 15km of the Historic Development

5.3.3 Habitats

The habitats within the study area are coded and categorised for the most part according to (Fossitt, 2000) and described in detail in the following sections.

5.3.3.1 Historic Extraction and infill site (since 2012)

5.3.3.1.1 Improved Agricultural Grassland (GA1)

At the time of the original site visit in May 2006, improved agricultural grassland was the dominant habitat at the site. The historical agricultural interference with this habitat was evident in the species composition of the habitat. However, these fields had become rank due to lack of regular mowing or grazing. The fields within the central sections of the study area form the hill and were steeply sloped. The grass sward was dominated by tall growing perennial rye grass (*Lolium perenne*) and Yorkshire fog (*Holcus lanatus)*, along with a much lower abundance of cock's foot (*Dactylis glomerata*), foxtail (*Alopecurus pratensis*), annual meadow grass (poa annual, sweet vernal grass (*Anthoxanthum odoratum*), common bent (*Agrostis capillaris*) and velvet bent (*A. canina*). The slopes of the main hill in the centre of the study area, had a similar composition. However, they had a much shorter sward height and had a higher prevalence of broadleaved herbs, which additionally include greater plantain (*P. major*), cuckoo flower (*Cardamine pratensis*) and germander speedwell (*Veronica chamaedrys*). There were occasional outcrops of monospecific stands of nettle (*Urtica dioica*) dispersed throughout the fields, which indicated past physical disturbance or heavy fertilisation, within these patches. A wet flush was noted within the southern portion of the study area and was characterised by dominant growth of soft rush (*Juncus effusus*), Yorkshire fog and marsh thistle (*Cirsium palustre*). Many of the additional species which occur throughout the fields were also present in lower abundance within this wet flush.

Figure 5-2: Improved agricultural grassland recorded during site visit in 2006. (Image: EssGee Consultants)

5.3.3.1.2 Hedgerow (WL1)

This habitat formed many of the field boundaries at the time of the original site visit in 2006. The hedgerows varied in their composition and quality throughout the site. The most interesting hedgerows were located on the three sides (i.e., north, west and south) of the site. These three hedgerows comprised of mature beech (*Fagus sylvatica*) and hawthorn (*Crataegus monogyna*) of about 10 - 15 m height, but a few individuals of rowan (*Sorbus aucuparia*), elder (*Sambucus nigra*), sweet chestnut (*Castanea sativa*) and Norway spruce (*Picea abies*) were present. There was an understorey layer present comprised of ivy (Hedera helix), bramble (*Rubus fruticosus agg.)* an absence of mature trees. The ground flora layer was reasonably diverse, containing many of the species present within the adjacent grassland habitat. It included bracken (*Pteridium aquilinum*), wild oat (*Avena fatua*), perennial ryegrass, Yorkshire fog, cock's foot. velvet bent, hogweed (*Heracleum sphondylium*), nettle, creeping thistle, field scabious (*Knautia arvensis*), cleavers (*Galium aparine*), germander speedwell, bulbous (*R. bulbosus*) and creeping buttercup, foxglove (*Digitalis purpurea*), white clover, ragwort, common mouse-ear and dock. The remaining hedgerows within the study area vary and are either remnants of original hawthorn-dominated hedgerows or are hedgerows which have been replaced by lines of gorse, Norway spruce or Japanese larch (*Larix leptolepis*).

Figure 5-3: Hedgerow at the south of Historic site boundary recorded in 2006. This hedgerow was typical of those along the other boundaries (Image: EssGee Consultants).

5.3.3.1.3 Route and Bare Ground (ED2)

The internal haul roads are comprised of sand and gravel tracks which along with the extracted area were virtually devoid of vegetation aside from individuals of dock, dandelion (*Taraxacum agg*.), common mouse-ear and chickweed. This route and extracted area were of no value for any fauna species. Overall, this habitat was of no ecological value. The roadside area showed a return of vegetation such as common chickweed (*Stellaria media*), creeping buttercup (*Ranunculus repens*), common mouse-ear (*Cerastium fontanum*), ribwort plantain (*Plantago lanceolata*) and dock (*Rumex obtusifolius*.).

5.3.3.1.4 Depositing/lowland Rivers (FW2)

The BROADSTOWN 1st order watercourse is a slit rich slow flowing stream that runs along a 150m stretch of the southern boundary of the historic site. This stream flows to the west into the Graney watercourse which joins the river Lerr before entering the river Barrow 13.5 km to the southwest. Both sides of the bank along this stretch of the watercourse are steep and are flanked by hedgerows (on the southern bank) and dry meadows and grassy verges (on the northern bank). Bank vegetation consisted of Lady's Smock (*Cardamine pratensis*) Willowherb (*Epilobium hirsutum*), Pink Water Speedwell (Veronica catenate), Common Nettle (Urtica dioica), Cleaver (Galium aparine), Dandelion (*Taraxacum officinale*), Groundsel (*Senecio vulgaris*), Creeping Thistle (*Cirsium arvense*), Common Daisy (*Bellis perennis*) and Creeping Buttercup (*Ranunculus repens*). Aquatic vegetation was dominated by Common Duckweed (*Lemna minor*), Greater Tussock Sedge (*Carex paniculate*) and Common Bulrush (*Typha latifolia*). Cattle drinking access point is also present along this stretch of watercourse.

Figure 5-4: Broadstown stream at the Historic site southern boundary flowing westward (Image: EssGee Consultants).

5.3.3.1.5 Active Quarries and Mines (ED4)

During site visits in August 2021, this habitat type makes up the majority of the central and western sections of the Site of the HIstoric Development, where ongoing extraction activities and infrastructure are located. This habitat type interchanges with sections of *Recolonising bare ground (ED3),* particularly in the northwestern and southwestern boundaries of the site where vehicular and excavation activity has not occurred for periods of time.

Figure 5-5: Example of active quarry habitat (ED4) that covers majority of the western side of the site

5.3.3.1.6 Recolonising Bare Ground (ED3)

This habitat type is located in two distinct patches across the current Site where vehicular activity has not occurred for a period of time allowing vegetation to establish. Notable areas were recorded to the west of the site that have not been excavated recently. This habitat type will progress to *Dry meadows and grassy verges (GS2)* and *Scrub (WS1)* with time if left undisturbed.

Species recorded here include: Rosebay Willowherb (*Chamaenerion angustifolium*), Bird's-foot trefoil (*Lotus corniculatus*), Black medick (*Medicago lupulina*), Coltsfoot (*Tussilago farfara*), Hoary Willowherb (*Epilobium parviflorum*), Ragworth (*Jacobaea vulgaris*), Yarrow (*Achillea millefolium*), White Clover (*Trifolium repens*), Bitter Dock (*Rumex obtusifolius*), Oxeye daisy (*Leucanthemum vulgare*), Horse Tails (*Equisetaceae*), Gorse (*Fabaceae*), Bush vetch (*Vicia sepium*), Common poppy (*Papaver rhoeas*), Red shank (*Persicaria maculosa*), Sow thistle (*Sonchus spp.*) and Pineapple weed (*Matricaria discoidea*).

Figure 5-6: Example of a less species diverse section of recolonising bare ground habitat (ED3)

5.3.3.1.7 Artificial Surfaces and Buildings (BL3)

This habitat is present in the form of the entrance route to the quarry at the southwestern site boundary including concrete walls, steel gates and wheel wash facility. In addition, the northeastern boundary of the site encompasses a farm yard, outbuildings, dwelling house and driveways.

5.3.3.1.8 Treelines (WL2)

Mature treelines occur along the northern and southern site boundaries. The treelines along the northern site boundary are mainly composed of Ash trees (Fraxinus spp), trees with smaller sections of Beech trees (Fagus spp), particularly on the northwestern boundary. The southern boundary is composed mainly of beech trees with smaller sections of ash trees. Other tree species which are interspersed within treelines include: Alder (Alnus spp), Elder (Sambucus spp), Sycamore (*Acer pseudoplatanus),* Yew (*Taxus baccata*).

Figure 5-7: View facing south-east along mature beech treeline that runs along Site's southern boundary.

5.3.3.1.9 Dry meadows and Grassy Verges (GS2)

This habitat type was located in several pockets across the Site, particularly along western site boundary, on both sides of the quarry entrance as well as alongside the BROADSTOWN stream on the southern site boundary. In addition, patches of GS2 habitat also occur within the quarry on top of old piles of spoil and areas which have not been excavated (beneath telegraph poles)

Typical species recorded here include: Dandelion (*Taraxacum*), Ragworth (*Jacobaea vulgaris*), Sow thistle (*Sonchus spp.*), Ribworth plantain (*Plantago lanceolata*), Horsetail (*Equisetaceae*), Hoary Willowherb (*Epilobium parviflorum*), Coxfoot (*Dactylis glomerata*), False Oatgrass (*Arrhenatherum elatius*), Creeping buttercup (*Ranunculus repens*), Yarrow (*Achillea*

millefolium), Meadow foxtail (*Alopecurus pratensis*), Hogweed (*Heracleum spp.*), Marsh Thistle (*Cirsium palustre*), Nettle (*Urtica dioica*), Yorkshire Fog (*Holcus lanatus*), Dovesfoot cranesbill (*Geranium mole*), Cleavers (*Galium aparine*), Spear Thistle (*Cirsium vulgare*), Meadow Sweet (*Filipendula ulmaria*), Great willow herb (*Epilobium hirsutum*) and White clover (*Trifolium repens*).

Figure 5-8: Dry meadows and grassy verges which found mainly towards the west of the Site

5.3.3.1.10 Improved Agricultural Grassland (GA1)

Improved agricultural grassland donated the central portion of the site in the form of pasture fields which were being grazed by sheep at the time of site visit. Perennial rye-grass (*Lolium perenne*) was the dominant species present here with some White Clover (*Trifolium repens*) also present.

Figure 5-9: Improve agricultural grassland which dominates the eastern section of the site.

5.3.3.1.11 Other Artificial Lakes and Ponds (FL8)

Three settling ponds were recorded surrounded in bare disturbed earth for the most part likely due to recent machinery activity within the active quarry. The largest settlement pond was the only pond in use at the time of the site visit with the other two smaller ponds appearing to be out of use for some time. Species located on the banks surrounding these waterbodies included: White Willow (*Salix alba*) Coltsfoot (*Tussilago farfara*) Bitter Dock (*Rumex obtusifolius*) Ragworth (*Jacobaea vulgaris*) and Horsetails (*Equisetaceae*).

Figure 5-10: Extraction/settling pond located within the active quarry

5.3.3.1.12 Arable Crops (BC1)

The eastern portion of the side was dominated by arable crops which composed of Brassica which were being grown for animal fodder. Sheep were present in these fields grazing on these crops during the time of the site visit.

Figure 5-11: Brassica crops being grown for animal fodder

5.3.3.1.13 Exposed sand, gravel or till (ED1)

This habitat type is present along the extent of the main areas of excavation i.e., the face of the cliffs to the west of the Site where the active quarry ground level drops slightly below that of the surrounding area. Vegetation was mostly found at the base or lower sections of this habitat.

Typical species recorded here include Dandelion (*Taraxacum*) Redshank (*Persicaria maculosa*) Marsh thistle (*Cirsium palustre*), and Rosebay Willowherb (*Chamaenerion angustifolium*).

Figure 5-12: Example of exposed cliff face habitats at limits of current extraction works (ED1).

5.3.3.2 Habitat Evaluation

Table 5-6: Evaluation of Habitats recorded within the vicinity of the Historic Site (pre-extraction) in May 2006.

Habitat	Evaluation	Rationale	Key Ecological Receptor (KER)
Recolonizing bare ground (ED3)	Local Importance (Lower Value)	The access route is comprised of a sand and gravel track and, along with the extracted area is virtually devoid of vegetation aside from individuals of dock, dandelion (*Taraxacum agg.),* common mouse-ear and chickweed. This route and extracted area is of no value for any fauna species. Overall, this habitat is of no ecological value.	NO
Improved agricultural grassland (GA1)	Local Importance (Lower Value)	This habitat is characterized by low biodiversity and is of low conservation value.	NO
Hedgerow (WL1)	Local Importance (Higher Value)	Located in various areas along the Site's boundary. Hedgerows can be important wildlife habitats, providing refuge for many flora and fauna species.	**YES**

Depositing lowland streams (FW2)	Local Importance (Higher Value)	A section of this habitat runs to the south of the Site's southern boundary. Potential impacts as a result of Historic works are unlikely. However, maintains links to several designated sites through receiving waterbodies.	**YES**

Table 5-7: Evaluation of Habitats recorded within the vicinity of the Site of the Proposed extraction and infill works (2021).

Habitat	Evaluation	Rationale	Key Ecological Receptor (KER)
Recolonizing bare ground (ED3)	Local Importance (Lower Value)	Located in patchy areas where machinery activity has not occurred recently. Not considered of high conservation value due to active nature of quarry and high frequency of potential disturbance.	NO
Dry meadows and grassy verges (GS2)	Local Importance (Lower Value)	Located in scattered sections along Site margin. Not considered to be of high conservation value as likely areas where recolonizing bare ground has been undisturbed for a time.	NO
Improved agricultural grassland (GA1)	Local Importance (Lower Value)	This habitat is characterized by low biodiversity and is of low conservation value	NO
Treelines (WL2)	Local Importance (Higher Value)	Two prominent Ash and Beech treelines located along the Site's northern and southern boundary, separating the quarry from the surrounding farmland. Both, treelines show bat roost potential	**YES**
Arable crops (BC1)	Local Importance (Lower Value)	This habitat is characterized by low biodiversity and is of low conservation value	NO
Other artificial lakes and ponds (FL8)	Local Importance (Lower Value)	Three quarry settling/abstraction ponds located within the active quarry. Moorhen chick observed at pond margin during site visit. Moorhen were observed nesting in the broadstown stream in in original EIS. Moorhen may occasionally frequent the pond but unlikely that the pond represent useful feeding and breeding habitat. Not considered to be of biodiversity value due to current active function and high sediment load.	NO
Hedgerow (WL1)	Local Importance (Higher Value)	Located in various areas along the Site's boundary, particularly to the north in front of sections of the mature conifer treeline. Plenty of bird activity observed along these sections.	**YES**

Active Quarry and Mines (ED4)	Local Importance (Lower Value)	An active, highly disturbed habitat type. Low to negligible vegetation cover. Low conservation value.	NO
Depositing lowland streams (FW2)	Local Importance (Higher Value)	A section of this habitat runs to the south of the Site's southern boundary. Potential impacts are not considered likely due to proposed works. However, maintains links to several designated sites through receiving waterbodies.	**YES**
Exposed Sand, Gravel or Till (ED1)	Local Importance (Higher Value)	Located in particular along the un-quarried cliff faces in the west of the Site, designated for infill as part of this application. Sand Martin nest burrows visible along upper cliff faces.	**YES**
Artificial Surfaces and Buildings (BL3)	Local Importance (Lower Value)	Structures such as wheel wash facilities, farm yard buildings and roadways are spread across the site. These structures are of little to no ecological value and will not be affected by any future restoration development.	NO

Figure 5-13: Map of the habitats recorded at the Historic Site in 2006.

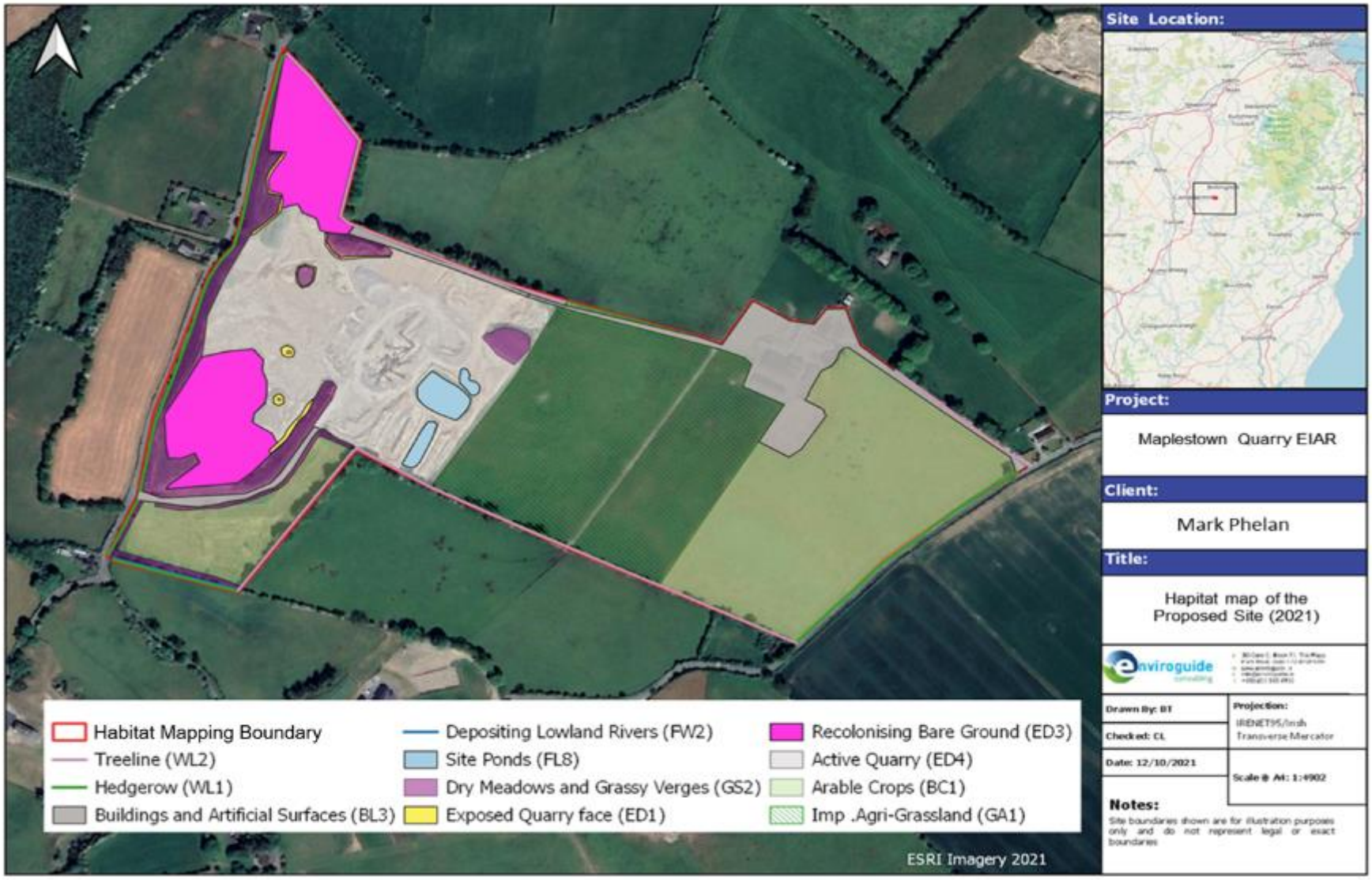


Figure 5-14: Map of the current habitats present at the site of the Unauthorised Development.

5.3.4 Species and Species Groups

5.3.4.1 Flora

5.3.4.1.1 Rare and Protected Flora

The Site of the Historic/Unauthorised Development site is located within the Ordnance Survey National Grid 10km Square S88, 2km square (S88M) and 1km square (S8484). Species records from the National Biodiversity Data Centre (NBDC) online database for these areas were studied for the presence of rare or protected flora species. In addition, an information request was also made to the NPWS for records of protected/rare species reported within a 5km area encompassing the Site of the Historic Development. Both of these data bases contained no records of rare and protected flora within the last 30 years. The FPO Bryophytes data base was also checked for rare and protected flora within the vicinity of the quarry. Table 5-8 below presents details of the rare and protected flora species obtained from the FPO Bryophytes database.

Table 5-8: Records of Rare and Protected Species of Moss, Fern and Flowering Plant for the last 30 years, recorded within the areas surrounding the Site of the Historic Development; from the FPO Bryophytes database

Name	Species Group	Date of last record	Database	Designation
Hamatocaulis vernicosus	Moss	30/05/2017	FPO Bryophytes	Near Threatened; listed on the Flora Protection Order, Bern Convention & EU Habitat Directive

5.3.4.1.2 Invasive Species

There are records for 5 species of flora considered to be invasive within the 10km square S88 and 2km grid square S88M within which the Site is located. Details of these records are listed in *Table 5-9* below.

No invasive plant species were recorded at the Site during the site surveys in 2006 or 2021.

Table 5-9: Records of Invasive Species of Flowering Plant for the surrounding 2km (S88M) & 10km (S88) grid squares from the NBDC.

Species	Grid square	Date of last record	Source	Designations
Canadian Waterweed (*Elodea canadensis*)	S88	31/08/2020	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	- High impact invasive species - Regulation S.I. 477
Giant Hogweed (*Heracleum mantegazzianum*)	S88	23/08/2006	National Invasive Species Database	- High impact invasive species - Regulation S.I. 477
Indian Balsam (*Impatiens glandulifera*)	S88	26/07/2020	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	- High impact invasive species - Regulation S.I. 477
Japanese Knotweed (*Fallopia japonica***)**	S88	17/09/2019	Vascular plants: Online Atlas of Vascular Plants 2012 Onwards	- High impact invasive species - Regulation S.I. 477
Nuttall's Waterweed (Elodea nuttallii)	S88	21/08/2006	National Invasive Species Database	- High impact invasive species - Regulation S.I. 477

5.3.4.2 Mammals (excl. bats)

Records for terrestrial mammals were obtained from the NBDC online database, along with records obtained from the NPWS. *Table 5-10* below lists these species, their date of last record and summarises their protected status.

Table 5-10: Records of Terrestrial Mammals for the surrounding 2km Grid Square (S88M) and 10km Grid Square (S88) from the NBDC and NPWS.

Species	Grid square	Date of last record	Source	Designation
NATIVE				
Eurasian Badger (*Meles meles*)	**S 88M**	31/12/2014	Badger Setts of Ireland Database	- Wildlife (Amendment) Act 2000 - Bern Convention Appendix III
Sika Deer (*Cervus nippon*)	**S88**	2004	NPWS Database	- Wildlife Act 1976 / 2000
European Otter (*Lutra lutra*)	**S88**	2010	NPWS Database	- Wildlife (Amendment) Act 2000 - EU Directive 92/43 Annex II, Annex IV - Bern Convention Appendix III
Pine Martin *Martes*	**S88**	2018	NBDC Database	- EU Directive 92/43 Annex II, Annex V
Irish Hare (*Lepus timidus subsp. Hibernicus*)	**S88**	2006	NPWS Database	- Wildlife Act 1976 / 2000 - Bern Convention Appendix III - EU Directive 92/43 Annex II, Annex V
Western Euro-pean Hedgehog *Erinaceus euro-paeus*	**S88**	2018	NBDC Database	- Wildlife Act 1976 / 2000
Eurasian Pygmy Shrew *Sorex minutus*	**S88**	2018	NBDC Database	- Wildlife Act 1976 / 2000

No rare or protected mammal species were directly recorded during site surveys in 2006 or 2021.

The habitats within the Site of the Historic Development are of variable value to mammals. The hedgerows habitats that form the margins of most of the Site of the Historic Development could provide habitat for Hedgehog and Pygmy shrew. Other species such as Mountain-hare and Irish stoat could also potentially inhabit/have inhabited these Sites, although not recorded in the 10km grid square surround the site in the last 30 years. No Badger setts or signs of Badger were recorded during the site survey in 2006 or 2021, however should a suspected badger sett be discovered during the proposed works it is recommended a professional ecologist be consulted regarding how best to proceed. No signs of Otter were recorded at the

Historic/Proposed Site nor do these sites provide suitable habitat for this species. However, Otter may/may have been active in the area with the presence of the various streams near the Site, and the River Barrow downstream.

Figure 5-15: Evidence of mammal usage at the Site. A) suspected fox den and signs of rabbit activity beneath treelines at the site and B) suspected fox den.

The Site of the Historic Development also has/had the potential to support the non-native/invasive species such as Brown Rat and European Rabbit (Rabbit droppings and burrows recorded on-site); while there is some potential habitat for the invasive American mink through the presence of the waterbody to the south of the site. No signs of Wild Boar or the elusive Muntjac deer were observed at the Site of the Historic Development. As these species are non-native/invasive they are not considered further in this report.

Suspected Red fox dens were observed in Dry Meadows and Grassy Verge (GS2) habitat on the boundary of the active quarry within the proposed infill area as well as beneath treelines on the sites southern boundary which borders the arable fields. Wood Mouse also may frequent the site as is a relatively widespread species. Although not afforded the same level of protection as the other mammal species mentioned above; wilful harming of the animal should be avoided. Fox is also protected from a variety of hunting/extermination techniques as per the **Wildlife Acts 1976 to 2012**; and from acts of cruelty as per the **Animal Health and Welfare Act 2013**. As suspected fox dens were observed on site, this species is assessed further in this report. No badgers' sets were recorded during site visits.

5.3.4.3 Bats

Records for 5 species of bat exist within the grid squares which encompass the Site of the Historic Development. These species records are listed in Table 5-11.

Table 5-11: Records of Bats for the surrounding National Grid Squares from the NBDC

Species	Grid square	Date of last record	Source	Designation
Daubenton's Bat (*Myotis daubentoniid*)	**S88**	29/08/2011	National Bat Database of Ireland	- EU Habitats Directive – Annex IV - Wildlife (Amendment) Act 2000
Lesser Noctule (*Nyctalus leisleri*)	**S88**	12/08/2010	National Bat Database of Ireland	- EU Habitats Directive - Annex IV - Wildlife (Amendment) Act 2000
Natterer's Bat *(Myotis nattereri)*	**S88**	13/08/2007	National Bat Database of Ireland	- EU Habitats Directive - Annex IV - Wildlife (Amendment) Act 2000
Pipistrelle (*Pipistrellus sensu lato*)	**S88**	12/08/2010	National Bat Database of Ireland	- EU Habitats Directive - Annex IV - Wildlife (Amendment) Act 2000
Soprano Pipistrelle (*Pipistrellus pygmaeus*)	**S88**	12/08/2010	National Bat Database of Ireland	- EU Habitats Directive - Annex IV - Wildlife (Amendment) Act 2000

5.3.4.4 Birds

5.3.4.4.1 Historic extraction and Infill (since 2012)

Results from the bird survey carried out at the Site of the Historic Development on 13th May 2006 are shown in Table 5-13 below. A total of 5 species were identified within the Site of the Historic Development.

Table 5-12: Bird Species recorded within the vicinity of the Site of the Historic Development (pre-extraction) during site Bird Surveys in May 2006.

Species	BoCCI[3] Status	Observations
Feral Pigeon	**Green**	Seen in flight over agricultural grassland
Rook	**Green**	Seen utilizing agricultural grassland habitat
Hooded Crow	**Green**	Seen utilizing agricultural grassland habitat
Blackbird	**Green**	Seen in hedgerows during site visit
Robin	**Amber**	Seen in hedgerows during site visit

Results from the bird survey carried out at the Site of the Development on 19th August 2021 are shown in Table 5-13 below. A total of 14 species were identified within the Site of the Development.

Table 5-13: Bird Species recorded within the vicinity of the Site of the Development during site Bird Surveys in August 2021.

Species	BoCCI[4] Status	Observations
Wood Pigeon	**Green**	Several individuals recorded flying over the site
Rook	**Green**	Several individuals recorded flying over the site
Wren	**Green**	Several Individuals recorded vocalizing in tree lines across the site
Buzzard	**Green**	One juvenile bird observed perched on mature beech tree line on the northwestern site boundary
Magpie	**Green**	Several individuals recorded flying over the site
Pied Wagtail	**Green**	One individual recorded on activity quarry substrate
Jackdaw	**Green**	Several individuals recorded on site
Chaffinch	**Green**	Several Individuals recorded vocalizing in tree lines and across the site
Moorhen	**Green**	Juvenile record along in vegetation at the edge of settlement pond

[3] Birds of Conservation Concern in Ireland 2020-2026 (Gilbert, G., Stanbury, A. & Lewis, L. 2020).
[4] Birds of Conservation Concern in Ireland 2020-2026 (Gilbert, G., Stanbury, A. & Lewis, L. 2020).

Starling	**Amber**	Observed flying across the site
Swallow	**Amber**	>50 individuals recorded flying over the site
Robin	**Amber**	Pair heard vocalising along hedgerow
Mistle Thrush	**Amber**	One individual perched on wall near entrance gate.
Sand Martin	**Amber**	Nesting burrows observed in exposed sand gravel and till faces within active quarry

5.3.4.5 Fish

5.3.4.5.1 Atlantic salmon (*Salmo salar*)

The Atlantic salmon is listed as an Annex II species under the Habitat Directive. There is no record of this species in the 10km national grid square S88 in which the Site of the Historic Development is located.

However, surveys of the Barrow River Catchment by Inland Fisheries Ireland in 2017 (Matson *et al.*, 2018) covered the rivers Greese, Lerr and Barrow which runs to the west of the Site of the Development and receives the *BROADSTOWN* stream that runs 0.07 km south of the site boundary.

A survey was carried out on the Lerr River *ca.*5.8 km west of the Site, and *ca.* 360m upstream from the point the *BROADSTOWN stream* joins the Lerr River; and on the Greese river 14 km to the West *ca.* 1.8 river kilometres upstream of where the Lerr River enters the Barrow. Surveys in 2017 recorded presence of Salmon at both locations. IFI carried out spot checks at these sites as opposed to timed electrofishing sampling and therefore could only give a qualitative assessment of presence/absence.

Although it is highly unlikely that Salmon would be found in the stretch of the *BROADSTOWN* stream south the Site, their presence downstream is worth consideration and as such protected species Atlantic salmon will be assessed further. Although salmon were not assessed in the original EIS, given their presence in the surrounding catchment as of 2017, it is likely that salmon would have also been present at the time of the Historic Development. As such they are further assessed below.

5.3.4.5.2 Lamprey (*Lampetra sp. & Petromyzon marinus*)

All three lamprey species recorded in Ireland are listed on Annex II of the EU Habitats Directive. Lamprey larval burrows are characteristically found at eddies or backwaters, on the inside of bends or behind obstructions, where current velocity is below that of the main stream and where organic material tends to accumulate (Kelly & King, 2001). There are no records for any species of lamprey within either the 10km (S88), 2km (S88M) grid squares associated with the Site of the Development.

However it is commonly accepted that the distributions of Lamprey species in Ireland is not yet fully known and that it is likely they occur in most catchments throughout the country (Igoe *et al.* 2004). For example, lamprey were recorded in the River Greese downstream of the BROADSTOWN stream during IFI surveys in 2013. As such these species will be assessed further as 'Lamprey'. Similarly Although Lamprey were not assessed in the original EIS, given their presence in the sourcing catchment as of 2017, it is likely that lamprey would have also been present at the time of the Historic Development. As such they are further assessed below.

5.3.4.5.3 European eel (*Anguilla anguilla*)

European Eel is a red listed species and are currently considered to be the most threatened fish species in Ireland, following a recent red-listed publication (King *et al*. 2011). European Eel can inhabit a range of waterway types including lakes, small streams and rivers; migrating from where they live in freshwater habitats to breed out at sea, before returning then as young eel to their freshwater homes (King et al. 2011). Eel were recorded in the Greese River, downstream of the BROADSTOWN stream; during IFI surveys in 2013.This river flows into the River Barrow and River Nore SAC and so Eel are likely to be present along this river and as such are assessed further in this report. Although eel were not assessed in the original EIS, given their presence in the surrounding catchment as of 2017, it is likely that eel would have also been present at the time of the Historic Development. As such they are further assessed below.

5.3.4.6 Other Vertebrates

5.3.4.6.1 Common frog (*Rana temporaria*)

There was some potential breeding habitat for common frog (*Rana temporaria*) within the Historic/Proposed site in the form of shallow pooling in recessed areas of the quarry, the attenuation ponds and the broadstown stream to the south of the site. There are records of Common frog within the 10km grid square S88 and so these species are assessed further in this report.

5.3.4.6.2 Common Lizard (*Zootoca vivipara*)

There are no records of Common Lizard (*Zootoca vivipara*, formerly *Lacerta vivipara*) within the 10km grid square S88 and there is no suitable habitat for this species (woodland, marshes, moors, sand dunes) within the Site of the Historic Development. As such it is not assessed further.

5.3.4.7 Invertebrates

5.3.4.7.1 White-clawed crayfish (*Austropotamobius pallipes*)

In Ireland, the white-clawed crayfish most commonly occur in small and medium-sized lakes, large rivers, streams and drains; wherever there is sufficient lime (Reynolds, 2007). Freshwater crayfish require relatively hard water with high calcium levels, due to their requirement for sufficient calcium to harden their exoskeletons following moulting (Gallagher et al., 2006 in Reynolds *et al.* 2010a). The overall conservation status of the white-clawed crayfish in Ireland is inadequate, due to the reduction in its range and the continuing pressures that it faces (NPWS, 2013).

There are no records for this species within the grid square S88 which encompasses the Site of the Historic Development. It is noted that this species is widely distributed in midlands of Ireland with including the River Barrow Catchment (Reynolds *et al.* 2010b). As the River Barrow receives water from the *BROADSTOWN* stream that abounds part of the Site's southern boundary, this species is further assessed below.

5.3.4.7.2 Marsh Fritillary (*Euphydryas aurinia*)

Marsh Fritillary butterfly is listed under Annex II of the EU Habitats Directive. There are records for this species within the 10km grid square S88

Neither Marsh Fritillary, nor its associated food plant; devil's bit scabious (*Succisa pratensis*), were recorded during site surveys. The Site of the Historic development did not contain any wet grassland or other habitat considered suitable for marsh fritillary and so this species is not assessed further. Similarly, the Site of the historic development did not contain any wet grassland or other habitat considered suitable for marsh fritillary and so this species is not assessed further.

5.3.4.8 Faunal Evaluation

Fauna that have been observed within the site of the Historic Development (pre-extraction), or for which records exist in the wider area, have been evaluated below in Table 5-14 for their conservation importance. This evaluation follows the Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009b). The rationale behind these evaluations is also provided.

Table 5-14: Evaluation of Fauna recorded within the Site of the Historic Development (pre-extraction) in May 2006.

Species	Evaluation	Rationale	Key Ecological Receptor (KER)
Bird Assemblage (Green listed)	Local Importance (Higher Value)	Numerous green-listed species potentially utilized site.	**Yes**
Bird Assemblage (Amber listed)	National Importance	A number of amber listed species potentially bred in hedgerows on site.	**Yes**
Badger	National Importance	No setts were recorded at the Site during surveys in 2006. Some evidence of foraging on agricultural grassland. Abundant alternative habitat present in surrounding lands should Badger be in the locality.	No
Hedgehog	National Importance	Potential nesting/foraging habitat for hedgehog was recorded within the hedgerow habitat at the Site.	**Yes**
Rabbit	Local Importance (Lower Value)	Recorded within grassland habitat on site surveys in 2006. Abundant habitat in the surrounding area.	No
Brown rat	Local Importance (Lower Value)	Recorded within grassland habitat on site surveys in 2006. Abundant habitat in the surrounding area.	No

House Mouse	Local Importance (Lower Value)	Recorded within grassland habitat on site surveys in 2006. Abundant habitat in the surrounding area.	No
Wood Mouse	Local Importance (Lower Value)	Recorded within grassland habitat on site surveys in 2006. Abundant habitat in the surrounding area.	No
Pygmy Shrew	National Importance	Potential foraging habitat for shrew within the hedgerow habitat sections present at the Site.	**Yes**
Irish (mountain) Hare	National Importance	May have utilize Site but abundant suitable habitat in the form of surrounding agricultural grassland abounding the Site.	No
Red Fox	Local Importance (Higher Value)	No dens were recorded on-site in 2006. Abundant and likely foraged on grassland on-site. Not of conservation concern or protected species.	No
Bat assemblage	International Importance	Some potential foraging and roosting habitat for bats within the site along Site margins and northern and southern mature treelines.	**Yes**
Sika Deer	National Importance	None recorded during field surveys in 2006. No suitable habitat was present on-site.	No
Pine Marten	National Importance	Known to be present in the surrounding areas. No suitable habitat was present on-site	No
Otter	International Importance	No evidence or suitable habitat recorded on-site although may have been in the area due to streams and rivers in the locality.	**Yes**
Common Frog	International Importance	Some potential habitat in the vicinity included the broadstown stream south of the site.	**Yes**
Common Lizard	National Importance	No evidence of common lizard or suitable habitat recorded during surveys in 2006. Alternative suitable habitat located outside of the site.	No
Atlantic Salmon	National Importance	There is potential for Salmon to have utilised the Lerr, Greese and Barrow rivers downstream of the Site.	**Yes**
Lamprey sp.	National Importance	There is the potential for Lamprey to have utilised the Greese River downstream of the Site.	**Yes**
European Eel	National Importance	There is the potential for Eel to have utilised the Greese River downstream of the Site.	**Yes**
White Clawed Crayfish	International Importance	No records of this species nearby however this species is regularly found in the river Barrow downstream of the site.	**Yes**
Marsh Fritillary	International Importance	Neither marsh fritillary, nor its associated food plant; devil's bit scabious (*Succisa pratensis*), were recorded during site surveys in 2006.	No

5.4 Characteristics of the Historic (since 2012) Development

5.4.1 Construction phase

5.4.1.1 Historic extraction and infill (since 2012)

The permitted development did not require the construction of permanent buildings. Instead, construction at the site was limited to the importation infrastructure such as washing/rinsing plant, a dry screener, one bunded fuel storage tank, a wheel wash, a weighbridge, Portacabin, chemical toilet, portable generator and water supply. The construction phase also involved the excavation of 3 no. settlement lagoons, stockpiling area, truck and plant parking area and site access. The unauthorised development made use of this existing infrastructure and therefore there was no construction phase.

5.4.2 Operational Phase

5.4.2.1 Historic extraction and infill (since 2012)

The operational phase of the historic (unauthorised) development involved the extraction of approximately 192,240 tonnes of sand and gravel from the site. A total of 41,700 m^3 of overburden were removed and set aside for re-use in the restoration of the area. Material was to be extracted in five phases, starting from the western portion of the extraction area and moving eastwards for the remaining phases. Topsoil was to be stripped,1.0 hectares at a time as the pit face advanced. The machinery used in stripping was brought on site and removed off site as needed by means of low loaders. Phase I was progressively restored using the topsoil stripped from Phase II (once work on Phase Two had commenced) and so on until the final phase. Silts extracted from the settlement lagoons were also used in the restoration process.

5.5 Potential Impact of the Historic (since 2012) Development

The Potential impacts from the Historic extraction and infill activities (since 2012) on habitats, flora and fauna associated with Site of the Development is assessed in the following sections.

5.5.1 Construction Phase

5.5.1.1 Historic extraction and infill (since 2012)

As there was no construction phase associated with the historic (unauthorised) development there will have been no impacts.

5.5.2 Operational Phase

5.5.2.1 Impacts to Designated Sites

An Appropriate Assessment Screening report has been carried out in relation to the Historic Development and accompanies this application. The conclusions of this are included below:

The Historic extraction and infilling (since 2012) at Maplestown, Rathvilly, Co. Carlow has been assessed taking into account:

- the nature, size and location of the Historic works and possible impacts arising from the construction works.
- the qualifying interests and conservation objectives of the European Sites
- the potential for in-combination effects arising from other plans and projects.

In conclusion, upon the examination, analysis and evaluation of the relevant information and applying the precautionary principle, it is concluded by the authors of this report that, on the basis of objective information; the possibility may be excluded that the Historic Development would not have had a significant effect on any of the European Sites listed below:

- *Holdenstown Bog SAC (001757)*
- *Slaney River Valley SAC (000781)*
- *Wicklow Mountains SAC (002122)*

However, upon examination of the relevant information including in particular the nature of the Historic Development and the likelihood of significant effects on European Sites, the possibility may not be excluded that the Historic Development would have had a likely significant effect on any of the European Sites listed below:

- River Barrow and River Nore SAC (002162)

Accordingly, a Remedial Natura Impact Statement has been prepared for the Historic Development and is included under separate cover.

5.5.2.1.1

5.5.2.2 Loss of Habitat

5.5.2.2.1 Potential Impact to Birds

Historic (unauthorised) extraction and infill activities during the period (since 2012) occurred primarily on improved agricultural grassland habitat at the centre of the site. Stripping of the site and extraction during the operational phase would have resulted in the progressive loss of this habitat over a 5 year period, however this habitat would have been of low ecological value to birds. Site visits in August 2021 highlighted that this area has been infilled and the grassland habitat has been restored. The loss of the grassland habitat would not have resulted in significant habitat loss for birds and may in fact have led to the creation of habitat for Sand Martin in the exposed cliff faces. Conversely, subsequent infilling works may have led to loss of suitable Sand Martin nesting habitat. The original landscape strategy for rehabilitation of the quarry states that:

"*The pit will be progressively restored using silt, sub soil and top soil commencing at the end of Phase one and two excavations. Soils and silt will be placed against the exposed sand and gravel faces and would be graded to a 1:6 max slope. Soil will be spread 500mm deep over the pit floor*"

As there was no loss of hedgerow habitat and a 5m buffer was maintained between historic extraction and infill works, it is considered that these works did not result in habitat loss for other bird species.

Figure 5-16: Example of cliff faces supporting Sand martin nesting burrows at the proposed infill site.

5.5.2.2.2 Potential Impact to Bats

As extraction and infill works primarily occurred on improved grassland habitat and did not affect hedgerows or treelines, this would not have led to the loss of roosting or commuting habitat for bats. Although bats can utilise agricultural grasslands as foraging habitat, the availability of this habitat type in the surrounding area suggests that the works would not have significantly impacted foraging habitat availability.

5.5.2.3 Aquatic Species

The historic works were approximately 150m from the broadstown stream to the south of the site. The likelihood of potential significant impacts on aquatic species as a result of historic extraction and infill work was imperceptible due the mitigation measures which were implemented during the construction and operations phases the as part of the original planning application including:

"*All surface water runoff runs into the pit or permeates into the ground. No surface water run-off will be directed towards the nearby stream".*

"Topsoil that is to be stored on site will be stored in mounds on a low-lying area away from the stream, so as to prevent solids entering the stream during periods of high rainfall".

5.5.2.4 Mammals

As the historic extraction did not influence hedgerow or treeline habitat, habitat loss for small mammals such as Hedgehog, Hare, and Pygmy Shrew would not have occurred. The loss of agricultural grassland may have resulted in the loss of a small area of foraging ground however given the availability of this habitat in the wider area the impact of this would have been negligible.

5.5.2.5 Potential Importation of Invasive flora

This area was restored using silt, sub soil and topsoil overburden which was removed from the extraction area and stockpiled at the site. No soil was imported for the purpose of backfilling. During site surveys in August 2021, no invasive flora was recorded at or immediately surrounding the infilled area. As such it can be determined that the historic infilling did not lead to the importation of spread of invasive species.

5.5.3 Potential Cumulative Impacts

A review of other off-site developments and Developments was completed as part of this AA Screening Report. The following projects and plans were reviewed and considered for possible cumulative effects with the Historic Development:

Projects:

Planning Application Reference: 21148

This site is located in the farmyard in the northeastern corner of the current site boundary of the Development. Permission is sought to construct a new grain / straw & machinery store, concrete aprons with all associated works on lands located in Maplestown, Rathvilly, Co. Carlow. **Decision Date: 11/06/2021. Application Status: Finalised**

Planning Application Reference: 2147

This site is located 500m to the northeastern of the Development. Permission is sought for development of a milking parlour and collecting yard, cattle handling area, dairy, machine room, farm office, storeroom, meal bin, slatted tanks, extension to existing cattle shed, concrete yards and ancillary works. **Date Received: 17/02/2021. Application Status: Finalised.**

Planning Application Reference: 2043

This site is located 450m to the south of the Development. Permission is sought to construct new agricultural buildings including a new indoor horse-riding arena, riding school stables, private breeding yard stables and walker, toilet facilities with waste water treatment unit and percolation area, private well, widening of existing site entrance & all associated site works . **Date Received: 13/02/2020. Application Status: Finalised.**

Planning Application Reference: 16204

This site is located 460m to the south of the site boundary of the Historic Development. Permission was sought to install a septic tank with percolation area and all associated site works on lands located in Maplestown, Rathvilly, Co. Carlow. **Decision Date: 13/08/2015. Application Status: Granted.**

Plans:

- Carlow County Development Plan 2009-2014

- Carlow County Development Plan 2015-2021

The Carlow County Development 2009-2014 recognises the importance of quarry industries to the local and national economy as valuable sources of raw material for industry in general and the construction industry in particular and as an important source of employment. However, the plan also recognising the potential environmental impacts of quarrying activities recommends that appropriate environmental guidelines be implanted in quarrying activities.

"*Quarry Planning Guidelines, as published by the Department of the Environment Heritage and Local Government in April 2004, the ICF Environmental Code of October*

2005, and the Guidelines for Environmental Management in the Extractive Sector as published by the Environmental Protection Agency in May 2006 are key documents for standards required of extractive developments".

The Carlow County Development Plan 2015 – 2021, lists policy E.D. Policy 13 outlining the councils commitment to facilitate the further development of the quarrying industry by permitting the continuation and extension of existing quarries where it does not adversely impact on the environment "*It is the policy of Carlow County Council to: Provide for quarry and extractive development where it can be demonstrated that the development would not result in a reduction of the visual amenity of designated scenic area, to residential amenities or give rise to potential damage to areas of scientific, geological, botanical, zoological and other natural significance including all designated European Sites"*

Section 3.5.7 of the Carlow County Development plan relating to Aggregate Resources, Mining and Extractive Industry also states:

"*Carlow County Council recognises the importance of sand and gravel extractions in the economic life of the county and its importance as a valuable source of employment in parts of the county. However, it is also recognized that exploitation of deposits or mining (open cast or underground) can have significant environmental impacts on the amenities of surrounding areas. The Planning Authority will have regard to the provisions of the DoEHLG's "Quarries and Ancillary Activities; Guidelines for Planning Authorities" in the assessment and determination of development proposals."*

The Historic and Proposed extraction and infilling works in this case were not found to be at odds with these policies. All other existing or proposed developments within the locality of the assessed area were small scale individual projects which are residentially based. There are 5 other smaller quarries located approx. within a 1km radius of the site, however there is no

direct link between the site and this other quarries and it would be subject to the same assessment as the subject site in this report. All other existing or proposed developments within the locality of the assessed area were small scale individual projects which are residentially based. There are no other known activities or proposed activities at or within close proximity to the site that would be likely to result in any significant cumulative impacts on the ecology of the local area at this current time. It is therefore considered that no significant cumulative ecological impacts would occur.

5.5.4 "Do Nothing" Impact

Should the Historic extraction and infill work not have proceeded the lands would have remained under agricultural use.

5.6 Avoidance, Remedial & Mitigation Measures

Several mitigation measures were implemented as part of the original EIS for the historic development to mitigate against significant impacts to habitats and fauna during both the construction and operation phase. The following paragraphs outline the mitigation measures implemented as part of the permitted development. These measures implemented in full would have been sufficient to prevent significant impacts on habitats or fauna during the historic development including the unauthorised development.

5.6.1.1 Mitigation by Avoidance

The extraction and infill activities were contained within a clearly defined area of the site, largely concentrating on the hill located in the centre of the property. Machinery operated only within the allocated area and the access route to the site was confined to the existing track, in order to reduce to the largest extent possible, potential damage from vehicular disturbance.

Where preparation work was adjacent to hedgerows on site, a buffer zone of at least 5 metres from the drip line of mature trees was fenced off, to prevent damage to roots and branches. This minimum distance also aimed to help in reducing dust build up on hedgerows. In addition, this 5m buffer would have limited disturbance to birds and mammals which may have been utilising the hedgerows adjacent to extraction and infill activities.

Although the unauthorised extraction and infill activities during the period after 2012 did not lead to the removal of any hedgerows or trees onsite, the original EIS states that any trimming or pruning works required along the access route, were to be carried out outside of the nesting period (March-August) in line with the Wildlife (Amendment) Act, 2000.This was to ensure that no avifauna is directly affected by the Historic development. This time period also coincides with the summer breeding season for bats and pruning and trimming works outside of this time would avoid any disturbance to bats which may have had summer maternity roosts within mature trees.

The original EIS also proposed measures to avoid significant impacts on aquatic habitats including the broad town stream to the south of the site. In particular, all surface water runoff runs into the pit or permeates into the ground. No surface water runoff was directed towards the nearby stream. In addition, topsoil that was stored on site was stored in mounds on a low-

lying area away from the stream, so as to prevent solids entering the stream during periods of high rainfall.

5.6.1.2 Mitigation by Reduction

Measures were also taken to limit the working area during the preparation phase to reduce the impacts of the development on the adjacent habitats. On dry windy days dust preventative measures were implemented in order to prevent any dust blow to areas outside the delimited preparation areas. All fuels were contained within specially constructed bunds to ensure that all fuel spillages were fully contained and thus would not impact on any off-site habitats. The waste water from the washing / rinsing plant was fed by gravity to two settlement lagoons laid out in series, in the west of the study area. These settlement ponds are designed to prevent any silt laden surface water run-off to adjacent habitats.

A significant amount of soil, sand and gravel was removed as a result of the extraction activities. All mounded soils or temporary aggregate were not placed within 5 metres of the drip line of any trees or hedgerows to be retained on site. In addition, all excavated topsoil was re-used for the reinstatement of the area once excavation was complete. Phase I was progressively restored using the topsoil stripped from Phase Two (once work on Phase Two had commenced) and so on until the final phase was completed. Silts extracted from the settlement lagoons were also used in the restoration process.

5.6.1.3 Mitigation by Remedy

Remedial measures included reseeding the areas of lost grassland habitat once pit operations were stopped and the area was infilled.

5.6.2 "Worst Case" Scenario

In one of the "worst case scenarios" untreated water from the attenuation ponds or Site itself would enter the waterway abounding the Site to the South. Sediment and pollutants would enter the stream and cause negative effects downstream; impacting on ecological sensitivities such as habitats, designated sites and aquatic species (fish species such as salmon and trout in particular). Higher predators such as otter would then be negatively impacted through a loss of prey numbers.

Another scenario would see infilling of exposed sand gravel and till cliffs during the breeding bird season; resulting in profound damage and disturbance to the resident Sand martin colony recorded inhabiting these cliffs during site surveys.

5.7 Residual Impacts

Residual impacts are impacts that remain once mitigation has been implemented or impacts that cannot be mitigated. Table 5-15 below provides a summary of the impact assessment for the identified Key Ecological Resources (KERs) and details the nature of the impacts identified, mitigation proposed and the classification of any residual impacts.

Table 5-15: Summary of potential impacts on KER(s), mitigation measures/mitigating factors and residual impacts resulting from the Historic Development.

Key Ecological Resource	Level of Significance	Potential Impact	Impact Without Mitigation				Proposed Mitigation/ Mitigating Factors	Residual Impact
			Quality	Magnitude / Extent	Duration	Significance		
Designated Sites								
Nearby pNHAs	National importance	No potential impacts predicted.	n/a	n/a	n/a	n/a	No Mitigation recommended.	**No impact.**
Habitats								
Hedgerows (WL1)	Local importance (Higher value)	No hedgerows were removed as part of historic works. Quarrying and infill activities adjacent to hedgerow habitat had the potential to cause disturbance to small mammals and bird species and dust build up on hedgerows reducing the quality of this resource	Negative	Localised	Medium-term	Non-significant	A minimum 5m buffer was implemented between the edge of quarrying and infill areas and hedgerows	**Negative: Localised; Medium term; Imperceptible**
Lowland/ Depositing River (FW2)	Local importance (Higher value)	Potential surface water run off from the historic extraction and infill area reaching the broadstown stream to the south of the site.	Negative	Localised	Medium-term	Significant	As a precaution overburden and imported infill material was stored in mounds on a low-lying area away from the stream, so as to prevent solids entering the stream during periods of high rainfall No surface water was directed toward the stream.	**No impact**

Mammals								
Otter	International Importance	Potential surface water run off from the historic extraction and infill area reaching the broadstown stream to the south of the site.	Negative	Localised	Medium-term	Significant	As a precaution overburden and imported infill material was stored in mounds on a low-lying area away from the stream, so as to prevent solids entering the stream during periods of high rainfall No surface water was directed toward the stream	**Imperceptible**
Hedgehog	National Importance	Potential disturbance due to extraction/infill works adjacent to hedgerows Potential dust build up on hedgerows reducing the quality of this habitat for hedgehog	Negative	Localised	Medium-term	Not-significant	A minimum 5m buffer was implemented between the edge of extraction and infill areas and hedgerows to reduce disturbance and dust build up on hedgehog habitat.	**Negative; Localised; Medium term; Imperceptible**
Pygmy shrew	National Importance	Potential disturbance due to extraction/infill works adjacent to hedgerows Potential dust build up on hedgerows reducing the quality of this habitat for hedgehog	Negative	Localised	Medium-term	Not-significant	A minimum 5m buffer was implemented between the edge of extraction and infill areas and hedgerows to reduce disturbance and dust build up on hedgehog habitat.	**Negative; Localised; Medium term; Imperceptible**

Bat assemblage	International Importance	Potential loss or disturbance of roosting habitat along mature ash treeline to the south of the site due to disturbance to tree roots.	Negative	Localised	Permanent	Significant	A minimum 5m buffer was implemented between the edge of extraction and infill areas and hedgerows/ trees to reduce disturbance to bats and their potential roosting habitat.	**No impact**
Birds								
Bird assemblage (Green-listed)	County Importance	Disturbance to bird species utilizing hedgerows adjacent to extraction and infill works. Build up of dust on hedgerows may have reduced the quality of this habitat for bird species	Negative	Localised	Medium Term	Not significant	A minimum 5m buffer was implemented between the edge of extraction and infill areas and hedgerows to reduce disturbance to bird species and dust build up on potential habitat.	**Negative: Localised; Medium term; Imperceptible**
Bird assemblage (Amber-listed)	National Importance	Disturbance to bird species utilizing hedgerows adjacent to extraction and infill works. Build up of dust on hedgerows may have reduced the quality of this habitat for bird species	Negative	Localised	Medium Term	Not significant	A minimum 5m buffer was implemented between the edge of extraction and infill areas and hedgerows to reduce disturbance to bird species and dust build up on potential habitat.	**Negative: Localised; Medium term; Imperceptible**

Aquatic Species								
Common Frog	International Importance	Potential surface water run off from the historic extraction and infill area reaching the broadstown stream to the south of the site.	Negative	Localised	Medium-term	Significant	As a precaution overburden and imported infill material was stored in mounds on a low-lying area away from the stream, so as to prevent solids entering the stream during periods of high rainfall No surface water was directed toward the stream	**Imperceptible**
Atlantic Salmon	International Importance	Potential surface water run-off from the historic extraction and infill area reaching the broadstown stream to the south of the site.	Negative	Localised	Medium-term	Significant	As a precaution overburden and imported infill material was stored in mounds on a low-lying area away from the stream, so as to prevent solids entering the stream during periods of high rainfall No surface water was directed toward the stream	**Imperceptible**
Lamprey								
European Eel	National Importance	Potential surface water run-off from the historic extraction and infill area reaching the	Negative	Localised	Medium-term	Significant	As a precaution overburden and imported infill material was stored in mounds on a low-lying area away from the	**Imperceptible**

		broadstown stream to the south of the site.					stream, so as to prevent solids entering the stream during periods of high rainfall No surface water was directed toward the stream	
White Clawed Crayfish	National Importance	Potential surface water run-off from the historic extraction and infill area reaching the broadstown stream to the south of the site.	Negative	Localised	Medium-term	Significant	As a precaution overburden and imported infill material was stored in mounds on a low-lying area away from the stream, so as to prevent solids entering the stream during periods of high rainfall No surface water was directed toward the stream	**Imperceptible**

5.8 Monitoring

No environmental monitoring was undertaken during the operational phase of the unauthorised development.

5.9 Interactions

This chapter pertaining to the ecological and biodiversity aspects of the Development, has the potential to interact with aspects of the following chapters of this EIAR:

- Chapter 6: Land, Soil & Geology
- Chapter 7: Hydrology

5.9.1 Land & Soil

An assessment of the potential impact of the Historic Development on the existing land, soils and geological environment, with emphasis on the extraction and infilling of material; and the potential accidental release of contaminated materials to ground during operational phases of the Historic Development, is included in Chapter 6 Land, Soil and Geology. Measures for the mitigation of these impacts are also set out in Chapter 6.

5.9.2 Hydrology

An assessment of the potential impact of the Historic Development on the hydrological and hydrogeological environment is included in Chapter 7 of this EIAR. Procedures for dealing with silt laden runoff at the Site; potential spills/leakages of fuels/contaminants; and the protection of nearby watercourses are outlined in this chapter.

5.10 Difficulties Encountered When Compiling

No difficulties were encountered during the compiling of this Chapter

5.11 Conclusions

It is deemed that historic extraction and infill activities (since 2012) would not have resulted in any significant environmental impacts given the habitat effected and the mitigation measures implemented during that period. Any potential Sand Martin habitat loss would have been compensated by new habitat creation is the existing quarry.

5.12 References

Bang, P. and Dahlstrom, P. (2001). Animal Tracks and Signs, Oxford University Press, Oxford.

Bibby, C.J., Burgess, N.D., Hill, D.A. & Mustoe, S. 2000. Bird Census Techniques. Second Edition. Academic Press, London.

Brickell C. (1998) The Horticultural Society's Encyclopaedia of Garden Plants.

CIEEM (2015). Guidelines for Ecological Report Writing. Chartered Institute of Ecology and Environmental Management, Winchester, UK.

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

Dempsey E. (2002) The Complete Guide to Ireland's Birds. 2nd Ed. Gill and Macmillan

Department of the Environment, Heritage and Local Government (2010) Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities. Dublin.

EPA (2002). Guidelines on information to be contained in Environmental Impact Statements. Published by the Environmental Protection Agency, Ireland.

EPA (2017). Guidelines on the information to be contained in Environmental Impact Assessment Reports (Draft). Published by the Environmental Protection Agency, Ireland.

EPA, (2020). Environmental Protection Agency Online Mapping [ONLINE] Available at: http://www.epa.ie/ [Accessed June 2020].

EssGee Consultants 2006. Environmental Impact Statement for Sand and Gravel Pit, Maplestown, Co. Carlow.

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

Gallagher, M.B., Dick, J.T.A. and Elwood, R.W. (2006). Riverine habitat requirements of the white-clawed crayfish, *Austropotamobius pallipes*. Biology and Environment: Proceedings of the Royal Irish Academy. 106B: 1-8.

Gilbert, G., Stanbury, A. & Lewis, L. (2020).Birds of Conservation Concern in Ireland 2020-2026

GSI, (2020). Geological Survey of Ireland website [ONLINE] Available at: http://www.gsi.ie/ accessed [Accessed June 2020].

Igoe, F., Quigley, D.T.G., Marnell, F., Meskell, E., O' Connor, W. & Byrne, C. (2004). The Sea Lamprey (*Petromyzon marinus L.*), River Lamprey (*Lampetra flubviatilis L.*) and Brook Lamprey (*Lampetra planeri*) (BLOCH) in Ireland: General Biology, Ecology, Distribution and Status with Recommendations for Conservation. Biology and Environment: Proceedings of the Royal Irish Academy, 104B (3), 43-56.

Joint Nature Conservancy Council (1993) Phase I Habitat Survey Techniques. JNCC.

King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., FitzPatrick, Ú., Gargan, P.G., Kelly, F.L., O'Grady, M.F., Poole, R., Roche, W.K. and Cassidy, D. (2011).

Ireland Red List No. 5: Amphibians, Reptiles and Freshwater Fish. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland

Kelly, F.L., and King, J.J. (2001) A review of the ecology and distribution of three lamprey species*, Lampetra fluviatilis (L.), Lampetra planeri (Bloch)* and *Petromyzon marinus (L.):* A context for conservation and biodiversity considerations in Ireland. Biology and Environment: Proceedings of the Royal Irish Academy 101B (3), 165-185.

Morgan, R.A. (1979) Sand Martin nest record cards, Bird Study, 26:2, 129-132, DOI: 10.1080/00063657909476630

NBDC, (2020). National Biodiversity Data Centre online mapping [ONLINE] Available at: http://maps.biodiversityireland.ie/Map.aspx. [Accessed June 2020].

NPWS, (2013). The Status of EU Protected Habitats and Species in Ireland. Species Assessments Volume 3, Version 1.0. Unpublished Report, National Parks & Wildlife Services. Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

NPWS, (2020). National Parks and Wildlife Service website [ONLINE] Available at: http://www.npws.ie/en/ [Accessed June 2020].

NRA (2009a). Environmental Assessment and Construction Guidelines. National Roads Authority (now Transport Infrastructure Ireland), Dublin.

NRA (2009b). Guidelines for Assessment of Ecological Impacts of National Road Schemes. National Roads Authority (now Transport Infrastructure Ireland), Dublin.

Reynolds, J. D. (2007) Conservation Assessment of the white-clawed crayfish *Austropotamobius pallipes* (Lereboullet, 1858) in Ireland. Conservation Status Assessment Report. National Parks and Wildlife Service.

Reynolds, J.D., O'Connor, W., O'Keeffe, C. & Lynn, D. (2010a) A technical manual for monitoring white-clawed crayfish Austropotamobius pallipes in Irish lakes. Irish Wildlife Manuals, No 45, National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin

Reynolds, Julian & Lynn, Deirdre & O'keeffe, Ciaran & Lucey, J & Clabbey, Kevin & Mcgarrigle, Martin & King, Jimmy. (2010b). Conservation assessment and current status of protected white-clawed crayfish, Austropotamobius pallipes (Lereboullet), in Ireland (2010). 17. 123-127.

Scannell, M.J.P & Synnott, D.M. (1987) Census catalogue of the flora of Ireland. (2nd Ed.). Stationery Office, Dublin.

Smith, G.F., O'Donoghue, P, O'Hora K., and Delaney, E. (2010). Best Practice Guidance for Habitat Survey and Mapping. Published by the Heritage Council.

Webb, D.A., Parnell, J. and Doogue, D. (1996) An Irish Flora. Dundalgan Press, Dundalk.

6 LAND AND SOIL

6.1 Introduction

This Chapter of the remedial Environmental Impact Assessment Report (rEIAR) provides a description of the land, soils and geology within and immediately surrounding the Development Site, an assessment of the potential impacts of the Development requiring substitute consent on land, soils and geology and sets out any required mitigation measures, where appropriate.

The rEIAR will assess any potential impact associated with the unauthorised extraction and restoration activities (Unauthorised Development) which historically took place on the Site lands since 2012 as a continuation of the authorised development for quarrying between 2007 and 2012. This follows a notice issued under Section 261A to submit a Substitute Consent application to An Bord Pleanála, requiring a remedial Environmental Impact Assessment.

The principal objectives of this chapter are to identify:

- Land, soils, and geological characteristics at the Site;
- Potential impacts on land, soils and geology which have occurred, which are occurring, or which can be reasonably expected to occur as a result of the historic unauthorised extraction and infilling activities at the Site;
- Evaluate the significance of any residual impacts.

6.1.1 Quality Assurance and Competence

This chapter of the rEIAR was written by Gareth Carroll BAI, Senior Environmental Consultant with Enviroguide Consulting (Enviroguide) with over 9 years' experience of environmental assessment of brownfield and greenfield sites. The chapter was reviewed by Claire Clifford BSc., MSc., PGeo., EurGeol who is Technical Director of the Contaminated Land and Hydrogeology Division of Enviroguide Consulting and is a Professional Geologist with the Institute of Geologists of Ireland and has extensive experience in preparing environmental assessments for a range of project types and geological and hydrogeological site settings.

6.1.2 Description of the Unauthorised Development

The Site covers an area measuring 15.21Ha and is situated in Maplestown, Co. Carlow approximately 5 km northwest of the town of Rathvilly, Co. Carlow, and 4.5 km southwest of Baltinglass, Co. Wicklow (refer to Figure 6-3 for the Site Location Plan).

The Unauthorised Development comprises the following:

- Application for substitute consent for the Unauthorised Development at the site since 2012 when planning permission expired in 2012 (An Bord Pleanála Planning Ref. 221741);
    - Approximately 192,240 tonnes of sand and gravel including 75,060 tonnes of overburden was extracted over an area of 4.177Ha since 2012;
    - Approximately 4.177Ha of the existing quarry was subsequently restored using surplus materials already on Site;

The overall Development Site Layout is presented in *Figure 6-1* (refer to Drawings P-01 through P-04 included as part of this application).

Figure 6-1: Unauthorised Development and Development Site Layout

6.1.2.1 Unauthorised Development

The Unauthorised Development is part of an existing quarry site with the permitted intended extraction of 700,000 to 900,000 tonnes of sand and gravel at an average rate of 60,000 tonnes per annum up to a maximum of 100,000 tonnes per annum over 10 years. Planning was granted for the extraction five years from 2007 to 2012, there was however unauthorised development at the Site and quarrying continued since 2012. This included the quarrying of approximately 192,240tonnes of sand and gravel including 75,060tonnes of overburden and the subsequent restoration of the quarry over an area of approximately 4.177Ha. It is noted that the entire quarry area measuring approximately 15.205Ha was used for the processing and stockpiling of excavated soil.

The Applicant is now seeking substitute consent for an area of the Site that was quarried and restored outside of the granted planning permission period (An Bord Pleanála Planning Ref. 221741.

6.2 Study Methodology

6.2.1 Regulations and Guidance

The methodology adopted for the assessment takes cognisance of the relevant guidelines in particular the following:

- Environmental Protection Agency, August 2017. Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2017);
- Environmental Protection Agency, September 2015. Draft Advice Notes for preparing Environmental Impact Statements (EPA, 2015);
- Environmental Protection Agency, 2002. Guidelines on Information to be contained in Environmental Impact Statements (EPA, 2002);
- Environmental Protection Agency, 2003. Advice Notes on Current Practice in the preparation of Environmental Impact Statements (EPA, 2003);
- Environmental Protection Agency, 2006. Environmental Management in the Extractive Industry (Non-Scheduled Minerals);
- Institute of Geologists of Ireland Guidelines, 2002. Geology in Environmental Impact Statements, A Guide (IGI, 2002);
- Institute of Geologists of Ireland Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013);
- National Roads Authority, 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009); and
- S.I. No. 179/2019 Safety, Health and Welfare at Work (Quarries)(Amendment) Regulations 2019.

6.2.2 Phased Approach

A phased approach was adopted for this rEIAR in accordance with Environmental Protection Agency (EPA) and Institute of Geologists of Ireland (IGI) guidelines as set out above and is described in the following sections.

Element 1: An Initial Assessment and Impact Determination stage was carried out by Enviroguide to establish the project location, type and scale of the development, the baseline conditions, and the type of land, soil and geological environment, to establish the activities associated with the unauthorised developments at the Site and to undertake an initial assessment and impact determination.

This stage of the assessment included a desk top study that comprised a review of published environmental information for the Site, information provided by the Applicant including the Environmental Impact Statement (EIS) prepared in 2004 as part of the planning application for the existing quarry development and a site walkover survey, which was undertaken by Gareth Carroll and Fionnuala Joyce of Enviroguide Consulting on the 14th October 2021, to identify the environmental site setting and establish baseline conditions at the Site relevant to the land, soil and geological environment.

The study area, for the purposes of assessing the baseline conditions for the Land, Soils and Geology Chapter of the rEIAR, extends beyond the site boundaries and includes potential receptors within a 2.0km radius of the Site. The extent of the wider study area was based on the IGI, 2013 Guidelines which recommend a minimum distance of 2.0km from the Site.

The desk study involved collecting all the relevant geological data for the site and surrounding area.

The Element 1 stage of the assessment completed by Enviroguide Consulting included a review of the following sources of information:

- Environmental Protection Agency (EPA) webmapping 2021;
- Environmental Protection Agency (EPA) Guidance on waste acceptance criteria at authorised soil recovery facilities 2020;
- Geological Survey Ireland (GSI) Datasets Public Viewer and webmapping 2021;
- Google Earth Mapping and Imagery
- Ordnance Survey Ireland (OSI) webmapping 2021;
- National Parks and Wildlife Services (NPWS) webmapping 2021; and
- Information provided by the Applicant including:
    - planning drawings and documents pertaining to the Development and referenced within this report where relevant.
    - Environmental Impact Statement for the permitted development (EIS Essgee, 2004)

Element 2: The Direct and Indirect Site Investigation and Studies stage was carried out to refine the conceptual site model and undertake a detailed assessment and impact determination. All Direct and Indirect site investigation were overseen by Enviroguide Consulting in accordance with relevant best practice guidance and standard and included the following tasks:

- A site walkover survey was undertaken by Gareth Carroll and Fionnuala Joyce of Enviroguide Consulting on the 14th of October 2021;
- An intrusive site investigation was undertaken between 14th October 2021 and 21st October 2021 including the following:
    - Trial pit excavation across the Development Site (TP01 through TP11) on the 14th October 2021 to identify and assess the shallow geological and subsurface conditions across the Development Site;
    - Borehole drilling was undertaken between the 14th of October 2021 and the 21st October 2021 by Gerry Comerford Drilling Ltd. to investigate the deeper geological conditions at the Development Site and to install groundwater monitoring wells;
- Soil samples from three trial pit locations were submitted to Element Materials Technology Ltd. for laboratory analysis; and
- A topographical survey of the site was undertaken and included surveying of all site investigation and sampling locations.

The site investigation and monitoring locations are shown on Figure 6-2 (refer to Drawing No. M-01 included as part of this application).

The reports and documents reviewed and evaluated for Element 2 of this assessment included the following:

- Element Materials Technology Ltd. Laboratory Analytical Report, October 2021. Report Reference 21/16389.

The site investigation results are discussed in Section 6.3 and referenced documents are provided in the appendices to this report.

Element 3: Mitigation Measures, Residual Impacts and Final Impact Assessment were based on the outcome of the information gathered in Element 1 and Element 2 of the assessment. Mitigation measures to address all identified adverse impacts that were identified in Element 1 and 2 of the assessment were considered in relation to the Operational and Construction phase of the development. These mitigation measures were then considered in the impact assessment to identify any residual impacts.

Element 4: Completion of this Land, Soils, Geology assessment is included in this chapter is provided in this and includes all the associated figures and documents.

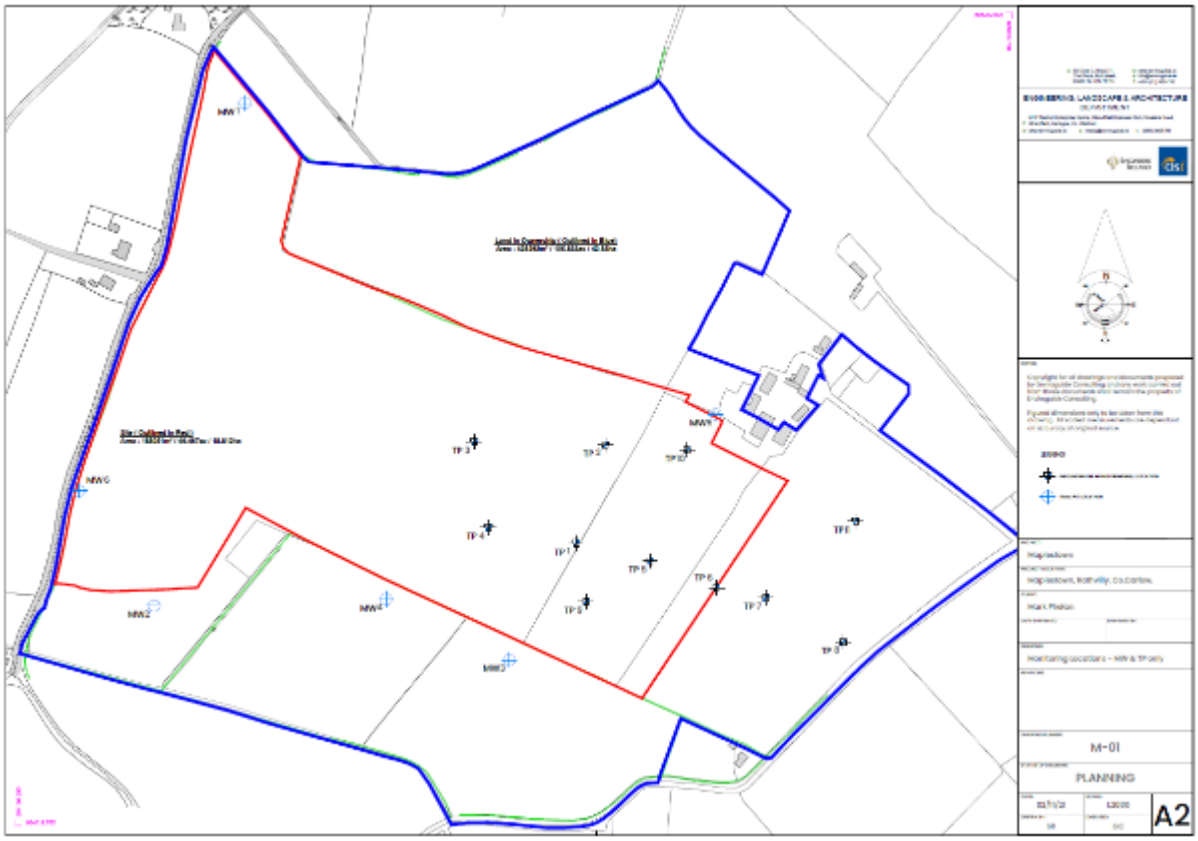


Figure 6-2: Site Investigation and Monitoring Locations to include locations on lands which may be considered for future development

6.2.3 Description and Assessment of Potential Impact

Impacts will vary in quality from negative, to neutral or positive. The effects of impacts will vary in significance on the receiving environment. Effects will also vary in duration. The terminology and methodology used for assessing the 'impact' significance and the corresponding 'effect' throughout this Chapter is described in Table 6-1.

Table 6-1: Assessment of Potential Impacts Terminology and Methodology

Quality of Effects / Impacts	Definition
Negative	A change which reduces the quality of the environment
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment
Significance of Effects / Impacts	**Definition**
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.
Duration of Effects / Impacts	**Definition**
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting one year or less
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration

The baseline sensitivity of the receiving soils, geology and land has been established and assessed and any impacts associated with the Unauthorised Development assessed including impacts that have occurred, impacts that are occurring and impacts that are likely to occur for the lifecycle of the future restoration at the site of the Historic Development.

The potential impacts associated with the unauthorised quarry development were assessed based on the baseline site conditions for the period pre-2007, prior to commencement of the quarrying from 2007 to 2012 within the existing Quarry Development.

6.3 The Existing and Receiving Environment (Baseline Situation)

The baseline receiving land, soil and geology environment has been established based on the site conditions in 2004, prior to the commencement of the existing quarrying activity at the Site to enable an assessment of the impacts that have occurred, are occurring and impacts that are likely to occur. The baseline receiving land, soil and geology environment has been established for the current existing environment.

6.3.1 Site Location and Description

The Site covers an area measuring 15.21Ha and is situated in Maplestown, Co. Carlow approximately 5 km northwest of the town of Rathvilly, Co. Carlow, and 4.5 km southwest of Baltinglass, Co. Wicklow.

The Site comprises the following:

- The existing quarry, for which substitute consent is being sought, measuring approximately 15.21Ha and located in the western portion of the Site (refer to Drawing P-02 included as part of this application);
- The existing restored area, for which substitute consent is being sought, measuring approximately 4.177Ha and located in the central portion of the Site (refer to Drawing P-02 included as part of this application).
-

The Development Site location is presented in Figure 6-3.

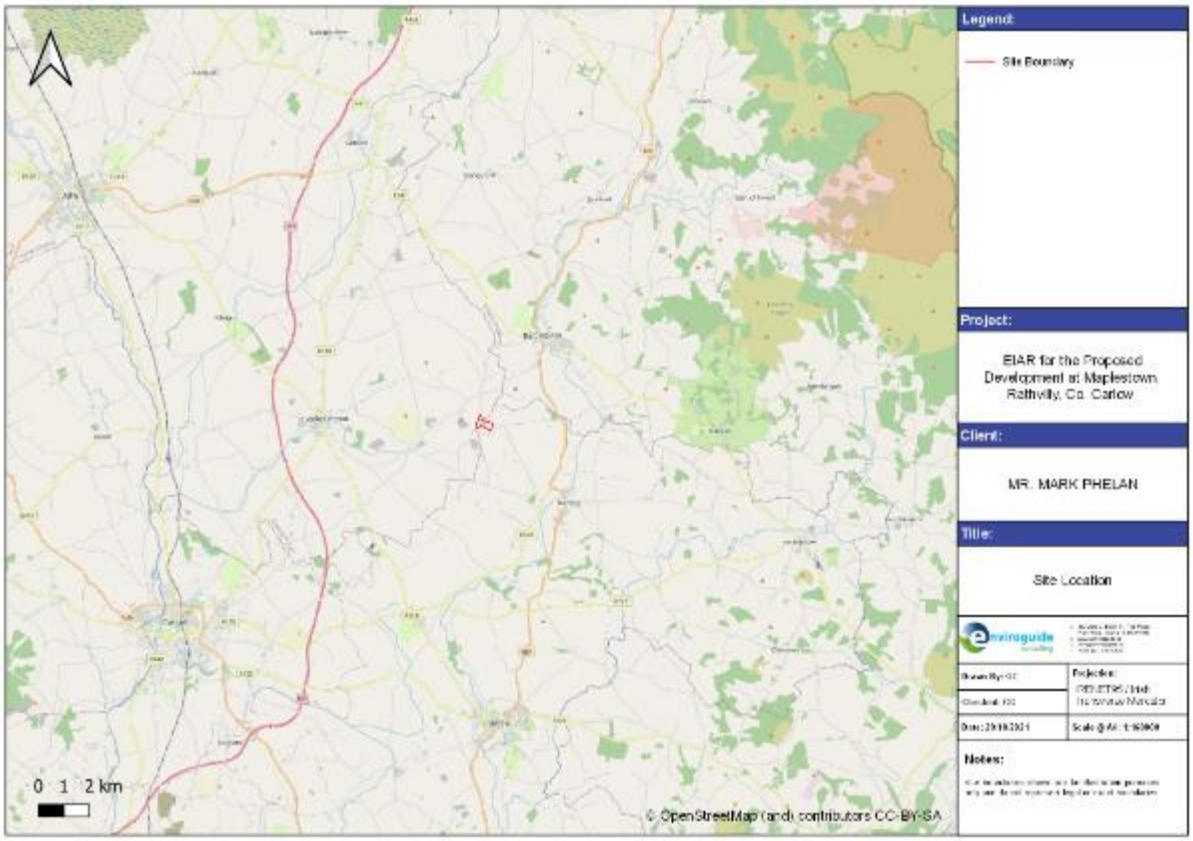


Figure 6-3: Site Location

6.3.2 Current and Historical Land Use

Historical mapping and aerial photography available from the Ordnance Survey of Ireland website (OSI, 2021) and Google Earth (Google Earth, 2021) were reviewed and key observations on-site and off-site are summarised in Table 6-2.

Table 6-2 Historical Land Use

Date	Information Source	Site Description
1837-1842	**OSI map 6inch**	**On-site:** The Development Site is shown as open fields divided by field boundaries. An unnamed waterbody (recorded on the EPA database (EPA, 2021) as the Broadstown Stream) is identified along the southern boundary in the southwest portion of the Site and is shown to discharge to the River Graney approximately 0.27km west of the Development Site. **Off-site:** The surrounding land-use is shown as open fields with some one-off building structures. The River Graney is identified approximately 0.06km north of the northern portion of the Site and approximately 0.27km west of the Development Site.
1888-1913	**OSI map 25inch**	**On-site:** No significant change. **Off-site:** A 'spring' is located approximately 0.08km north of the eastern portion of the Site and flows west before discharging o the River Graney. A 'pump' is identified at the building structures located approximately 0.08km north of the Development Site. There is a gravel pits mapped 0.37km south of the Development Site (refer to Table 6 3 below).
1830-1930	**OSI Cassini map 6inch**	**On-site:** No significant change. **Off-site:** No significant change.
1995	**OSI Aerial photography**	**On-site:** A circular feature is identified in the central portion of the Site. No other significant change. **Off-site:** used for agricultural. Some newer one-off residential buildings are shown in the vicinity of the Development Site. Ground disturbance (possible quarrying) at locations 0.62km west and 0.17km south of the Site.
2003	**Google Earth photography**	**On-site:** No significant change. **Off-site:** Areas of ground disturbance / quarries with open water / ponds identified at four locations approximately 0.57west, 1.04km southwest, 1.53km west and 2.0km west of the Development Site.
2005	**OSI Aerial photography**	**On-site:** Localised area of ground disturbance noted adjoining an entrance area in the southwest corner of the Site. **Off-site:** No significant change.
2009	**Google Earth photography**	**On-site:** Area of ground disturbance is no longer evident and grass cover noted. **Off-site:** No significant change.
2011	**Google Earth photography**	**On-site:** Quarrying evident and extended across an area of approximately 4.5Ha with an area with grass cover removed adjoining the western boundary. Three waterbodies / lagoons with water are identified and quarry infrastructure (screening plant). **Off-site:**

Date	Information Source	Site Description
		No significant change.
2011-2013	**OSI Aerial photography**	**On-site:** No significant change **Off-site:** The quarries previously identified 0.17km south and 1.04km southeast are no longer shown.
2013	**Google Earth photography**	**On-site:** Quarrying and area of ground disturbance extended into the western area of the Site and extended to the area with the circular feature with a quarry footprint of approximately 5.7Ha. A fourth smaller water body/lagoon is identified. No other significant change **Off-site:** No significant change
2016 & 2017	**Google Earth photography**	**On-site** Quarrying and area of ground disturbance extended into the western area of the Site and extended to the east to a fence line with a quarry footprint of approximately 7.8Ha. The fourth water body/lagoon is not identified. No other significant change **Off-site:** No significant change.
2013-2018	**OSI Aerial photography**	**On-site:** Quarrying and area of ground disturbance extended into the western area of the Site and extending into the area with the circular feature. The fourth smaller pond is not identified **Off-site:** No significant change.
2018	**Google Earth photography**	**On-site:** The central portion of the Site has been restored (approximate area of 4.177Ha) and appears to have a similar topographical level as the adjoining lands with grass cover. The quarried area in the west of the Site has been extended towards the western site boundary with an approximate quarry footprint of 6.78Ha. The three water bodies/lagoons remain. **Off-site:** No significant changes.
2019	**Google Earth photography**	**On-site:** No significant changes **Off-site:** No significant changes
2021	**Google Earth photography**	**On-site:** No significant changes. Some vegetation cover on boundary areas of the quarry and on stockpiles/berms. **Off-site:** No significant changes.

Planning permission (Planning Reference: 221741) was granted with 25No. conditions by An Bord Pleanála on 24th July 2007, following an appeal of a grant by for the extraction and processing sand and gravel and to retain a new entrance and existing sand and gravel pit at the Site (Planning Permission Reg. Ref. 06/842).

The Grant of Planning (Planning Reference: 221741) expired on the expired in 2012. However, since 2012 unauthorised extraction activities have taken place within the existing sand and gravel quarry located in the eastern portion of the Site. During this period the eastern portion

of the existing sand and gravel extraction area and central portion of the Site was backfilled with excavated materials from the sand and gravel extraction operations for the purpose of landscaping and reinstatement. It is noted that no materials were imported onto the Site for the purpose of site restoration at this time.

The site condition identified during the during the site walkover survey undertaken by Enviroguide Consulting on the 14th of October 2021 identified that the Site comprised of:

- The existing quarry and restored area, for which substitute consent is required, measuring approximately 15.21Ha (refer to *Figure 6-1* and Drawing No. P-02 included as part of this application). It is noted that the restored area, measuring 4.177Ha, was covered with grass and being used for grazing of livestock;

6.3.3 Surrounding Land use

The lands surrounding the Site comprise agricultural lands. Fields are bounded with ditches and hedgerows and are mostly used for sheep and cattle grazing, with a number of sand and gravel quarries in the area (refer to Table 6-3). Settlement is quite sparse, with occasional farmhouses and one-off residential dwellings.

The Site is bound by agricultural fields within the Applicants landholding to the north, east and south and the L-8097 local road, through which the Development Site is accessed, to the west.

There are no EPA licensed facilities located within a 2km radius of the Development Site.

There are a number of historical pits and quarries mapped by the GSI (GSI, 2021) and OSI (OSI, 2021) within 2km of the Development (refer to Table 6-3). It is noted that there are no operational quarries mapped by the GSI (GSI, 2021) within 2km of the Development.

Table 6-3: Historical Pits and Quarries within 2km of the Development Site

Name/Type	Distance from Site (km)	Location from Site
Historical Pit / Quarry	0.17	South
Historical Pit / Quarry	0.57	West
Historical Pit / Quarry	0.37	South
Historical Pit / Quarry	0.62	West
Historical Pit / Quarry	0.65	North
Historical Pit / Quarry	1.04	Southwest
Historical Pit / Quarry	1.53	West
Historical Pit / Quarry	2.00	West

6.3.4 Land and Topography

The topography surrounding the Development comprises gently undulating farmland with elevations ranging between 110 metres above Ordnance Datum (mOD) to 140mOD (GSI, 2021).

The Site includes the existing infill area in the eastern portion of the.

The topographical survey of the Site indicated that the topography ranges from a high point 120mOD to the east of the Site and slopes to the south with elevation of 115mOD and to the west where ground elevation of 115mOD was recorded at the quarry floor.

There is a steep slope between the pit floor at approximately 115mOD and the western boundary of the Site at 120mOD.

There was no subsidence observed at the Site and on lands immediately adjoining the existing quarry during the Site walkover survey by Enviroguide Consulting on 14th September 2021.

The topographical survey for the Site is presented in Figure 6-4 (refer to Drawing No. P-01 included as part of this application).

Figure 6-4: Topographical Survey (Drawing No. P-01)

6.3.5 **Soil and Subsoil (Quaternary Deposits)**

The soils beneath the Site have been mapped by Teagasc (Teagasc, 2021) as moderately drained fine loamy drift with limestones of the Elton (1000c) soil series.

The Teagasc (Teagasc, 2021) mapped soils at the Development Site are presented in *Figure 6-5*.

The quaternary sediments beneath the majority of the Development Site are mapped by the GSI (GSI, 2021) as gravels derived from limestones (GLs).

The quaternary geology mapped for the Site is presented in *Figure 6-6*.

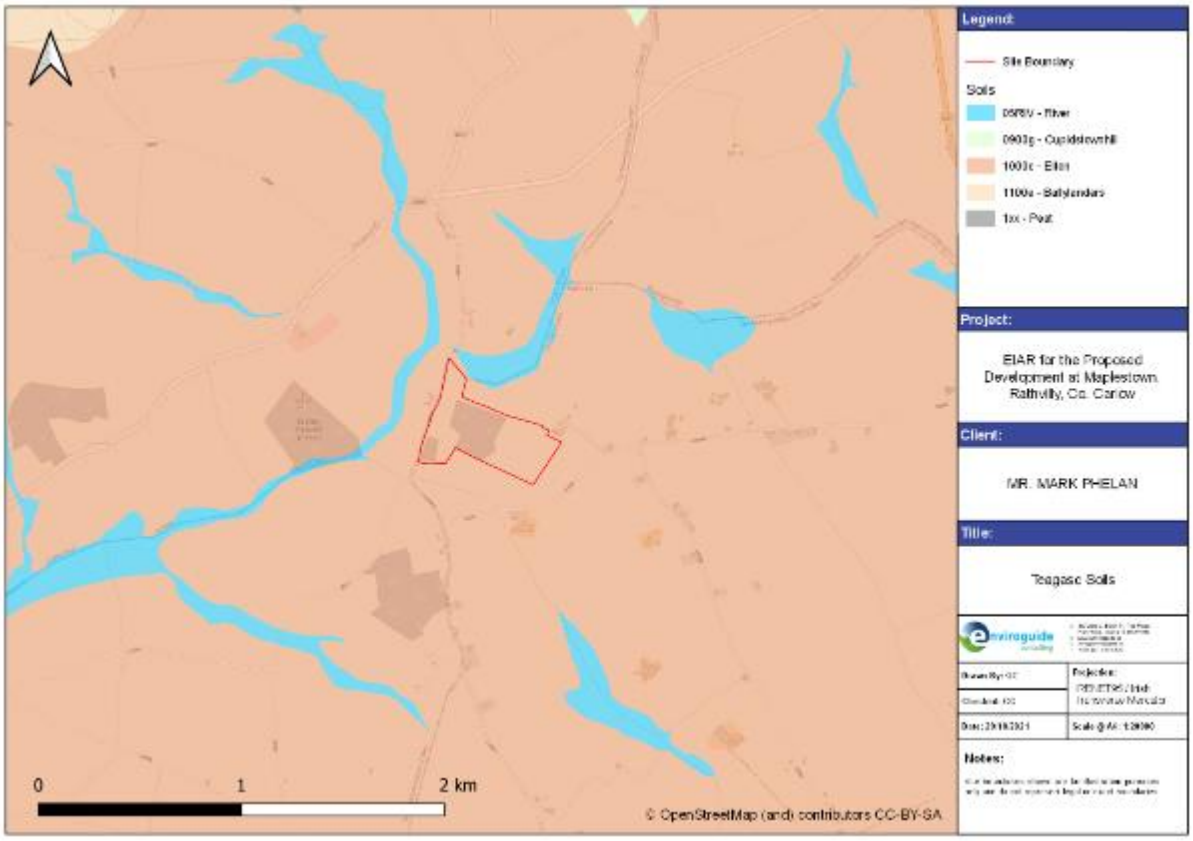


Figure 6-5: Soils

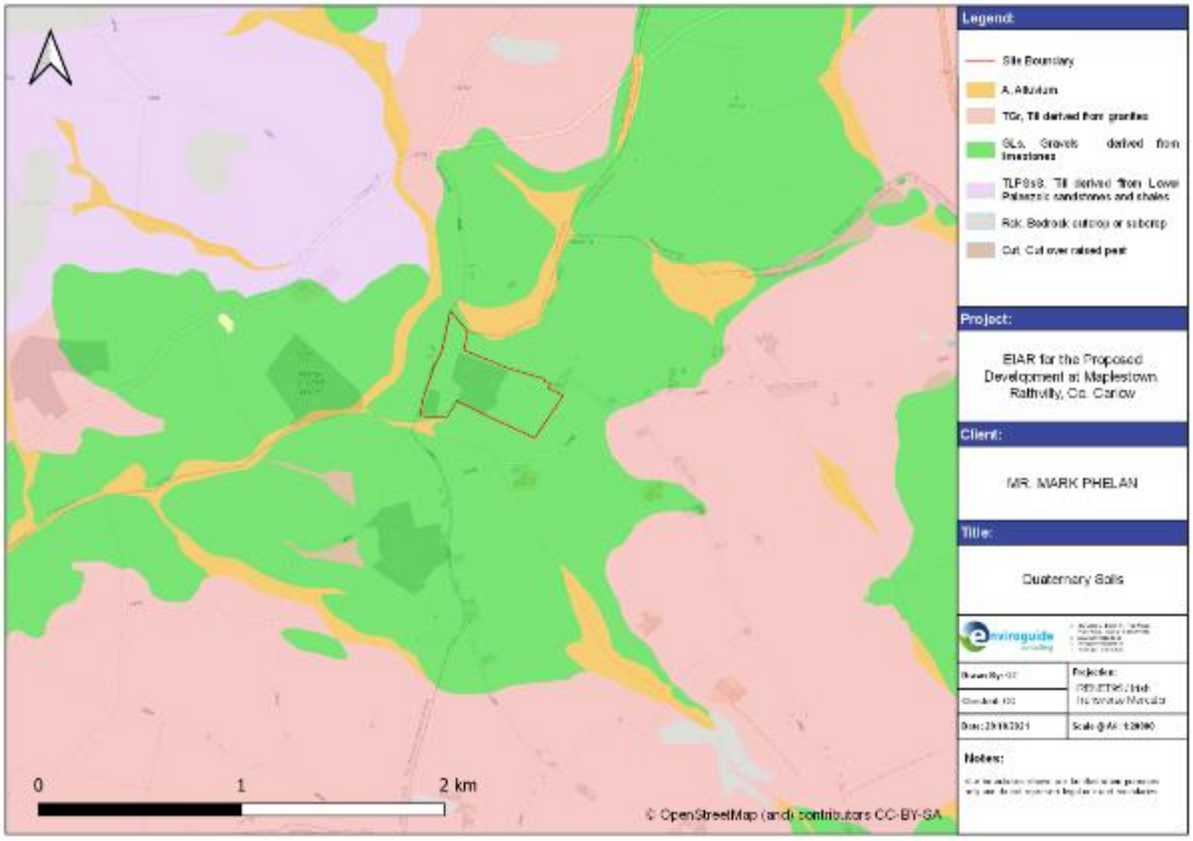


Figure 6-6: Quaternary Sediments

2004 Site Investigation

The results of previous site investigations (EIS, 2004) described the soil and subsoil as:

The Site Investigations showed that the thickness of topsoil on the site varies from between 0.3 and 0.5 m, with between 0.5 to 1 m of subsoil underlying the topsoil on the higher ground. The soils cover a thick deposit of sand and gravel with the thickness of this deposit reaching 6 metres in places. On the lower ground to the South East of the site, a thick layer of marl was encountered beneath the topsoil and the sandy subsoil layers.

2021 Site Investigation

The site investigation and surveys undertaken by Enviroguide Consulting in 2021 identified that the remaining soil and sand and gravel deposits across the entire site were broadly consistent with the published information and the findings of the findings presented in the 2004 EIS.

The locations (trial pits and boreholes) for the site investigation overseen by Enviroguide Consulting in October 2021 are presented in Figure 6-2 (included as part of this application) and trial pit and borehole logs are provided in Appendix A.

Soil has been excavated within the quarry footprint to a maximum depth of 115mOD some residual stockpiles of soil described primarily as sandy silt and sand remain within the existing quarry. This soil will be used in the authorised (Planning Reference: 21741)) restoration of the quarry.

The soils logged at quarry faces comprised of interbedded shows light brown slightly gravelly silty sand / sandy silt of varying thickness (between 0.2m and 0.8m) overlying grey to brown silty sand with occasional cobbles of limestone and bands of SAND and GRAVEL (refer Photograph 6-1).

It is noted that the subsoils encountered along the western boundary of the proposed infill area (MW6) comprised brown sands and gravels to 10.1mbGL (112.53mOD) underlain by clayey SILT to the final depth of drilling at 14mbGL (108mbGL).

Photograph 6-1. Exposed Soils along the West and North Boundary of the Existing Extraction Area

The soils encountered in the restored area of the Site are described as Made Ground (reworked soils) a maximum depth of 2.8mbGL that comprised of brown sand and silt with varying sand, gravel and cobble content. Native or undisturbed soil described as gravelly

sand was encountered beneath the made ground in TP3 and TP4 from 2.1mbGL to the maximum extent of excavation at 2.6mbGL. Soil encountered during drilling of borehole MW4 located to the south of the restored area comprised grey to brown SAND and GRAVEL deposits to the final depth of drilling at 11.5mbGL.

Detailed descriptions of the soils encountered are provided in the trial pit and borehole logs in Appendix A.

The soil encountered within the existing infill area are presented in shown in Photograph 6-2.

Photograph 6-2. Photos of TP2, TP3 and TP4 (left to right)

2021 Baseline Conditions - Proposed Quarry

The soils encountered within the proposed quarry area of the Site (TP5, TP9 and TP10) are summarised as brown, slightly gravelly, silty fine to medium grained sand with frequent rootlets between 0.1mbGL and 0.3mbGL. The subsoils encountered (TP5, TP9 and TP10) comprised light brown to orange, fine sand with varying silt and gravel content to maximum depth of 1.1mbGL. The fine sand was underlain sandy gravel and gravelly sand with varying inclusions of assorted cobbles of limestone and granite between 1.4mbGL and the maximum depth of excavation at 2.6mbGL. Outside of the proposed quarry area (MW5 to the north and MW3 to the south) the sands and gravels with varying silt content extended to a maximum depth of 16.2mbGL (98.832mOD) (MW3) where bedrock was encountered however, brown slightly gravelly silty clay was encountered at downgradient location MW3 between 8.5mbGL (106.553mOD) and 13.0mbGL (102.053mOD).

Typical subsoil deposits encountered are shown in Photograph 6-3.

Photograph 6-3. Photos of Soil and Subsoil (TP5 and TP10)

6.3.6 Bedrock Geology

The GSI database (GSI, 2021) has mapped the bedrock beneath the Development Site as the Tullow Type 2 Equigranular Granite Formation (Stratigraphic Code: IDTWGRE) which are described as 'pale, fine to coarse grained granite'. The mapped bedrock geology is presented in Figure 6-3.

A search of the GSI groundwater well database (GSI, 2021) was conducted to identify the boreholes within the immediate vicinity of the Site. The GSI groundwater well database (GSI, 2021) records the depth to bedrock some of the recorded borehole locations. Available records indicate that depth to bedrock within 2km radius of the Site ranges from 2.4mbGL to 19.8mbGL.

Bedrock described as white granite was encountered during borehole drilling of MW3 at a depth 16.2mbGL. Bedrock was not encountered in any other boreholes with total depths ranging from 11.5mbGL to 15.0mbGL during the site investigation. Borehole logs with details of drilling depths and strata encountered are included in Appendix A.

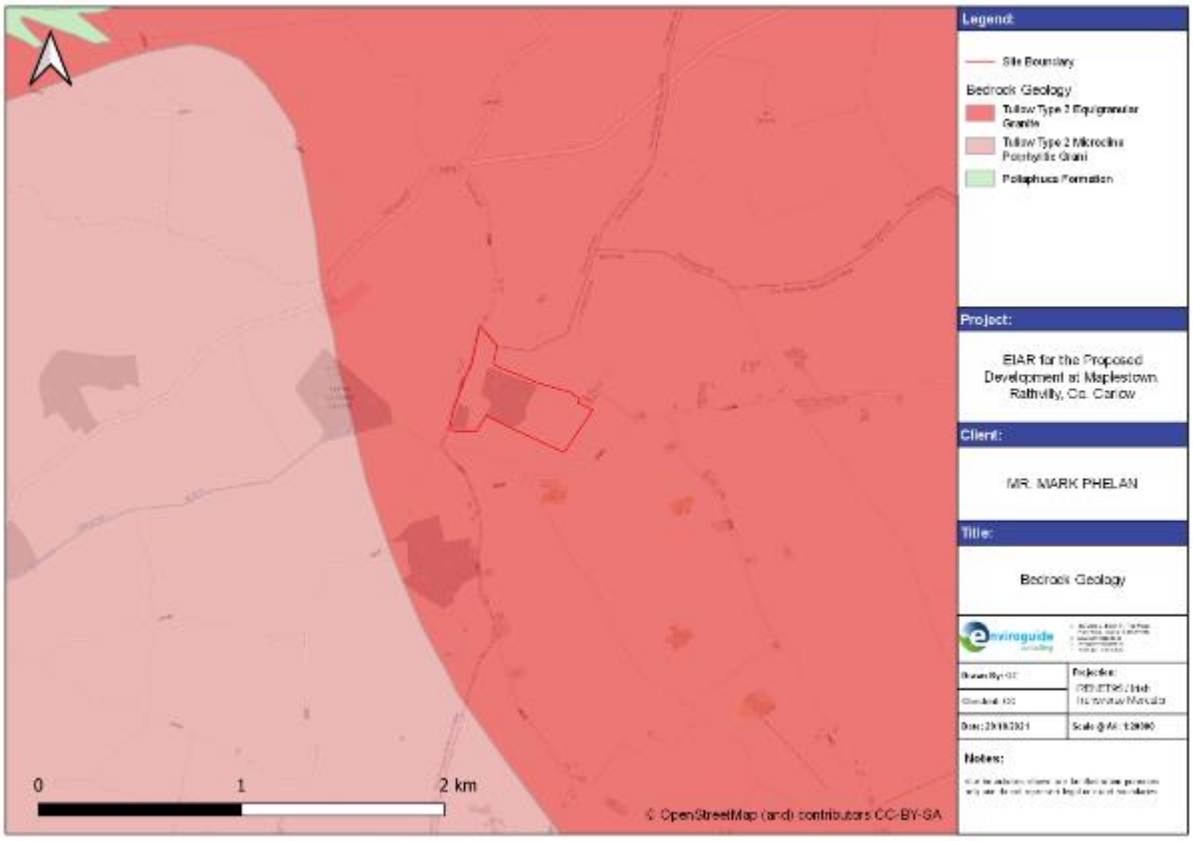


Figure 6-7: Bedrock Geology

6.3.7 Geochemical Domain

The GSI undertook a geochemical domain-setting exercise which divided the country into zones or domains based on similar geochemical signature by subdividing the National Soil Database using mapped subsoil and bedrock type (GSI, 2020). The GSI in partnership with the EPA developed Geochemically Appropriate Levels (GALs) for each of the seven geochemical domains identified by the GSI to account for the natural variation in soil metal contents associated with soil parent materials and rock types in Ireland. It is important to note that the GSI states that the purpose of the geochemical characterisation was not to determine an approach to defining whether soil is contaminated or uncontaminated. The GALs were defined to support the EPA's Guidance on Waste Acceptance Criteria at Authorised Soil Recovery Facilities (EPA, 2020).

The majority of the Site is located within Geochemical Domain 2 which is characterised as 'carboniferous limestones, shales and related rocks' (EPA, 2020, GSI, 2021) and a small area in the southwest mapped within Geochemical Domain 6 which is characterised as 'granite rocks' (EPA, 2020). A summary of the *Geochemically Appropriate Levels / maximum Concentrations for* Domain 2 and 6 (EPA, 2020) is presented in Table 6-4 below.

Table 6-4: Geochemically Appropriate Levels /Maximum Concentrations

Element	Units	Domain 2	Domain 6
Arsenic	mg/kg	24.9	85.8
Cadmium	mg/kg	3.28	2.38

Element	Units	Domain 2	Domain 6
Chromium	mg/kg	50.3	54.0
Copper	mg/kg	63.5	40.0
Mercury	mg/kg	0.36	0.527
Nickel	mg/kg	61.9	28.2
Lead	mg/kg	86.1	108.0
Zinc	mg/kg	197.0	168
BTEX	mg/kg	0.05	0.05
PAH 17 total	mg/kg	1	1
PCB 7 total	mg/kg	0.05	0.05
Mineral Oil	mg/kg	50	50
TOC	%	3%	3%
Asbestos	-	Absent	Absent

6.3.8 Geochemical Analytical Results

Soil analytical results for the three samples collected in October 2021 by Enviroguide Consulting from the soil at the Site (TP2(2.4-2.6), TP3(0.4-0.8) and TP4(1.0-1.5)) were within the GAL values specified for both for Domain 2 and 6. The soil analytical results verified that the sampled soil was free of any anthropogenic contamination. The soil analytical results are provided in Appendix B.

6.3.9 Radon

The Site is within an area mapped by the EPA (EPA, 2021) to be in an area between 10% and 20% of the homes in a 10km grid square are estimated to be above the Reference Level for Radon. A High Radon Area is any area where it is predicted that 10% or more of homes will exceed the Reference Level of 200 Becquerel per cubic metre (Bq/m3). Therefore, the Site is considered to be within a High Radon Area. It is noted that a high radon level can be found in any area, in any part of the country, but are more likely to be located in High Radon Areas.

6.3.10 Quaternary Geomorphology

The closest quaternary features to the Site are mapped as mapped as a meltwater channel located along the northern boundary of the Development Site. The meltwater channel forms part of the River Graney channel and is orientated in a west-southwest direction (GSI, 2021).

There are a number of drumlins mapped to the east of the Site, the closest of which is located approximately 0.66km from the Site boundary (GSI, 2021). The drumlins in the vicinity of the Site are orientated in a south easterly direction (GSI, 2021).

6.3.11 Geological Heritage

A review of the GSI Geological Heritage Database (GSI, 2021) indicates that there are no geological heritage sites located within 2km radius of the Site. The closest geological heritage site is mapped by the GSI (GSI, 2021) as the Manger-Saundersgrove (Site Code: WW046) which is located approximately 7.1km northeast of the Site and is designated for geological importance for its ‘delta feature composed of deep glaciofluvial and glaciolacustrine sediment’.

6.3.12 Economic Geology

The majority of the Site is mapped as having “moderate potential” for granular aggregate. with a small portion along the southern boundary mapped as having a ‘very low’ to ‘low’ granular aggregate potential. The Site is also mapped as having a ‘moderate potential’ for crushed rock aggregate (GSI, 2021).

Lands located to the west and north of the Site are mapped by the GSI (GSI, 2021) as having a ‘low’ potential for granular aggregate and a ‘high’ potential for crushed rock aggregate. While the lands to the east and south of the Site has been identified by the GSI (GSI, 2021) as having a ‘moderate, potential for both granular and crushed rock aggregate.

There are eight recorded historical pits and quarries mapped by the GSI (GSI, 2021) within 2km of the Site (refer to Table 6-3).

6.3.13 Geohazards

The GSI records verify that that there are no karst features (e.g., cave, enclosed depression, swallow hole, turlough) within 2km of the Site. Karst features in Ireland are generally associated with Carboniferous limestones and as the Site is underlain by granite bedrock, karst features and associated landforms are not expected at the Site.

The Site is located within an area with a ‘Low’ landslide susceptibility classification (GSI, 2021). There are no recorded landslides at, or within 2km of the Site recorded on the GSI database (GSI, 2021). Given the site topography and geological setting, landslide events are not likely to occur at the Site.

In Ireland, seismic activity is recorded by the Irish National Seismic Network operated by Dublin Institute for Advanced Studies (DIAS) which has been recording seismic events in Ireland since 1978. There are five permanent broadband seismic recording stations in Ireland operated by DIAS. Records since 2010 show that the nearest recorded events were associated with quarry blasts. There is a very low risk of seismic activity at the Site.

6.3.14 Summary of the Baseline Environment

The TII criteria for rating of the importance of geological features at the Site as documented in the NRA Guidelines (NRA, 2009), are summarised in Table 6-5.

Table 6-5: Criteria for Rating Site Importance of Geological Features

Importance	Criteria	Typical Example
Very High	Attribute has a high quality, significance or value on a regional or national scale. Degree or extent of soil contamination is significant on a national or regional scale. Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.	Geological feature rare on a regional or national scale (NHA). Large existing quarry or pit. Proven economically extractable mineral resource.

Importance	Criteria	Typical Example
High	Attribute has a high quality, significance or value on a local scale. Degree or extent of soil contamination is significant on a local scale. Volume of peat and/or soft organic soil underlying route is significant on a local scale.	Contaminated soil on-site with previous heavy industrial usage. Large recent landfill site for mixed wastes. Geological feature of high value on a local scale (County Geological Site). Well drained and/or high fertility soils. Moderately sized existing quarry or pit. Marginally economic extractable mineral resource.
Medium	Attribute has a medium quality, significance or value on a local scale. Degree or extent of soil contamination is moderate on a local scale. Volume of peat and/or soft organic soil underlying route is moderate on a local scale.	Contaminated soil on-site with previous light industrial usage. Small recent landfill site for mixed wastes. Moderately drained and/or moderate fertility soils. Small existing quarry or pit. Sub-economic extractable mineral resource.
Low	Attribute has a low quality, significance or value on a local scale. Degree or extent of soil contamination is minor on a local scale. Volume of peat and/or soft organic soil underlying route is small on a local scale.	Large historical and/or recent site for construction and demolition wastes. Small historical and/or recent landfill site for construction and demolition wastes. Poorly drained and/or low fertility soils. Uneconomically extractable mineral resource.

In accordance with the TII Guidance outlined in Table 6-5 the receiving soil and geology environment at the Site would be considered as an attribute of 'medium' to 'high' importance, given that while the area is mapped as an area of 'moderate' aggregate potential there is a moderate to large existing quarry and proven aggregated resource within the proposed quarry area of the Site.

6.4 Characteristics of the Unauthorised Development

The Unauthorised Development comprises the following:

- Application for substitute consent for the Unauthorised Development at the site since 2012 when planning permission expired in 2012 (An Bord Pleanála Planning Ref. 221741);
    - Approximately 192,240tonnes of sand and gravel including 75,060tonnes of overburden was extracted over an area of 4.177Ha since 2012;
    - Approximately 4.177Ha of the existing quarry was subsequently restored using surplus materials already on Site;

The overall Development Site Layout is presented in *Figure 6-1* (refer to Drawings P-01 through P-04 included as part of this application.

6.4.1 Construction Phase

There was no Construction Phase for the unauthorised quarry development and therefore no associated impacts.

The mobile washing plant and site office/welfare (portacabins) and ancillary equipment were established at commencement of the authorised development for the existing quarry

Accordingly, as there is no Construction phase therefore no impacts have occurred or would occur associated with the unauthorised development at the Site.

6.1.1 Operational Phase

The Unauthorised Development is part of an existing quarry site with the intended extraction of 700,000 to 900,000tonnes of sand and gravel at an average rate of 60,000 tonnes per annum up to a maximum of 100,000 tonnes per annum over 10 years. Permission was granted for the extraction five years from 2007 to 2012, there was however unauthorised development at the Site and quarrying continued since 2012. This included the quarrying of approximately 192,240tonnes of sand and gravel including 75,060tonnes of overburden and the subsequent restoration of the quarry over an area of approximately 4.18Ha. It is noted that the entire quarry area measuring approximately 15.21Ha was used for the processing and stockpiling of excavated soil.

Sand and gravel were excavated and processed from this area of the Site using the existing plant and equipment installed at the Site. There was no excavation of bedrock during any phase of authorised or unauthorised development.

The plant and equipment on site included excavator and dumper trucks, washing and screening plant, wheelwash and diesel generator and a bunded diesel fuel tank. The existing settlement ponds and groundwater sump were used for the washing of sand and gravel.

A self-contained mobile welfare unit installed in 2007 for the authorised quarry operations was continued to be used for the unauthorised operational phase since 2012 that was emptied by an authorised contractor as required.

Water for the wheel wash and dust suppression was be sourced from the onsite groundwater sump used for the authorised quarry development.

Water was not abstracted from surface water courses.

There were no direct discharges to ground or surface water from the quarry operations. Wash water from the washing and screening plant was directed to the two (3No.) existing, interlinked, man-made settlement lagoons. The cleaned process water was then directed back to the existing sump by gravity

6.5 Potential Impact of the Unauthorised Development

6.5.1 Construction Phase

No construction activities were proposed or undertaken as part of the unauthorised development and accordingly there are no associated impacts as identified which have occurred, are occurring or will occur. It was verified during the site inspection by Enviroguide on the 14th of October 2021 that there were no built structures at the Site and no impacts associated with a Construction Phase had occurred.

There is no Construction Phase for the restoration of the existing quarry and proposed quarry and therefore there are no identified potential impacts.

6.5.2 Operational Phase

Land Take and Land Stability

The land take for the operational phase of the existing and part restored quarry over the intended 10year period was identified as 15.205Ha of the Site (refer to Drawing P-02 included as part of this application), which was prior to development, greenfield, agricultural land (refer to Section 6.3.2).

The footprint of the entire area quarried was approximately 15.025Ha within the overall Site with approximately 4.177Ha quarried since 2012. The area quarried was within the footprint of the quarry authorised by the grant of planning (Planning Reference: 221741), however the quarrying activities were continued for a five-year period after the planning permission expired.

The long-term phased restoration of the quarry has commenced in the central portion of the Site (refer to Drawing P-02 included as part of this application) and 4.177Ha the lands have been restored to grassland / agricultural land utilising the soil that was stockpiled during quarrying onsite for the restoration of the Site. Based on the results of the site investigation the restoration was used only native soil from within the Site that was geochemically suitable.

The land-take for the duration of the quarrying activities since 2012 was within the area identified for the authorised activity with an additional ‘short-term’, ‘moderate’ loss of agricultural lands. This area has now been restored to grassland for agricultural use with no net loss of agricultural lands.

It was identified that the engineered pit design for the existing quarry considered subsidence, slope stability, compaction and slope failure and included preventative measures as described in the 2004 EIS) for an operational phase of 10 years. During quarrying operations, collapse of quarry working faces can occur locally, however, no evidence of instability or subsidence of adjoining lands was identified during the Site walkover completed by Enviroguide on 21st October 2021. As the quarrying operations have ceased and restoration will continue, therefore there will be no future impact on land stability.

Overall, taking account of the quarrying and associated restoration phase completed and the observed Site condition it is concluded that the quarrying and restoration activity since 2012 has resulted in an overall ‘neutral’, imperceptible and ‘permanent’ impact on land.

Soil and Bedrock

There has been an unavoidable a loss of sand and gravel from the Site associated with the extraction of sand and gravel and the permanent removal of up to 192,240 tonnes of sand and gravel from the Site, including 75,060 tonnes of topsoil and soils above the sand and gravel. The topsoil and soils above the sand and gravel were stripped and stockpiled onsite in phased manner and have been used onsite for the restoration of the central portion of the Site (refer to Drawing No. P-02 included as part of this application). It is noted that remaining stockpiled soil will be used for restoration. Sand and gravel was excavated to a maximum depth of 115mOD. Overall, there has been an unavoidable "negative", "significant", "permanent" impact on the receiving environment with removal of 192,240 tonnes of soil from the Site since 2012, there will be no associated future impacts.

There has been and will be no impact on the receiving bedrock environment associated with quarrying since 2012.

Degradation and Contamination of Soil and Bedrock

The storage of fuel onsite has been within the bunded diesel tanks installed at the Site in accordance with the conditions of the authorised development for the operational phase of the existing quarry up to 2012. There are no reported incidents and there was no evidence of soil contamination identified during the site investigations at the Site. Accordingly, there has been an overall neutral', imperceptible and 'permanent' associated with the quarrying that has now ceased.

This existing bunded diesel tank and associated equipment and mobile plant will remain on site for the duration of any future proposed restoration of the existing quarry and proposed quarry.

The potential accidental release of hazardous material including fuels and materials being used on-site, through the failure of secondary containment or a materials handling accident on the Site is considered to potentially result in a 'negative', 'moderate to significant', 'medium-term' impact on the receiving geological environment depending on the nature of the incident.

There has been and will be no excavation of bedrock associated with the unauthorised development and therefore any impact that has or could occur has been or will be 'neutral, imperceptible, permanent'.

Dust generation during the normal quarrying operations associated would have been temporary in nature and appropriate operational measures including a wheel-wash were implemented. Quarrying operations have ceased and therefore any impacts are considered to have been 'negative', 'slight' and 'temporary' and there will be no future impacts associated with the unauthorised development.

6.5.3 Potential Cumulative Impacts

Cumulative Impacts can be defined as "impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed

as indirect effects. Cumulative effects are often indirect, arising from the cumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

The cumulative effects on land, soil and geology associated with the unauthorised development and other existing developments have been considered. It is noted that the potential impacts of dust and debris in particular on air quality arising from excavation of soil at the Site is assessed in Chapter 8 of this rEIAR. There are two quarries located within 2km of the Site and the most notable impact will be cumulative impact associated with the loss of agricultural land resulting from quarrying. However, as the Unauthorised Development at the Site includes restoration of the quarry with an overall neutral impact and taking account of the receiving environment, it is considered that once restoration activities have been completed there will be no overall cumulative impact associated with the Unauthorised Development.

6.5.4 "Do Nothing" Impact

In the 'Do Nothing' scenario the potential impact on the receiving land soil and geology if the Existing Development and Developments did not proceed is considered.

In the 'Do Nothing' scenario the following are considered:

- The identified loss of soil from the existing quarry area and the associated impacts to the receiving land, soil and geology environment at the Site would not have occurred. This is a significant, unavoidable impact that has occurred.
- The current use of the site as a disused quarry with exposed soil and open water bodies/lagoons would remain and any future proposals to restore the Site to agricultural land would not occur.

6.6 Avoidance, Remedial & Mitigation Measures

The mitigation measures, as outlined below, will ensure that there will be no significant impact on the receiving land, soil and geology environment.

6.6.1 Construction Phase

As there has been no Construction Phase for the existing quarry there are no remedial measures required.

There will be no Construction Phase for the restoration of the existing quarry and proposed quarry and therefore avoidance, remedial and mitigation measures are not required.

6.6.2 Operational Phase

The impact to land and land stability has been already mitigated in the central portion of the Site with the restoration using surplus stripped topsoil and overburden to ensure that the lands have been returned to suitable agricultural lands. The remaining quarry will be restored as part of the Development at the Site and utilising imported soil that has been verified to be geochemically suitable soil as per EPA guidelines (EPA, 2020) which will not present any unacceptable risk to the receiving environment.

There has been an unavoidable loss of soil associated with the extraction and sale for use offsite of the sand and gravel quarried from the Site. There has been no identified impact to soil quality or degradation of soils associated with the unauthorised development.

Overall, no significant impacts identified at the Unauthorised Development Site that would warrant remedial or mitigation measures and therefore avoidance, remedial and mitigation measures are not required.

6.6.3 "Worst Case" Scenario

In a 'Worst Case' scenario, the potential accidental release and impact to the receiving land, soils and geology environment would have occurred in the event of a failure of the mitigation measures. Had this occurred there would have been a negative impact on the receiving environment. There is no evidence that this occurred during the operational period of the unauthorised development.

6.7 Residual Impacts

Residual Impacts are defined as 'effects that are predicted to remain after all assessments and mitigation measures. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts. Potential residual impacts from the Development were considered as part of this environmental assessment. No negative residual impacts in the context of land, soils and geology are anticipated regarding this Development.

Once extraction activities have ceased the Site will be subject to a long-term restoration plan which will be subject to an additional planning application, therefore resulting in a neutral or imperceptible residual impact.

The predicted impacts of the Operational Phases (there is no Construction Phase for the Unauthorised Developments) are described in Table 6-6 in terms of quality, significance, extent, likelihood and duration. The relevant mitigation measures are detailed, and the residual impacts are determined which take account of the avoidance and mitigation measures.

Table 6-6: Summary of Residual Impacts

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Avoidance / Mitigation	Residual Impact
Operational Phase								
Unauthorised Development								
Quarrying and Restoration	Land and Land Stability	Loss of agricultural land for the duration of the quarrying activity only that has now been restored.	Neutral	Imperceptible	Permanent	Direct	None.	Imperceptible
Quarrying	Loss of soil and subsoil	Loss of geological material from the site	Negative	Significant	Permanent	Direct	Unavoidable impact. None.	Permanent
Quarrying – Accidental release of hazardous material including fuels and hazardous materials	Soil Quality	There has been no identified contamination of soil	Neutral	Imperceptible	Permanent	Direct	None	Imperceptible
Future Restoration Development (which will be subject to a future application)								
Extraction	Land stability onsite and offsite	The potential for collapse or subsidence of working faces or subsidence at adjoining lands may occur during extraction	Negative	Significant	Short - Term	Direct	There will be no potential for subsidence offsite due to the minimum 10m buffer with the site boundary. Any subsidence within the quarry will be prevented by the proposed management of the working faces and slopes at 1:1 and 1:2 and regular inspection and monitoring.	Imperceptible
Extraction	Dust generation	The potential for dust generation and dispersion of soil to offsite properties and potential impacts on human health	Negative	Significant	Medium - Term	Direct	There will appropriate mitigation and dust prevention measures in place. All operations will be in accordance with applicable health and safety legislation.	Imperceptible

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Avoidance / Mitigation	Residual Impact
Stripping of topsoil and subsoil	Soils	Degradation of soil quality by exposing soil and subsoil.	Negative	Moderate to significant	Long - Term	Direct	Stripping of topsoil will strictly only be undertaken on an as required basis on a phased manner to minimise potential exposure of soils. Topsoil will be stored appropriately onsite to maintain soil structure and will be used for the restoration of the site.	Moderate
Accidental release of hazardous material including fuels and hazardous materials.	Land, Soils and Geology	Potential for uncontrolled release of unidentified contaminant sources to localised area of ground environment.	Negative	Moderate to Significant	Long - term	Direct	Procedures will be developed, and spillage kits will be available on-site including in vehicles operating on-site. Construction staff will be familiar with emergency procedures for in the event of accidental fuel spillages. All works will be undertaken in accordance with conditions of granted planning	Imperceptible
Recovery of soil – importation of contaminated soils/materials	Land, Soil and Geology	In the unlikely event that that contaminated soils are inadvertently infilled to the site there would be a potential impact on the receiving environment.	Negative	Moderate	Medium Term	Direct	Quality control procedures will be in place as well as the conditions of the WFP that will be required for any Future Restoration Development Therefore, any unsuitable material will be identified prior to being transported/unloaded / placed on Site.	Imperceptible
Recovery of soil and	Off-site (source site) - Land, Soil and Geology	Potential loss of attribute at the source site.	Neutral	Imperceptible	Long Term	Secondary	A Future Restoration Development will divert the loss of valuable soil resource landfill. Contract and procurement procedures will ensure that all fill material imported to the Site are from a known source in accordance with industry	Imperceptible

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Avoidance / Mitigation	Residual Impact
							conformity/compliance standards and statutory obligations.	
Recovery of soil and	Offsite Land, Soil Resources	Potential loss of attribute to Landfill prevented by diverting material to the Future Development Site.	Positive	Slight to Moderate	Long Term	Secondary	None required.	Imperceptible

6.8 Monitoring

There are no monitoring requirements for the Construction Phase or Operational Phase of the Unauthorised Development.

6.9 Interactions

6.9.1 Landscape and Visual

An assessment of the potential impact of the Unauthorised Development on the landscape and visual environment is included in Chapter 10 of this rEIAR. Procedures for restoration of landscape are set out in Chapter 10 of this EIAR.

6.9.2 Public Health

The potential for quarry workers to be exposed to silica dust can arise from the quarrying activities.

Appropriate industry standard and health and safety legislative requirements were implemented during the operational phase of the Development that will be protective of site workers.

It is noted that specific issues relating to Population and Human Health associated with the Development are set out in Chapter 4 of this EIAR.

6.9.3 Hydrology and Hydrogeology

An assessment of the potential impact of the Unauthorised Development on the hydrological and hydrogeological environment is included in Chapter 7 of this rEIAR. Procedures for protection of water courses and the underlying bedrock aquifer are set out in Chapter 7 of this rEIAR.

6.9.4 Biodiversity

An assessment of the potential impacts of the Development on the Biodiversity of the Site, with emphasis on habitats, flora and fauna which may be impacted a result of the unauthorised development are included in Chapter 5 of this rEIAR. It also provides an assessment of the impacts of the Unauthorised Development on habitats and species, particularly those protected by national and international legislation or considered to be of particular conservation importance and proposes measures for the mitigation of these impacts.

6.9.5 Other Interactions

Land, soils and geology interact with other environmental attributes such as air quality (Chapter 8), noise (Chapter 9) and traffic (Chapter 12) and are examined in relevant chapters of this rEIAR.

6.10 Difficulties Encountered When Compiling

There were no difficulties encountered in compiling this land, soil and geology assessment.

6.11 References

British Standards Institution, July 2015. BS 5930:2015+A1:2020 Code of Practice for Ground Investigations

Construction Industry Research and Information Association, 2005. Environmental Good Practice on Site (CIRIA – C650).

Environmental Protection Agency, 2021. EPA Envision Maps. https://gis.epa.ie/EPAMaps/ Consulted on Consulted on 09/10/2021

Environmental Protection Agency, 2020. Guidance on waste acceptance criteria at authorised soil recovery facilities.

Environmental Protection Agency, August 2017. Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2017).

Environmental Protection Agency, September 2015. Draft Advice Notes for preparing Environmental Impact Statements (EPA, 2015).

Environmental Protection Agency, 2004. 'IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities'

Environmental Protection Agency, 2002. Guidelines on Information to be contained in Environmental Impact Statements (EPA, 2002).

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

Environmental Protection Agency, 2000. EPA Landfill Manuals – Landfill Site Design (EPA, 2000).

Environmental Protection Agency, 1999. EPA Landfill Manuals – Landfill Restoration and Aftercare (EPA, 1999).

Enviroguide Consulting, October 2021. Borehole Logs.

Enviroguide Consulting, October 2021. Trial Pit Logs.

Enviroguide Consulting, November 2021. Site Location Map (Drawing No. P-01).

Enviroguide Consulting, November 2021. Area of Substitute Consent (Drawing No. P-02).

Enviroguide Consulting, November 2021. Area of Proposed Quarry Extension (Drawing No. P-03).

Enviroguide Consulting, November 2021. Area of Proposed Infill (Drawing No. P-04).

Enviroguide Consulting, November 2021. Proposed Excavation, Plan and Section (Drawing No. P-05).

Enviroguide Consulting, November 2021. Proposed Quarry, Plan and Section (Drawing No. P-06).

Enviroguide Consulting, November 2021. Proposed Area of Infill Phasing Plan (Drawing No. P-07).

Enviroguide Consulting, November 2021. Proposed Area of Extension Phasing Plan (Drawing No. P-08).

Enviroguide Consulting, November 2021. Rego Pod (Drawing No. P-09).

Enviroguide Consulting, November 2021. Weighbridge & Wheelwash (Drawing No. P-10).

Enviroguide Consulting, November 2021. Monitoring Locations (Drawing No. M-01).

Element Materials Technology Ltd., October 2021. Laboratory Analytical Results. Laboratory Report No. 20-16389.

Geological Society of Ireland, 2021. GSI webmapping. https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228 Consulted on 09/10/2021

Institute of Geologists of Ireland Guidelines, 2002. Geology in Environmental Impact Statements, A Guide (IGI, 2002).

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

National Roads Authority, 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009).

Ordnance Survey Ireland, 2020. OSI webmapping http://map.geohive.ie/mapviewer.html. Consulted on 09/10/2021

Water Framework Directive, 2021. WFD webmapping http://watermaps.wfdireland.ie/NsShare_Web/. Consulted 09/10/2021.

7 HYDROLOGY

7.1 Introduction

This chapter of the remedial Environmental Impact Assessment Report (rEIAR) provides a description of the hydrology and hydrogeology (water) environment within and immediately surrounding the Development Site, an assessment of the potential impacts of the Development requiring substitute consent on hydrology and hydrogeology and sets out any required mitigation measures where appropriate.

The rEIAR will assess any potential impact associated with the unauthorised extraction and restoration activities (Unauthorised Development) which historically took place on the Site lands since 2012 as a continuation of authorised development for quarrying between 2007 and 2012. This follows a notice issued under Section 261A to submit a Substitute Consent application to An Bord Pleanála, requiring a remedial Environmental Impact Assessment.

The principal objectives of this chapter are to identify:

- Hydrological and hydrogeological characteristics of the receiving environment at the Site;
- Potential impacts on land, soils and geology which have occurred, which are occurring, or which can be reasonably expected to occur as a result of the historic unauthorised extraction and infilling activities at the Site;
- Evaluate the significance of any residual impacts.

7.1.1 Quality Assurance and Competence

This chapter of the rEIAR was written by Gareth Carroll BAI, Senior Environmental Consultant with Enviroguide Consulting (Enviroguide) with over 9 years' experience of environmental assessment of brownfield and greenfield sites. The chapter was reviewed by Claire Clifford BSc., MSc., PGeo., EurGeol who is Technical Director of the Contaminated Land and Hydrogeology Division of Enviroguide Consulting and is a Professional Geologist with the Institute of Geologists of Ireland and has extensive experience in preparing environmental assessments for a range of project types and geological and hydrogeological site settings.

7.1.2 Description of the Unauthorised Development

The Site covers an area measuring 15.21Ha and is situated in Maplestown, Co. Carlow approximately 5 km northwest of the town of Rathvilly, Co. Carlow, and 4.5 km southwest of Baltinglass, Co. Wicklow. (Refer to Figure 6-3 for the Site Location Plan).

The Unauthorised Development comprises the following:

- Application for substitute consent for the Unauthorised Development at the site since 2012 when planning permission expired in 2012 (An Bord Pleanála Planning Ref. 221741);
    - Approximately 192,240 tonnes of sand and gravel including 75,060 tonnes of overburden was extracted over an area of 4.177Ha since 2012;
    - Approximately 4.177Ha of the existing quarry was subsequently restored using surplus materials already on Site;

The overall Development Site Layout is presented in Figure 7-1 (refer to Drawings P-01 through P-04 included as part of this application).

Figure 7-1: Unauthorised Development Site Layout

7.1.2.1 Unauthorised Development

The Unauthorised Development is part of an existing quarry site with the intended extraction of 700,000 to 900,000tonnes of sand and gravel at an average rate of 60,000 tonnes per annum up to a maximum of 100,000 tonnes per annum over 10 years. Planning was granted for the extraction five years from 2007 to 2012, there was however unauthorised development at the Site and quarrying continued since 2012. This included the quarrying of approximately 192,240 tonnes of sand and gravel including 75,060 tonnes of overburden and the subsequent restoration of the quarry over an area of approximately 4.18Ha. It is noted that the entire quarry area measuring approximately 15.21Ha was used for the processing and stockpiling of excavated soil.

The Applicant is now seeking substitute consent for an area of the Site that was quarried and restored outside of the granted planning permission period (An Bord Pleanála Planning Ref. 221741).

7.2 Study Methodology

7.2.1 Regulations and Guidance

The methodology adopted for the assessment has regard to the relevant guidelines in particular the following:

- Council Directive 80/68/EEC, 1979. On the protection of groundwater against pollution caused by certain dangerous substances. Council of European Communities.
- Council Directive 2006/118/EEC, 2006. On the protection of groundwater against pollution and deterioration. European Parliament and the Council of European Communities.
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy with amendments 2455/2001/EC, 2008/32/EC and 2008/105/EC (Water Framework Directive, WFD);
- Department of the Environment, Heritage and Local Government, Environmental Protection Agency and Geological Survey of Ireland, 1999. Groundwater Protection Schemes (Groundwater Protection Schemes, 1999);
- Department of the Environment, Heritage and Local Government, 2009. Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities (DEHLG, 2009);
- Environmental Protection Agency, August 2017. Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2017);
- Environmental Protection Agency, September 2015. Draft Advice Notes for preparing Environmental Impact Statements (EPA, 2015);
- Environmental Protection Agency, 2002. Guidelines on Information to be contained in Environmental Impact Statements (EPA, 2002);
- Environmental Protection Agency, 2003. Advice Notes on Current Practice in the preparation of Environmental Impact Statements (EPA, 2003);
- Institute of Geologists of Ireland Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013);
- Local Government, July 1990. No. 21.1990. Local Government (Water Pollution) (Amendment) Act, 1990.
- Local Government, March 1977. No. 01/1977. Local Government (Water Pollution) Act, 1977.
- National Roads Authority, 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (NRA, 2009);
- S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 including amendments S.I. No. 327/2012, S.I. No. 386/2015 and S.I. No. 77/2019.
- S.I. No. 9 of 2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 including amendments S.I. No. 149 of 2012 and S.I. No. 366 of 201; and
- WFD Working Group, 2005. Guidance on the Assessment of the Impact of Groundwater Abstractions (WFD, 2005).

7.2.2 Phased Approach

A phased approach was adopted for this rEIAR and EIAR in accordance with Environmental Protection Agency (EPA) and Institute of Geologists of Ireland (IGI) guidelines as set out above and is described in the following sections.

Element 1: An Initial Assessment and Impact Determination stage was carried out by Enviroguide to establish the project location, type and scale of the development, the baseline conditions, and the type of hydrological and hydrogeological environment, to establish the activities associated with the Unauthorised Development and to undertake an initial assessment and impact determination.

This stage of the assessment included a desk top study that comprised a review of published environmental information for the Development Site, information provided by the Applicant including the Environmental Impact Statement (EIS) prepared in 2004 as part of the planning application for the existing quarry development and a site walkover survey, which was undertaken by Gareth Carroll and Fionnuala Joyce of Enviroguide Consulting on the 14th October 2021, to identify the environmental site setting and establish baseline conditions at the Site relevant to the land, soil and geological environment.

The study area, for the purposes of assessing the baseline conditions for the Hydrology and Hydrogeology Chapter of the rEIAR, extends beyond the Site boundaries and includes potential receptors within a 2.0km radius of the Site. The extent of the wider study area was based on the Institute of Geologists of Ireland (IGI) Guidelines (IGI, 2013) that recommends a minimum distance of 2.0km radius from the Development Site. This distance was reviewed during the desk top studies and revised to 15km, to identify potentially sensitive habitats which is a distance set out in rAA / rNIS methodologies (DEHLG, 2009). Designated and protected areas potentially hydraulically connected to the Development Site were also considered. The purpose of this increased search radius was to ensure that any potential hydrogeological / hydrological connections to sensitive habitats were identified.

This stage of the assessment was completed by Enviroguide Consulting and included the review of the following sources of information:

- Environmental Protection Agency (EPA) webmapping 2021;
- Geological Survey Ireland (GSI) Datasets Public Viewer and Groundwater webmapping;
- Google Earth Mapping and Imagery
- Ordnance Survey Ireland (OSI) webmapping 2021;
- Water Framework Directive Ireland (WFD) webmapping, 2021;
- Office of Public Works (OPW) database on historic flooding and the Catchment Flood Risk Assessment and Management (CFRAM) maps, 2021;
- National Parks and Wildlife Services (NPWS) webmapping 2021;
- Information provided by the Applicant including:
    - planning drawings and documents pertaining to the Development and referenced within this report where relevant; and
    - Environmental Impact Statement (EIS, 2004).

Element 2: Direct and Indirect Site Investigation and Studies stage was carried out to determine site specific details, refine the conceptual site model and undertake a detailed assessment and impact determination. The scope of work for site investigation at the Development Site carried out for Element 2 included:

- A site walkover survey was undertaken by Gareth Carroll and Fionnuala Joyce of Enviroguide Consulting on the 14th of October 2021;
- An intrusive site investigation was undertaken between 14th October 2021 and 21st October 2021 that was supervised by Enviroguide Consulting personnel including the following:
    - Trial pit excavation at the Development Site (TP01 through TP11) on the 14th of October 2021 to identify and assess the shallow geological and subsurface conditions across the Development Site;
    - Borehole drilling was undertaken between the 14th of October 2021 and the 21st October 2021 by Gerry Comerford Drilling Ltd. to investigate the deeper geological conditions at the Development Site;
    - Installation of groundwater monitoring wells as specified by the onsite Enviroguide Consulting hydrogeologist
- Groundwater and surface water monitoring and sampling on the 18th of October 2021 and the 22nd October 2021 including collection of samples for laboratory analysis at a UKAS accredited laboratory, Element Materials Technology.
- A topographical survey of the site was undertaken and included surveying of all site investigation and sampling locations relative to ordnance datum (mOD).

The site investigation and monitoring locations are shown on Figure 6-2 (refer to Drawing No. M-01 included as part of this application).

The reports and documents reviewed and evaluated for Element 2 of this assessment included the following:

- Element Materials Technology Ltd. Laboratory Analytical Report, October 2021. Report Reference 21/16428.

The site investigation results are discussed in Section 7.3 and referenced documents are provided in the appendices to this report.

Element 3: Mitigation Measures, Residual Impacts and Final Impact Assessment were based on the outcome of the information gathered in Element 1 and Element 2 of the assessment. Mitigation measures to address all identified adverse impacts that were identified in Element 1 and Element 2 of the assessment were considered in relation to the Operational Phase of the Development. These mitigation measures were then considered in the impact assessment to identify any residual impacts.

Element 4: Completion of the Hydrology and Hydrogeology sections of the rEIAR in this Chapter which includes all the associated figures and documents.

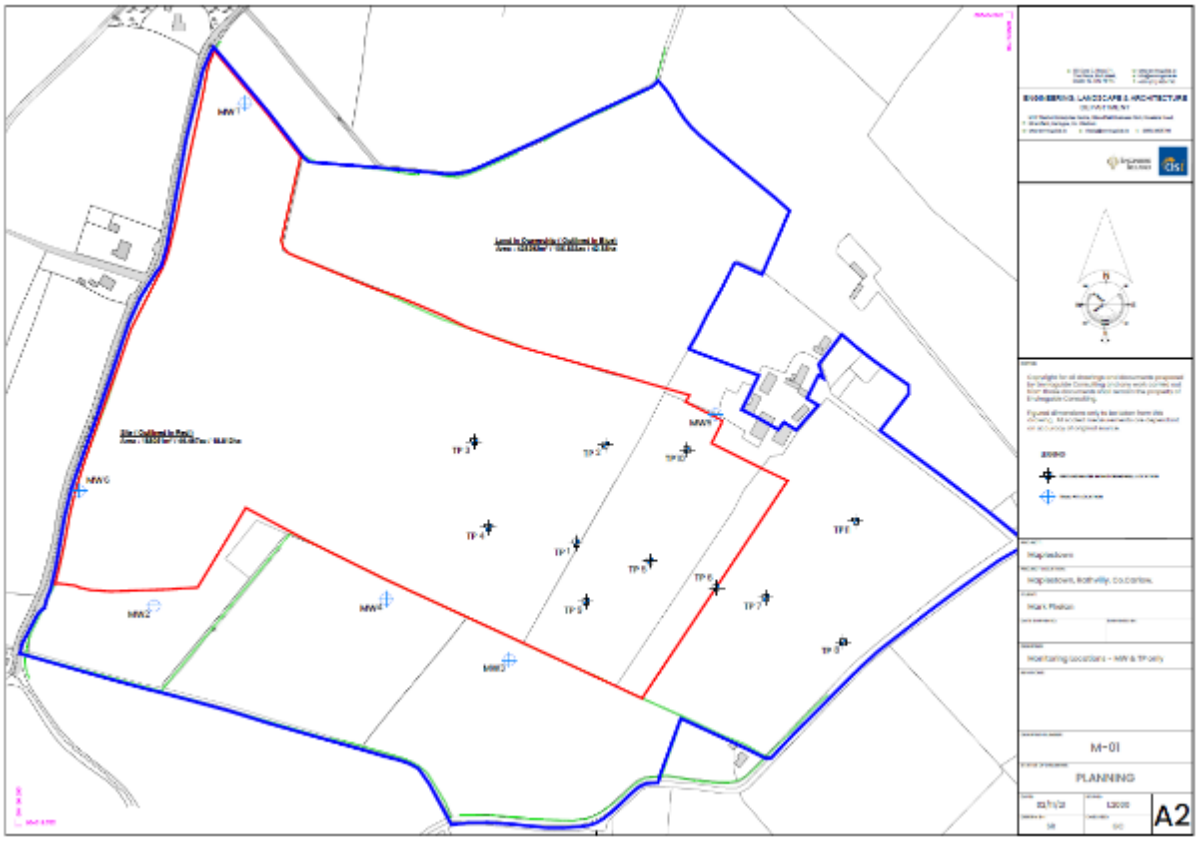


Figure 7-2: Site Investigation and Monitoring Locations to include locations on lands which may be considered for future development

7.2.3 Description and Assessment of Potential Impact

Impacts will vary in quality from negative, to neutral or positive. The effects of impacts will vary in significance on the receiving environment. Effects will also vary in duration. The terminology and methodology used for assessing the 'impact' significance and the corresponding 'effect' throughout this Chapter is described in Table 6-1.

Table 7-1: Assessment of Potential Impacts Terminology and Methodology

Quality of Effects / Impacts	Definition
Negative	A change which reduces the quality of the environment
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment
Significance of Effects / Impacts	**Definition**
Imperceptible	An effect capable of measurement but without significant consequences.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.

Significant	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters a sensitive aspect of the environment.
Profound	An effect which obliterates sensitive characteristics.
Duration of Effects / Impacts	**Definition**
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting one year or less
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration

The baseline sensitivity of the receiving soils, geology and land has been established and assessed and any impacts associated with the Development assessed including impacts that have occurred, impacts that are occurring and impacts that are likely to occur for the lifecycle of the Development.

The potential impacts associated with the existing quarry development were assessed based on the baseline site conditions for the period pre-2007, prior to commencement of the quarrying from 2007 to 2012 within the existing Quarry Development.

The potential impacts associated with the proposed restoration and infilling of the quarry site and the Proposed Quarry development have been assessed based on the current pre-development baseline condition of the receiving environment.

7.3 The Existing and Receiving Environment (Baseline Situation)

The baseline receiving hydrological and hydrogeological environment was established based on the Site conditions in 2004, prior to the commencement of the existing quarrying activity at the Site to enable an assessment of the impacts that have occurred, are occurring and impacts that are likely to occur. The baseline receiving hydrological and hydrogeological environment has also been established for the current existing environment.

7.3.1 Site Location and Description

The Site covers an area measuring 15.21Ha and is situated in Maplestown, Co. Carlow approximately 5 km northwest of the town of Rathvilly, Co. Carlow, and 4.5 km southwest of Baltinglass, Co. Wicklow.

The Site comprises the following:

- The existing quarry, for which substitute consent is being sought, measuring approximately 15.21Ha and located in the western portion of the Site (refer to Drawing P-02 included as part of this application);

The existing restored area, for which substitute consent is being sought, measuring approximately 4.18Ha and located in the central portion of the Site (refer to Drawing P-02 included as part of this application. The Development Site location is presented in Figure 6-3.

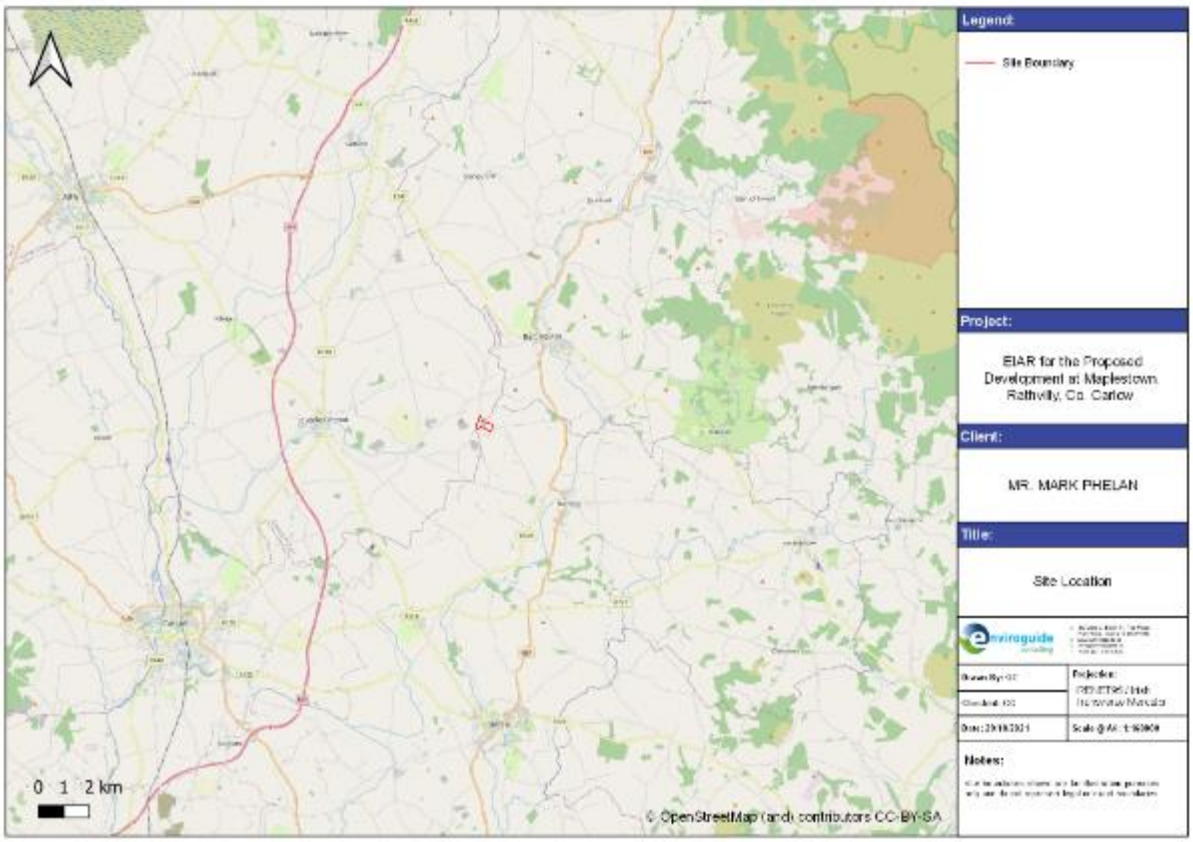


Figure 7-3: Site Location

7.3.2 Current and Historical Land Use

Historical mapping and aerial photography available from the Ordnance Survey of Ireland website (OSI, 2021) and Google Earth (Google Earth, 2021) were reviewed and key observations on-site and off-site are summarised in *Table 7-2*Table 6-2.

Table 7-2: Historical Land Use

Date	Information Source	Site Description
1837-1842	**OSI map 6inch**	**On-site:** The Development Site is shown as open fields divided by field boundaries. An unnamed waterbody (recorded on the EPA database (EPA, 2021) as the Broadstown Stream) is identified along the southern boundary in the southwest portion of the Site and is shown to discharge to the River Graney approximately 0.27km west of the Development Site. **Off-site:** The surrounding land-use is shown as open fields with some one-off building structures. The River Graney is identified approximately 0.06km north of the northern portion of the Site and approximately 0.27km west of the Development Site.
1888-1913	**OSI map 25inch**	**On-site:** No significant change. **Off-site:**

Date	Information Source	Site Description
		A 'spring' is located approximately 0.08km north of the eastern portion of the Site and flows west before discharging o the River Graney. A 'pump' is identified at the building structures located approximately 0.08km north of the Development Site. There is a gravel pits mapped 0.37km south of the Development Site (refer to Table 6 3 below).
1830-1930	**OSI Cassini map 6inch**	**On-site:** No significant change. **Off-site:** No significant change.
1995	**OSI Aerial photography**	**On-site:** A circular feature is identified in the central portion of the Site. No other significant change. **Off-site:** used for agricultural. Some newer one-off residential buildings are shown in the vicinity of the Development Site. Ground disturbance (possible quarrying) at locations 0.62km west and 0.17km south of the Site.
2003	**Google Earth photography**	**On-site:** No significant change. **Off-site:** Areas of ground disturbance / quarries with open water / ponds identified at four locations approximately 0.57west, 1.04km southwest, 1.53km west and 2.0km west of the Development Site.
2005	**OSI Aerial photography**	**On-site:** Localised area of ground disturbance noted adjoining an entrance area in the southwest corner of the Site. **Off-site:** No significant change.
2009	**Google Earth photography**	**On-site:** Area of ground disturbance is no longer evident and grass cover noted. **Off-site:** No significant change.
2011	**Google Earth photography**	**On-site:** Quarrying evident and extended across an area of approximately 4.5Ha with an area with grass cover removed adjoining the western boundary. Three waterbodies / lagoons with water are identified and quarry infrastructure (screening plant). **Off-site:** No significant change.
2011-2013	**OSI Aerial photography**	**On-site:** No significant change **Off-site:** The quarries previously identified 0.17km south and 1.04km southeast are no longer shown.
2013	**Google Earth photography**	**On-site:** Quarrying and area of ground disturbance extended into the western area of the Site and extended to the area with the circular feature with a quarry footprint of approximately 5.7Ha. A fourth smaller water body/lagoon is identified. No other significant change **Off-site:** No significant change
2016 & 2017	**Google Earth photography**	**On-site**

Date	Information Source	Site Description
		Quarrying and area of ground disturbance extended into the western area of the Site and extended to the east to a fence line with a quarry footprint of approximately 7.8Ha. The fourth water body/lagoon is not identified. No other significant change **Off-site:** No significant change.
2013-2018	**OSI Aerial photography**	**On-site:** Quarrying and area of ground disturbance extended into the western area of the Site and extending into the area with the circular feature. The fourth smaller pond is not identified **Off-site:** No significant change.
2018	**Google Earth photography**	**On-site:** The central portion of the Site has been restored (approximate area of 4.177Ha) and appears to have a similar topographical level as the adjoining lands with grass cover. The quarried area in the west of the Site has been extended towards the western site boundary with an approximate quarry footprint of 6.78Ha. The three water bodies/lagoons remain. **Off-site:** No significant changes.
2019	**Google Earth photography**	**On-site:** No significant changes **Off-site:** No significant changes
2021	**Google Earth photography**	**On-site:** No significant changes. Some vegetation cover on boundary areas of the quarry and on stockpiles/berms. **Off-site:** No significant changes.

Planning permission (Planning Reference: 221741) was granted with 25No. conditions by An Bord Pleanála on 24th July 2007, following an appeal of a grant by for the extraction and processing sand and gravel and to retain a new entrance and existing sand and gravel pit at the Site (Planning Permission Reg. Ref. 06/842).

The Grant of Planning (Planning Reference: 221741) expired in 2012. However, since 2012 unauthorised extraction activities have taken place within the existing sand and gravel quarry located in the western portion of the Site. During this period the eastern portion of the existing sand and gravel extraction area and central portion of the Site was backfilled with excavated materials from the sand and gravel extraction operations for the purpose of landscaping and reinstatement. It is noted that no materials were imported onto the Site for the purpose of site restoration at this time.

The site condition identified during the during the site walkover survey undertaken by Enviroguide Consulting on the 14th of October 2021 identified that the Site comprised of:

- The existing quarry and restored area, for which substitute consent is required, measuring approximately 15.205Ha (refer to *Figure 7-1* and Drawing No. P-02 included as part of this application). It is noted that the restored area, measuring 4.177Ha, was covered with grass and being used for grazing of livestock;

- The greenfield area in the easter portion of the Site where the proposed quarry site is located measuring 3.583Ha (refer to *Figure 7-1* and Drawing No. P-03 included as part of this application).

7.3.3 Surrounding Land use

The lands surrounding the Site comprise agricultural lands. Fields are bounded with ditches and hedgerows and are mostly used for sheep and cattle grazing, with a number of sand and gravel quarries in the area (refer to Table 6-3). Settlement is quite sparse, with occasional farmhouses and one-off residential dwellings.

The Site is bound by agricultural fields within the Applicants landholding to the north, east and south and the L-8097 local road, through which the Site is accessed, to the west.

There are no EPA licensed facilities located within a 2km radius of the Development Site.

There are a number of historical pits and quarries mapped by the GSI (GSI, 2021) and OSI (OSI, 2021) within 2km of the Development (refer to Table 6-3). It is noted that there are no operational quarries mapped by the GSI (GSI, 2021) within 2km of the Development.

Table 7-3: Historical Pits and Quarries within 2km of the Development Site

Name/Type	Distance from Site (km)	Location from Site
Historical Pit / Quarry	0.17	South
Historical Pit / Quarry	0.57	West
Historical Pit / Quarry	0.37	South
Historical Pit / Quarry	0.62	West
Historical Pit / Quarry	0.65	North
Historical Pit / Quarry	1.04	Southwest
Historical Pit / Quarry	1.53	West
Historical Pit / Quarry	2.00	West

7.3.4 Land and Topography

The topography surrounding the Development comprises gently undulating farmland with elevations ranging between 110 metres above Ordnance Datum (mOD) to 140mOD (GSI, 2021).

The Site includes the proposed infill Development in the western portion of the Development Site, the existing infill area in the central portion of the Development Site and the undeveloped greenfield lands to the east (i.e., proposed quarry development).

The topographical survey of the Site indicated that the topography ranges from a high point 120mOD to the east of the Development Site and slopes to the south with elevation of 115mOD and to the west where ground elevation of 115mOD was recorded at the quarry floor.

There is a steep slope between the pit floor at approximately 115mOD and the western boundary of the Development Site at 120mOD.

There was no subsidence observed at the Site and on lands immediately adjoining the existing quarry during the Site walkover survey by Enviroguide Consulting on 14th September 2021.

The topographical survey for the Site is presented in Figure 6-4 (refer to Drawing No. P-01 included as part of this application).

Figure 7-4: Topographical Survey (Drawing No. P-01)

7.3.5 Rainfall

2004 Baseline Conditions

The closest the synoptic meteorological station to the Site is at Oak Park, Co Dublin which is located approximately 12km southwest of the Site. Monthly rainfall data available for from the Oak Park station for the period 2004 (Met Éireann, 2021) is presented in Table 7-4.

Table 7-4: 2004 Monthly Rainfall Data (Met Éireann, 2021)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
82.7	NR	70.9	59.2	34.3	NR	NR	129.1	NR	159.4	41.6	51.9	718.1*
Notes: 'NR' = Not Recorded '*' = Total annual rainfall for 2004 based on reported rainfall data for eight of the twelve months of the year. Actual value likely higher.												

Monthly rainfall data available for 1km x 1km grids (for the period 1981 to 2010) was also sourced from Met Éireann (Walsh, 2012) and is presented in Table 7-5.

Table 7-5: Long Term Mean Monthly Rainfall Data (mm) (Walsh, 2012)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
90	63	71	65	69	72	66	83	79	104	96	93	952
Note: 1km x 1km Irish Grid Coordinates selected for the Site = X (Easting): 285000, Y (Northing): 185000												

2021 Baseline Conditions

Monthly rainfall data available for from the Oak Park station for the period 2004 (Met Éireann, 2021) is presented in Table 7-6.

Table 7-6: 2021 Monthly Rainfall Data (Met Éireann, 2021)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
61.4	172.8	51.8	29.7	12.9	40.5	76.5	100.1	57	96.6	87.6	123.2	910.1

The average potential evapotranspiration (PE) from the Oak Park station for the period 2020 (Met Éireann, 2021) is presented in Table 7-7. It is noted that the average PE data from Oak Park station was not available for the period 2004.

Table 7-7: Average Potential Evapotranspiration (Met Éireann, 2021)

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
12.1	23.2	40.7	65.4	100.5	78.9	78.1	68.1	50.3	27.7	13.4	9.2	567.6

The average annual PE at the Site is 567.6mm/year (Met Éireann, 2021) (refer to Table 7-7). The GSI (GSI, 2021) have calculated an Effective Rainfall (ER) value of between 489.1mm/year for the Site.

7.3.6 Hydrology

The closest water feature to the Site is recorded on the EPA database (EPA, 2021) as the River Graney and is located approximately 0.06km north of the northwest portion of the Site and 0.17km west of the western boundary of the Site. The River Graney flows west before discharging to the River Lerr (River Waterbody Code: IE_SE_17L010155) approximately 5.76km west and downstream of the Site. The River Lerr continues to flow west, discharging to the River Barrow (River Waterbody Code: IE_SE_14B012460) approximately 13.3km west of the Site.

The Broadstown Stream (River Waterbody Code: IE_SE_14G070200) is recorded on the EPA database (EPA, 2021) approximately 0.07km south of the Site. The Broadstown Stream flows

west before discharging to the River Graney (Lerr) (River Waterbody Code: IE_SE_14G070200) approximately 0.27km west of the Site.

There are land drains installed on the Development site and adjoining lands that discharge to the open drain at the eastern boundary of the existing quarry that subsequently discharges to the Broadstown Stream (refer to Figure 7-5 and Figure 7-9). The open drainage ditch was observed to be dry at the time of inspection.

The local surface water features in within a 2km radius of the Site is presented in Figure 7-5 and Figure 7-9.

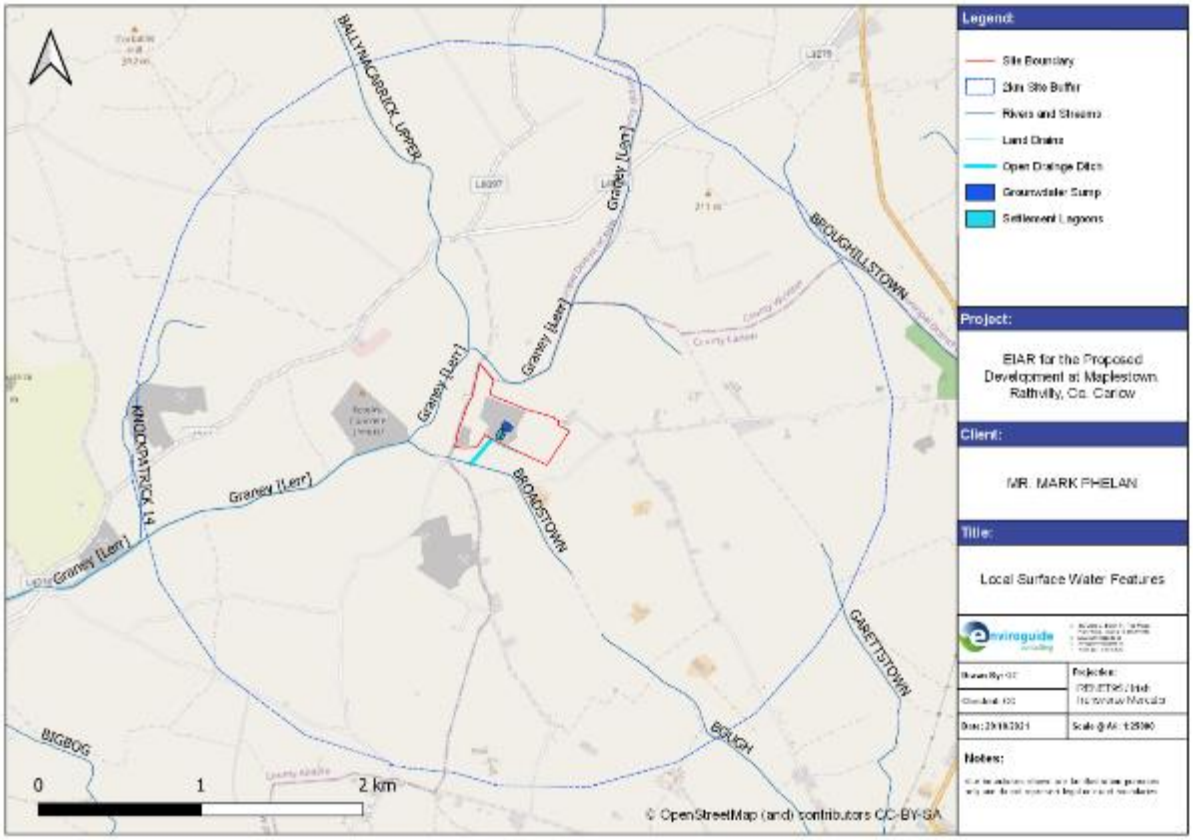


Figure 7-5: Local Surface Water Features

7.1.1 Surface Water Catchment Management Unit and Status

The Site is within the WFD catchment management units (EPA, 2021) of the River Barrow (Catchment (ID: 14), the Barrow Hydrometric Area (HA14), the sub-catchment of the Lerr_SC-010 (Sub-Catchment ID: 14_6), and the Graney (Lerr)_010 River Sub Basin (EU Code: IE_SE_14G070200).

2004 Baseline Conditions

The River Graney and the Broadstown Stream were both assigned a “good” water quality status for the periods of 2007-2012 and 2010-2015 and were identified as “not at risk” of not achieving the Water Framework Objectives for the WFD Cycle 2 (EPA, 2021).

2021 Baseline Conditions

The River Graney and the Broadstown Stream have both been assigned a “moderate” water quality status for the period of 2013-2018 and are identified as “at risk” of not achieving the Water Framework Objectives for the WFD Cycle 3 (EPA, 2021).

The river waterbody risk is presented in Figure 7-6.

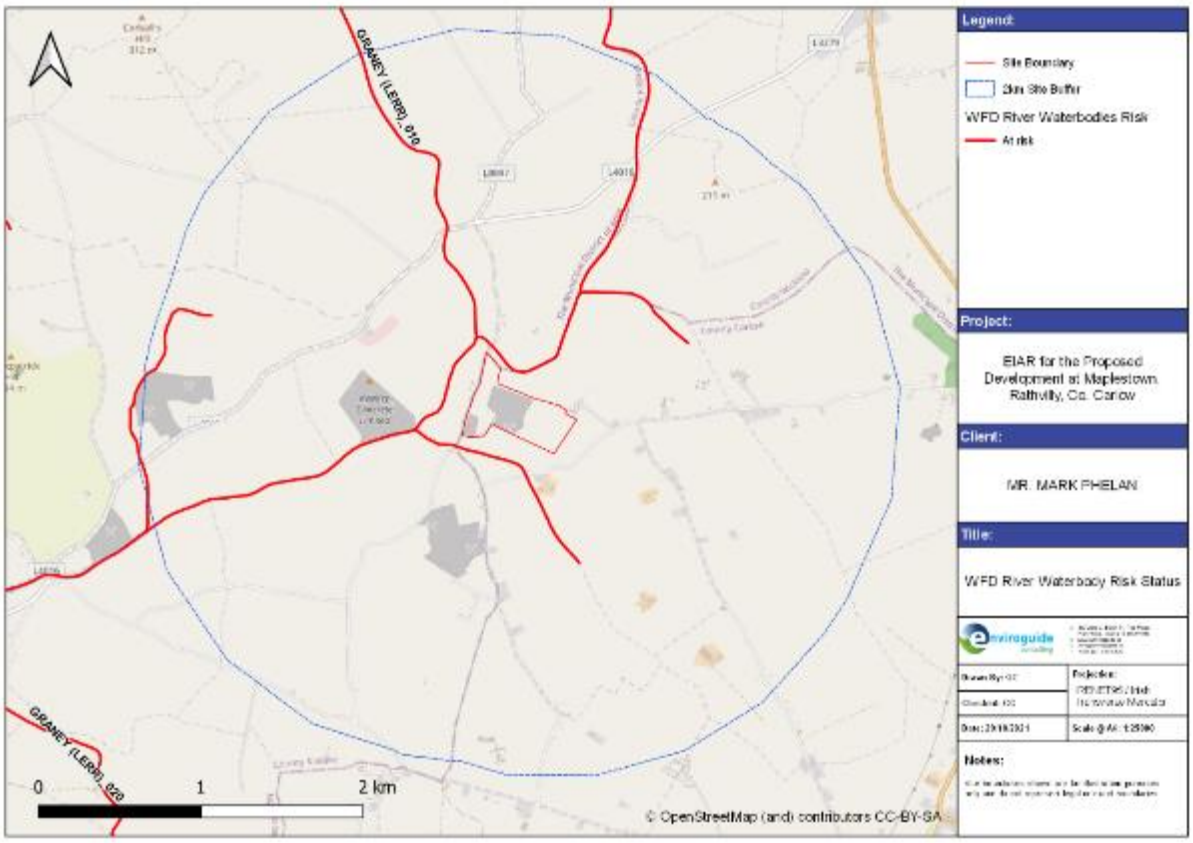


Figure 7-6: WFD Surface Water Risk Status

7.3.7 Surface Water Quality

The closest operational EPA monitoring station on the Graney River to the Site is the ‘Millers Bridge’ station (Station ID: RS14G070100) located approximately 0.06km north and upstream of the Development Site (EPA, 2021). The ‘Bridge in Graney’ station (Station ID: RS14G070200) is located approximately 2.6km downstream of the Site.

There are no operational EPA monitoring stations located on the Broadstown Stream (EPA, 2021).

2004 Baseline Conditions

The EPA surface water quality monitoring data and Q-Value ratings for the ‘Millers Bridge’ and ‘Bring in Graney’ ’stations is presented in

Table 7-8.

Table 7-8: EPA Surface Water Monitoring Data

Surface Waterbody I.D.	Sample Location / Monitoring Station	Indicative WFD Quality 2007-2012	Q-Value Score and (status) 2000
River Graney (0.06km upstream)	Millers Bridge Station I.D.: RS14G070100	Good	3 (Poor)
River Graney (0.26km downstream)	Bridge in Graney Station I.D.: RS14G070200	Good	3 (Poor)

Surface water monitoring data (EIS, 2004) for the River Graney and Broadstown Stream from 2000 indicated that the water quality was similar for upstream and downstream locations.

The surface water analytical results were screened against the assessment criteria as documented in the following legislation (refer to Table 7-12).

- S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 and as amended (SW EQS).

Table 7-9: Previous Surface Water Monitoring Data (EIS, 2004)

Parameter	European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272/2009 and as amended) (EQS)		Sample A – River Graney (Upstream of the Site at Miller's Bridge)	Sample B – Broadstown Stream (Upstream of the Site)	Sample C – Broadstown Stream (Downstream of the Site)
	Inland surface waters (mg/l)				
	AA-EQS	MAC-EQS			
Temperature (˚C)	Not greater than a 1.5°C rise in ambient temperature outside the mixing zone		15	15	15
pH (pH unit)	Soft Water 4.5< pH < 9.0 or Hard Water 6.0< pH < 9.0		7.7	7.5	7.5
Conductivity (µS/cm)	--	--	603	668	650
BOD	High status <= 1.3 mean) or <= 2.2(95%ile), Good status <= 1.5 (mean) or <= 2.6 (95%ile)		3	6	5
Suspended Solids	--	--	4	21	54
Orthophosphates as PO4	--	--	0.06	0.04	0.03
Total Phosphorus as P	--	--	<0.2	<0.2	<0.2
Nitrate as NO3	--	--	26.4	41.4	46.6

Notes:
Cells in ITALICS exceed European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272/2009 and as amended) (EQS)
- : Parameter Not Analysed
-- : no applicable standard

The reported analytical results for samples collected in the River Graney and Broadstown Stream were reported as less than the applicable SW EQS.

2021 Baseline Conditions

The EPA surface water quality monitoring data and Q-Value ratings for the 'Millers Bridge' and ''stations is presented in

Table 7-8. It is noted that there is no recent EPA surface water quality monitoring data for the 'Millers Bridge' located upstream of the Site.

Table 7-10: EPA Surface Water Monitoring Data

Surface Waterbody I.D.	Sample Location / Monitoring Station	Indicative WFD Quality 2013-2018	Q-Value Score and (status) 2020
River Graney (0.26km downstream)	Bridge in Graney Station I.D.: RS14G070200	Moderate	3-4 (Moderate)

The EPA surface water quality monitoring data at the 'Bridge in Graney' monitoring station, located approximately 0.26km downstream of the Site indicates a slight improvement in water quality downstream of the Site since 2000.

7.3.8 Flood Risk Assessment

The OPW national flood hazard mapping (NFHM) data base was consulted (OPW, 2021) and identifies one (1No.) reoccurring flood event within a 2km radius of the Site. This recurring flood incident is recorded approximately 0.04km west of the Site and is recorded under the name 'Bigstone Recurring' (Flood I.D. 1576). The Kildare County Council meeting minutes dated the 18th May 2005 reports that 'low lying land is flooded every year after heavy rain. Road is liable to flood. The water flows off the land. Development has exasperated the problem'.

Fluvial and coastal flood mapping published by the OPW as part of the National CFRAM Programme in 2016 / 2017 (OPW, 2021) and the National Indicative Fluvial Maps (NIFM) for catchments greater than 5km2 in areas for which flood maps were not produced under the National CFRAM Programme (OPW, 2021) were consulted. The CFRAM and NIFM flood maps (OPW, 2021) identify the Site within Flood Zone C where the probability of flooding from rivers and the sea is low (less than 0.1%AEP or 1 in 1000) for both river and coastal flooding.

The OPW database (OPW, 2021) does not contain mapped information in relation to pluvial flooding for the vicinity of the Site.

The OPW database (OPW, 2021) and GSI database (GSI, 2021) does not contain mapped information in relation to groundwater flooding for the vicinity of the Site.

There are no historical records of fluvial, coastal/tidal, pluvial and/or groundwater flooding at the Site

7.3.9 Soil, Subsoil and Geology

Published Information

The soils beneath the Site have been mapped by Teagasc (Teagasc, 2021) as moderately drained fine loamy drift with limestones of the Elton (1000c) soil series.

The quaternary sediments beneath the majority of the Site are mapped by the GSI (GSI, 2021) as gravels derived from limestones (GLs).

The GSI database (GSI, 2021) has mapped the bedrock beneath the Site as the Tullow Type 2 Equigranular Granite formation (Stratigraphic Code: IDTWGRE) which are described as 'pale, fine to coarse grained granite'.

2004 Site Investigation

The results of previous site investigations (EIS, 2004) described the soil and subsoil as:

'The Site Investigations showed that the thickness of topsoil on the site varies from between 0.3 and 0.5 m, with between 0.5 to 1 m of subsoil underlying the topsoil on the higher ground. The soils cover a thick deposit of sand and gravel with the thickness of this deposit reaching 6 metres in places. On the lower ground to the South East of the site, a thick layer of marl was encountered beneath the topsoil and the sandy subsoil layers'.

Bedrock was not encountered at the Site during previous site investigations.

2021 Site Investigation – Existing Quarry and Restoration

The site investigation and surveys undertaken by Enviroguide Consulting in October 2021 identified that the remaining soil and sand and gravel deposits across the entire site were broadly consistent with the published information and the findings of the findings presented in the 2004 EIS.

The locations (trial pits and boreholes) for the site investigation overseen by Enviroguide Consulting in October 2021 are presented in Figure 6-2 and trial pit and borehole logs are provided in Appendix A.

Soil and sand and gravel deposits have been excavated within the quarry footprint to a maximum depth of 115mOD. Some residual stockpiles of soil described primarily as sandy silt and sand remain within the existing quarry. This soil will be also used in the restoration of the quarry.

The soils encountered in the restored area of the Site are described as Made Ground (reworked soils) a maximum depth of 2.8mbGL that comprised of brown sand and silt with varying sand, gravel and cobble content. Native or undisturbed soil described as gravelly sand was encountered beneath the made ground in TP3 and TP4 from 2.1mbGL to the maximum extent of excavation at 2.6mbGL. Soil encountered during drilling of borehole MW4 located to the south of the restored area comprised grey to brown SAND and GRAVEL deposits to the final depth of drilling at 11.5mbGL.

It is noted that shallow groundwater seepages were encountered just below the interface with the infilled materials between 2.4mbGL and 2.35mbGL at downgradient trial pit locations TP3 and TP4 respectively. A groundwater strike was identified during drilling of downgradient borehole MW4 at 4.7mbGL.

7.3.10 Recharge

The GSI groundwater recharge map provides an estimate of the average amount of rainwater that percolates down through the subsoils to the water table over a year. The map accounts

for rainfall that percolates diffusely through soils and subsoils but does not take into account water that enters aquifers at points (e.g., at sinkholes) or along linear features (e.g., along sinking streams/rivers). Groundwater recharge amounts are estimated by considering soil drainage, subsoil permeability, thickness and type, the ability of the aquifer to accept the recharge, and rainfall.

As detailed in Section 7.3.5, the GSI (GSI, 2021) have calculated an ER value of 489.1mm/year for the Development Site. The GSI (GSI, 2021) have also identified the recharge coefficient for the aquifer beneath the majority of the Site as 85% of ER with a calculated recharge of 416mm/year.

Generally, recharge to the aquifer underlying the Site will occur via percolation of rainfall through the subsoil. No recharge cap has been applied to the Site.

7.3.11 Aquifer Classification

The GSI provides a methodology for aquifer classification based on resource value (regionally important, locally important and poor) of the aquifer.

The GSI (GSI, 2021) has classified the bedrock of the Tullow Type 2 Equigranular Granite formation beneath the majority of the Site and surrounding area as a locally important gravel aquifer. It is noted that the aquifer in the eastern portion of the proposed quarry area is mapped by the GSI (GSI, 2021) as a locally important bedrock aquifer which is moderately productive only in local zones.

The gravel and bedrock aquifer map is presented in Figure 7-7.

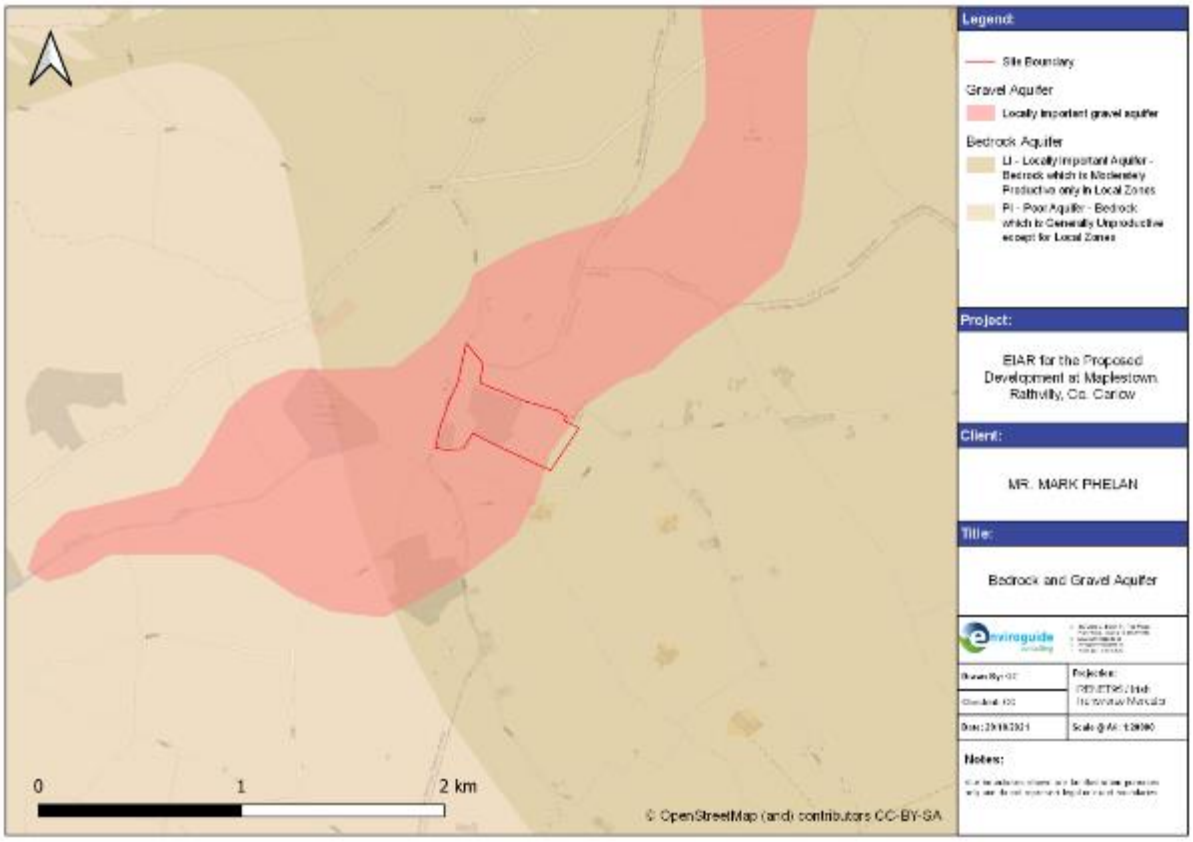


Figure 7-7: Gravel and Bedrock Aquifer

7.3.12 Aquifer Vulnerability Rating

The vulnerability categories, and methods for determination, are presented in the Groundwater Protection Schemes, 1999 publication. The guidelines state that 'as all groundwater is hydrologically connected to the land surface, it is the effectiveness of this connection that determines the relative vulnerability to contamination. Groundwater that readily and quickly receives water (and contaminants) from the land surface is considered to be more vulnerable than groundwater that receives water (and contaminants) more slowly and in lower quantities. The travel time, attenuation capacity and quantity of contaminants are a function of the following natural geological and hydrogeological attributes of any area:

- the subsoils that overlie the groundwater;
- the type of recharge - whether point or diffuse; and
- the thickness of the unsaturated zone through which the contaminant moves.

Table 7-11: Vulnerability Mapping Criteria (Groundwater Protection Schemes, 1999)

Subsoil Thickness	Hydrogeological Requirements				
	Diffuse Recharge			Point Recharge	Unsaturated Zone
	Subsoil Permeability & Type				
	High permeability (sand & gravel)	Moderate permeability (sandy subsoil)	Low permeability (clayey subsoil, clay, peat)	(Swallow holes, losing streams)	(sand & gravel aquifers *only*)
0-3m	Extreme	Extreme	Extreme	Extreme (30m radius)	Extreme
3-5m	High	High	High	N/A	High
5-10m	High	High	Moderate	N/A	High
>10m	High	Moderate	Low	N/A	High

Notes: (i) N/A = not applicable (ii) Permeability classifications relate to the material characteristics as described by the subsoil description and classification method.

The GSI has assigned a groundwater vulnerability rating of "High" (H) for the groundwater beneath the Site (GSI, 2021).

The GSI Groundwater Vulnerability Map is presented in Figure 7-8.

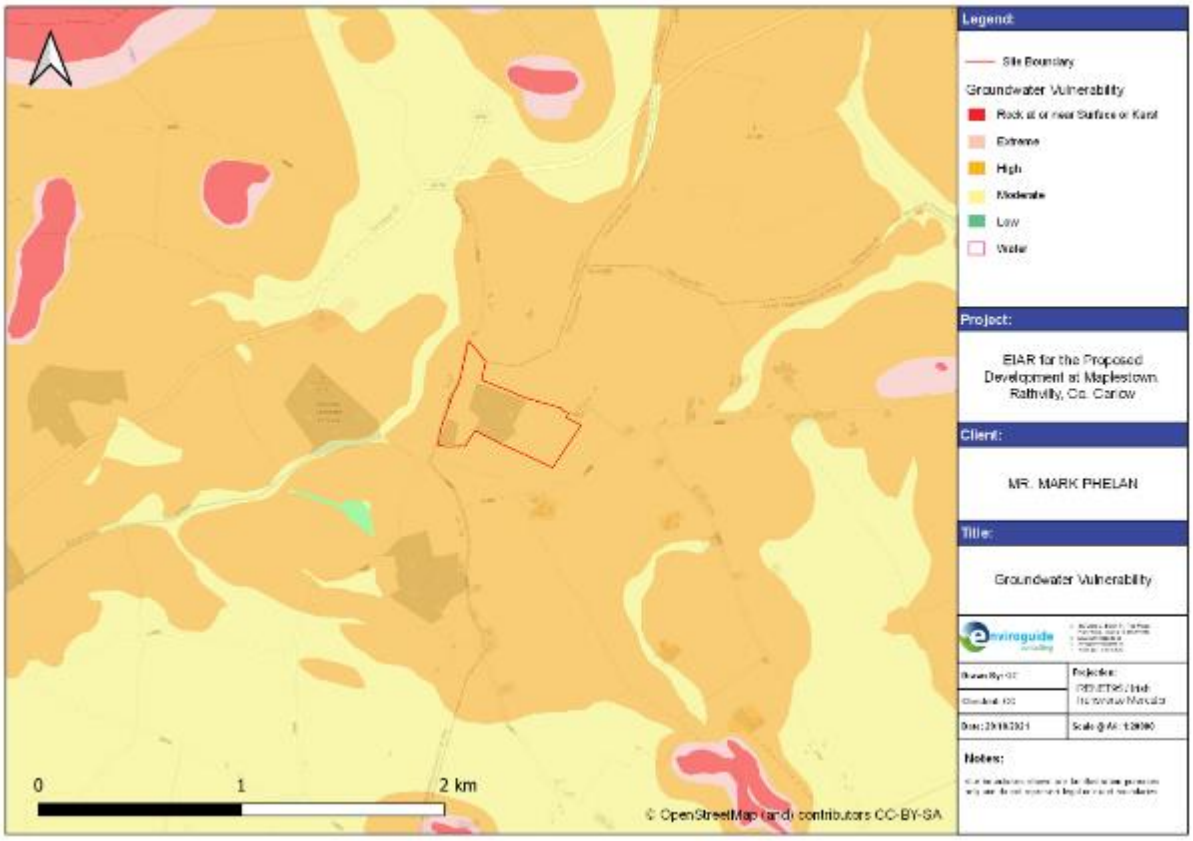


Figure 7-8: Groundwater Vulnerability

7.3.13 Groundwater Flow Regimes

The bedrock aquifer beneath the Site is within the New Ross GWB (EU Code: IE_SE_G_152). The New Ross GWB covers some 1059km^2 and occupies an area across Co. Kildare, Co. Carlow, Co. Wicklow, Co. Kilkenny and Co. Wexford (GSI, 2021).

Recharge in the vicinity of the Site is described as being diffuse through the sands and gravels, permeable till and outcrop to the aquifer. The main discharge within the GWB is described as occurring to the River Barrow via baseflow through the river bed.

Groundwater flows in the underlying gravel aquifer at the Development Site will be outwards from the sand and gravel deposits with discharge to the local rivers and streams. the Rivers Dee and Glyde. Based on the measured groundwater levels (refer to Figure 7-9), it is considered that the groundwater beneath the Site is likely hydraulically connected with the Broadstown Stream.

As document in the New Ross GWB report, groundwater flow will in the bedrock aquifer be limited to the upper weathered layer in the underlying bedrock (GSI, 2021).

Groundwater level measurements recorded by Enviroguide Consulting on the 21$^{st\ of}$ October 2021 are presented in Table 7-12.

Table 7-12: Groundwater Elevation Survey (21st October 2021)

Monitoring Well	Water Level (mbGL)	Water Level (maOD)
MW1	1.15	112.18
MW2	1.40	111.61
MW3	1.90	113.25
MW4	1.73	112.21
MW5	7.5	113.32
MW6	11.85	111.41

Based on the measured groundwater and surface water elevations, it is considered that the groundwater beneath the Site is potentially hydraulically connected with the Broadstown Stream and the sump located in the existing quarried lands in the eastern portion of the Site (refer to Figure 7-9 included as part of this application). The inferred groundwater flow direction beneath the Site is broadly to the west/southwest toward the Broadstown Stream and River Graney (refer to Figure 7-9 included as part of this application).

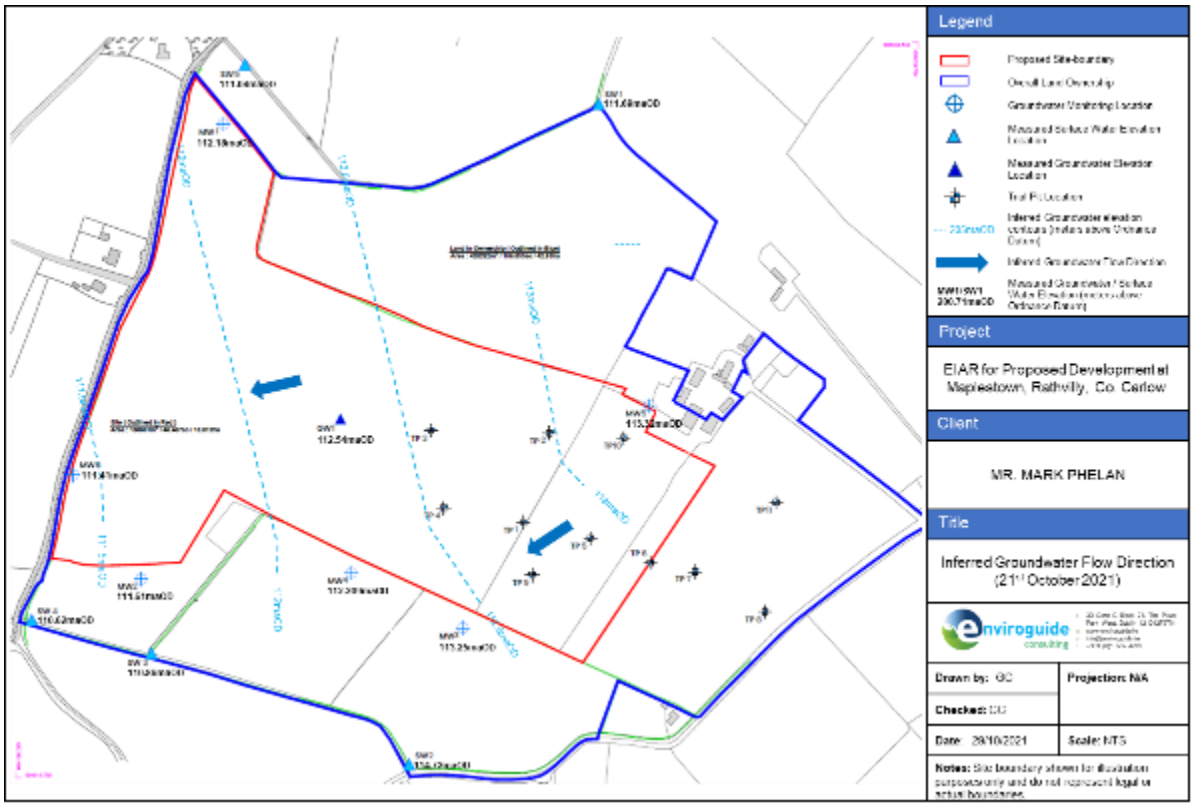


Figure 7-9: Inferred Groundwater Flow Direction (21st October 2021) to include locations on lands which may be considered for future development

7.3.14 Groundwater Use and Source Protection

A search of the GSI groundwater well database was conducted to identify registered wells and groundwater sources in the surrounding area. There is a total of thirty-eight (38No.) groundwater sources recorded within 2km radius of the Site (GSI, 2021) as detailed in Table 7-13.

Table 7-13: Groundwater Sources Within 2.0km of the Site.

Well Use	Location	Distance (km)	Total Number of Wells	Yield (m^3/d)
Unknown Use	Southwest	0.35	28	16.37
	Southwest	0.1		-
	Southwest	0.25		38.19
	Southwest	0.21		-
	South	0.01		130.9
	South	0.93		65.5
	South	0.64		-
	South			-
	Southeast	0.0 (accurate to within 1km)		-
	Southeast	0.13		-
	Southeast	0.35		-
	Southeast	1.24		39.9
	Southeast	1.22		-
	Northeast	1.91		-
	Northeast	1.93		-
	Northeast	0.76		-
	Northeast	1.06		22
	Northeast	1.35		-
	North	175		-
	North	0.0 (accurate to within 5km)		33.82
	North	0.0 (accurate to within 5km)		10.91
	North	0.0 (accurate to within 5km)		43.64
	North	0.0 (accurate to within 1km)		33.82
	North	0.76		-
	North	1.41		32.7
Public Supply (Co Co)	East	1.74	3	21.8
	East	1.74		38.2
	West	1.27		135.0
Domestic Use Only	Northeast	0.96	5	32.7
	Northeast	1.09		65.0
	Northeast	1.86		28.0
	North	0.25		27.3

Well Use	Location	Distance (km)	Total Number of Wells	Yield (m^3/d)
	North	1.76		21.8
Agricultural and Domestic Use	Southwest	1.22	2	21.8
	Northeast	1.29		65.4
Other	West	1.78	3	-
	On-site	0.0		-
	On-site	0.0		31.6

It is noted that the two (2No.) boreholes mapped by the GSI (GSI, 2021) in the western and eastern portions of the Site were not identified during the site walkover undertaken on the 14th of October 2021.

The groundwater supply to the residential dwelling and farmyard adjoining the northeast boundary of the Site and located within the overall land ownership of the Applicant does not appear to be listed on the GSI database (GSI, 2021). It is noted from the site walkover that the groundwater level at the supply well could not be measured as the location of the well head is unknown.

There are two (2No.) existing groundwater monitoring wells (MW1 and MW2) and four (4No.) recently installed groundwater monitoring wells (MW3, MW4, MW5 and MW6) at the Site.

The location of the groundwater sources recorded by the GSI (GSI, 2021) in the vicinity of the Site is presented in Figure 7-10.

There are no recorded Groundwater Source Protection Areas (SPAs) within 2km of the Site. The closest groundwater SPA is the Baltinglass PWS source located 3.0km northeast of the Site (GSI, 2021).

The Groundwater SPAs in the vicinity of the Site are presented in Figure 7-11.

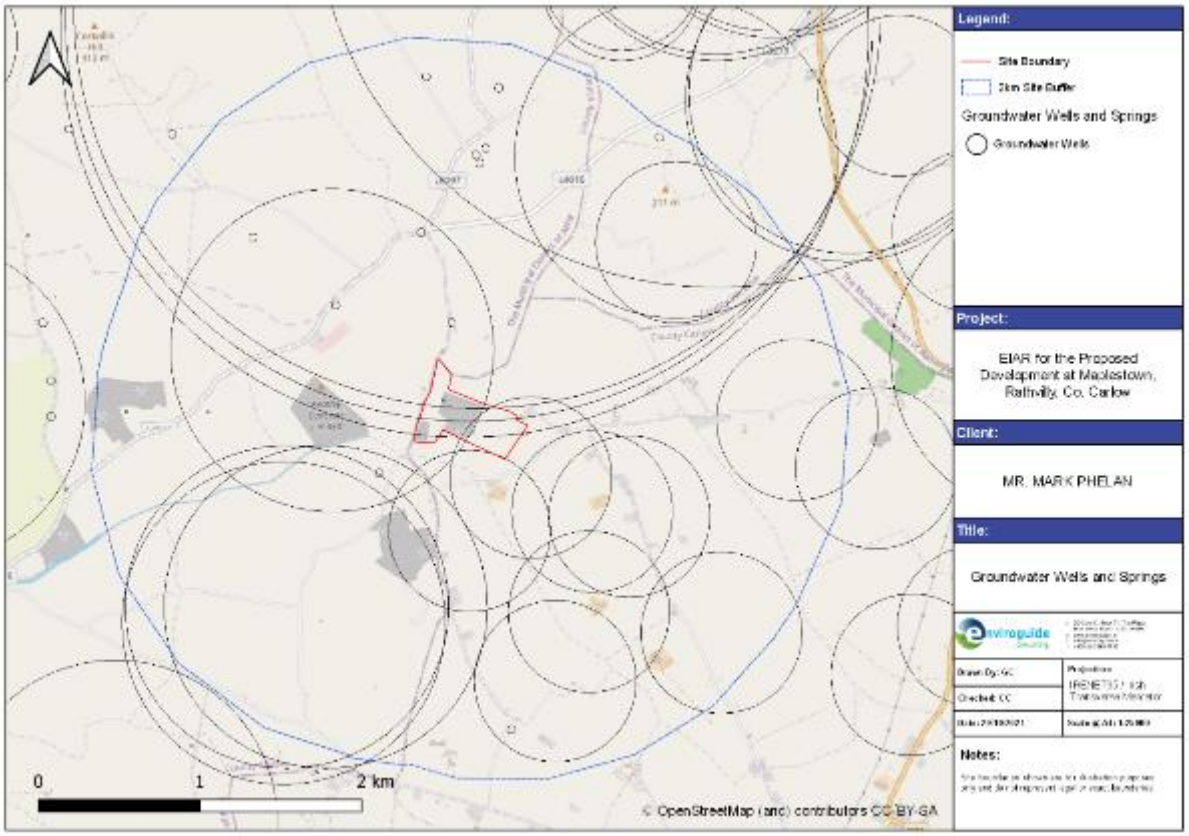


Figure 7-10: Groundwater Wells and Springs

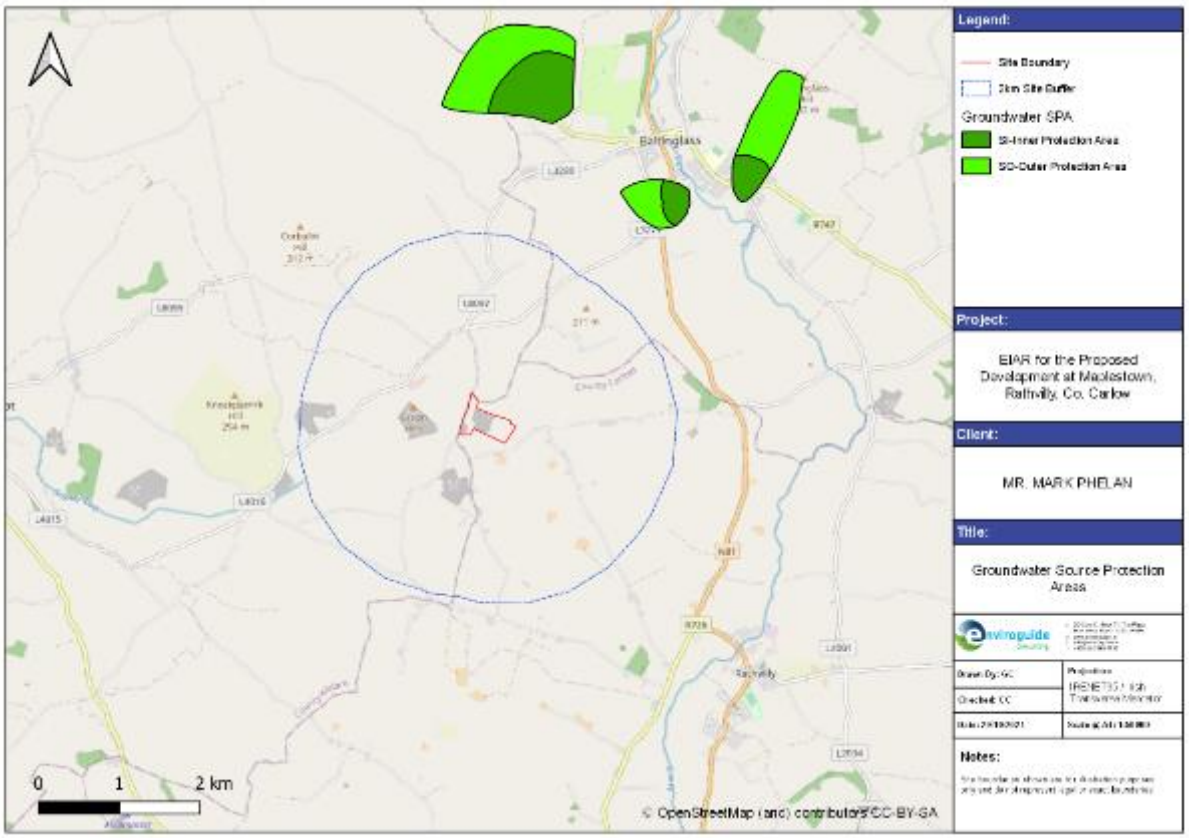


Figure 7-11: Groundwater Source Protection Areas

7.3.15 Groundwater Body and Status

According to the WFD, groundwater beneath the Site is part of the New Ross GWB (EU Code:IE_SE_G_152).

2004 Baseline Conditions

The New Ross GWB is classified by the WFD as having an overall 'good' water quality status for the periods of 2007-2012 and 2010-2015 and was identified as "not at risk" of not achieving the Water Framework Objectives for the WFD Cycle 2 (EPA, 2021).

2021 Baseline Conditions

The New Ross GWB is classified by the WFD as having an overall 'good' water quality status for the period of 2013-2018 and was identified as under "review" to achieve the Water Framework Objectives for the WFD Cycle 3 (EPA, 2021).

The WFD groundwater quality monitoring data for the New Ross GWB indicates a similar water quality status of the Development Site since 2000.

7.3.16 Groundwater Quality

Groundwater analytical results have been assessed by screening against the relevant assessment criteria as set out in the following legislation:

- S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 and as amended (GTVs);
- S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 and as amended (EQS); and
- SI. No. 122/2014 - European Union (Drinking Water) Regulations 2014 and as amended (PVs).

2004 Baseline Conditions

There is no reported EPA water quality data available for the New Ross Groundwater body prior to 2010. The EPA groundwater quality monitoring data for samples collected in August 2010 were less than the laboratory limits of detection (LOD) for metals, orthophosphate, nitrite, total organic carbon, sulphate, total oxidised nitrogen and ammonia and hence less than the applicable GTV, EQS and PV.

2021 Baseline Conditions

The EPA groundwater quality monitoring data for samples collected in August 2021 were less than the laboratory limits of detection (LOD) for metals, orthophosphate, nitrite, total organic carbon, sulphate, total oxidised nitrogen and ammonia and hence less than the applicable GTV, EQS and PV.

Groundwater monitoring and sampling was undertaken by Enviroguide Consulting on the 19th of June 2021. Samples were collected from one (1No.) existing groundwater monitoring well (MW1) and one (1No.) newly installed groundwater monitoring well (MW3). The groundwater

monitoring locations are presented in Figure 6-2 and the groundwater laboratory analytical reports are included in Appendix B.

The reported analytical results for total petroleum hydrocarbons and BTEX at both groundwater monitoring locations (MW1 and MW3) were reported as below the laboratory limits of detection (LOD) and hence below the applicable GW GTV, SW EQS and/or DW PV.

Detectable concentrations of dissolved metals were also below the applicable GW GTV and/or SW EQS at both groundwater monitoring locations.

The report concentrations of total metals (arsenic, chromium and nickel) were observed to exceed the applicable DW PV at both upgradient (MW1) and downgradient (MW3) groundwater monitoring locations and are therefore attributed to offsite groundwater conditions.

The reported concentration of ammonia at upgradient groundwater monitoring location MW1 was observed to exceed the applicable GW GTV. However, the reported concentration of ammonia in downgradient groundwater monitoring well MW3 was less than the laboratory LOD and therefore the elevated ammonia at MW1 can attributed to offsite groundwater sources (i.e., agriculture).

7.3.17 Designated and Protected Sites

There are four (4No.) Special Areas of Conservation (SAC) and eight (8No.) Natural Heritage Areas (pNHA) identified within a 15km radius of the Site (EPA, 2021).

The designated and protected sites located within a 15km radius of the Site are presented in Figure 7-12 and are summarised in Table 7-14 with the area and sites that are hydraulically connected to the Site highlighted.

Table 7-14: Designated Protection Areas

Site Name	Site Code	Distance to Site (km)	Location
Special Areas of Conservation (SAC)			
Slaney River Valley SAC	000781	3.2	South
Wicklow Mountains SAC	002122	14.9	Northeast
River Barrow and River Nore SAC	002162	12.9	Southwest
Holdenstown Bog SAC	001757	3.0	East
Special Protection Areas (SPA)			
There are no SPAs within a 15km radius of the Development Site.			
National Heritage Area (NHA)			
There are no NHAs within a 15km radius of the Development Site.			
Proposed National Heritage Area (pNHA)			
Ardristan Fen	000788	13.8	South
Baggot's Wood	000792	7.8	East
Oakpark	000810	11.8	Southwest
Barrow Valley at Tankardstown Bridge	000858	14.3	West
Corballis Hill	001389	3.3	Northwest

Site Name	Site Code	Distance to Site (km)	Location
Ballycore Rath	001751	9.4	North
Holdenstown Bog	001757	3.0	East
Lowtown Fen	001764	7.1	North

A remedial Appropriate Assessment (rAA) Screening (Enviroguide, 2021a) has been carried out in relation to the Unauthorised Development and Development. The report concluded that given the nature of the Unauthorised and the likelihood of significant effects on European Sites, the possibility may not be excluded that the Unauthorised Development will have a likely significant effect on the River Barrow and River Nore SAC (002162).

On the basis of the information obtained in the rAA Screening Report (Enviroguide, 2021a), a remedial Natura Impact Statement (rNIS) (Enviroguide, 2021b) was also carried out in relation to the Historic to further assess the potential impacts on the qualifying interests (QIs) of River Barrow and River Nore SAC (002162) as a result of potential direct and indirect impacts during the Operational Phases associated with the Unauthorised Development. The report concluded that, as the Unauthorised Development implemented the mitigation measures outlined in the EIS (EIS, 2004) there have not, are not and will not be any significant adverse effects on the River Barrow and River Nore SAC (002162).

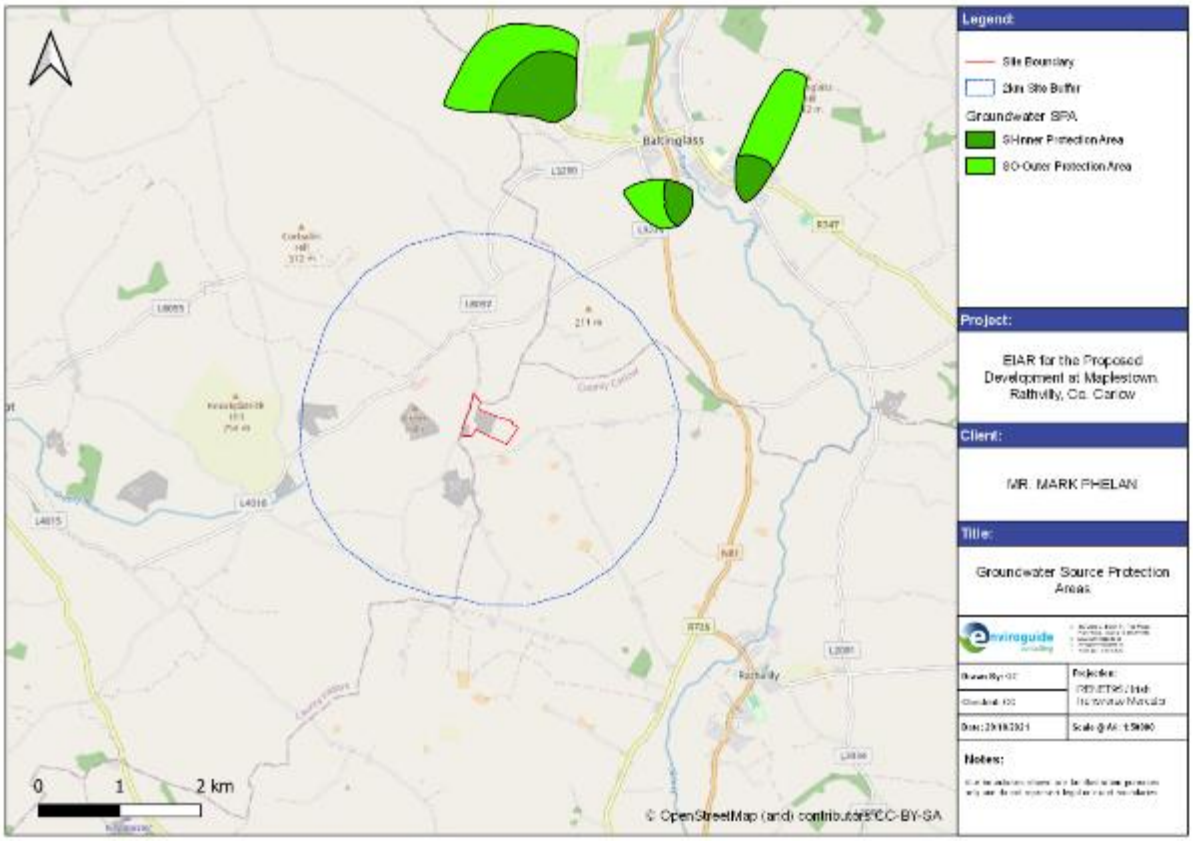


Figure 7-12: Designated and Protected Areas

7.3.18 Importance of Hydrogeological Features

The National Roads Authority (NRA) criteria for estimation of the importance of hydrogeological features at the Site during the Environmental Impact Assessment (EIA) stage, as documented by IGI (IGI, 2013) are summarised in Table 7-15.

Table 7-15: Criteria for Rating Site Importance of Hydrogeological Features

Importance	Criteria	Typical Example
Extremely High	Attribute has a high quality or value on an international scale.	Groundwater supports river, wetland or surface water body ecosystem protected by European Union (EU) legislation (e.g., SAC or SPA status).
Very High	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 >2500 homes Inner source protection area for regionally important water source.
High	Attribute has a high quality or value on a local scale.	Regionally Important Aquifer. Groundwater provides large proportion of baseflow to local rivers. Locally important potable water source supplying >1000 homes. Outer source protection area for regionally important water source. Inner source protection area for locally important water source.
Medium	Attribute has a medium quality or value on a local scale.	Locally Important Aquifer Potable water source supplying >50 homes. Outer source protection area for locally important water source.
Low	Attribute has a low quality or value on a local scale.	Poor Bedrock Aquifer. Potable water source supplying <50 homes.

It is noted that, in accordance with the NRA Guidance (NRA, 2008) the Site would be considered to be of 'medium' hydrogeological importance give that it is mapped as being within an area underlain by a bedrock aquifer classified as a Locally Important (LI) aquifer. In addition, the Site is not mapped within a source protection area or in the vicinity of a significant water supply source

The generic type of geological/hydrogeological environment of the Site can be determined based on the IGI guidelines (IGI, 2013). The generic types of geological/hydrogeological environments include:

- Type A – Passive geological / hydrogeological environments (e.g., areas of thick low permeability subsoil, areas underlain by poor aquifers, recharge areas, historically stable geological environments);
- Type B – Naturally dynamic hydrogeological environments (e.g., groundwater discharge areas, areas underlain by regionally important aquifers, nearby spring rises, areas underlain by permeable subsoils);
- Type C – Man-Made dynamic hydrogeological environments (e.g., nearby groundwater abstractions, nearby quarrying or mining activities below the water table, nearby wastewater discharges to ground, nearby geothermal systems);
- Type D – Sensitive geological / hydrogeological environments (e.g., potentially unstable geological environments, groundwater source protection zones, karst); and
- Type E – Groundwater dependent eco systems (e.g., wetlands, nearby rivers with a high groundwater component of base flow).

Therefore, the Site is considered to be Type A due to the locally important gravel aquifer and distance to any sensitive sites including groundwater source protection zones.

7.3.19 Summary of the Baseline Environment

The closest surface water features to Site are the River Graney (located approximately 0.06km north of the Site) and the Broadstown Stream (located approximately 0.07km south of the Site) and the River Graney (located approximately 0.06km north of the Site). The Broadstown Stream and River Graney flow in a westerly direction before converging with the Lerr River which discharges to the River Barrow approximately 13.3km west of the Site.

The GSI (GSI, 2021) has classified the bedrock of the Tullow Type 2 Equigranular Granite formation beneath the majority of the Site and surrounding area as a locally important gravel aquifer. It is noted that the aquifer in the eastern portion of the proposed quarry area is mapped by the GSI (GSI, 2021) as a locally important bedrock aquifer which is moderately productive only in local zones

The GSI has assigned a groundwater vulnerability rating of “High” (H) for the groundwater beneath the Site (GSI, 2021).

Based on the measured groundwater elevations, it is considered that the groundwater beneath the Site is potentially hydraulically connected with the Broadstown Stream and the sump located in the existing quarried lands in the eastern portion of the Site. The inferred groundwater flow direction beneath the Site is broadly to the west/southwest toward the Graney River and Broadstown Stream (refer to Figure 7-9)

Groundwater monitoring and sampling was undertaken from on-site groundwater monitoring wells (MW1 and MW3). There were no impacts to groundwater identified, associated with the Site. Elevated concentration of total metals (arsenic, chromium and nickel) and ammonia in excess of the applicable GW GTV and/or DW PV are considered to be baseline and/or associated with contributory sources (e.g., agriculture runoff) within the wider catchment.

7.4 Characteristics of the Unauthorised Development

The Unauthorised Site covers an area measuring 15.21Ha and comprises the following:

- Application for substitute consent for the Unauthorised Development that was quarried and restored outside of the that took place onsite outside of the granted planning permission period from 2007 to 2012 (An Bord Pleanála Planning Ref. 221741);
    - Approximately 192,240 tonnes of sand and gravel including 75,060tonnes of overburden was extracted over an area of 4.18Ha since 2012;
    - Approximately 4.18Ha of the existing quarry was subsequently restored;

The overall Development Site Layout is presented in Figure 7-1.

7.4.1 Construction Phase

There was no Construction Phase for the existing unauthorised quarry development and therefore no identified impacts.

7.4.2 Operational Phase

The Unauthorised Development is part of an existing quarry site with the intended extraction of 700,000 to 900,000tonnes of sand and gravel at an average rate of 60,000 tonnes per annum up to a maximum of 100,000 tonnes per annum over 10 years. Planning was granted for the extraction five years from 2007 to 2012, there was however unauthorised development at the Site and quarrying continued after 2012. This included the quarrying of approximately 192,240 tonnes of sand and gravel including 75,060 tonnes of overburden and the subsequent restoration of the quarry over an area of approximately 4.18Ha. It is noted that the entire quarry area measuring approximately 15.21Ha was used for the processing and stockpiling of excavated soil.

Sand and gravel was excavated and processed from this area of the Site using the existing plant and equipment installed at the Site as authorised under the Grant of Planning (Planning Reference: 221741).

The plant and equipment on site included excavator and dumper trucks, washing and screening plant, wheelwash and diesel generator and a bunded diesel fuel tank.

Water for washing of aggregates was sourced from the existing sump at the southern section of the existing quarry development, which was excavated to below the water table as authorised under the Grant of Planning (Planning Reference: 221741). Water was pumped from this sump to the screening and washing plant. It is estimated that the plant used between 125m3 and 150m3 per hour, with a maximum of 200m3 per hour. Wash water from the washing and screening plant was directed to the two (3No.) existing, interlinked, man-made settlement lagoons. The cleaned process water was then directed back to the existing sump by gravity.

Water for the wheel wash and dust suppression was sourced from the onsite groundwater sump used for the authorised quarry development. All trucks exiting the Development Site were required to pass through the existing wheel wash at the entrance to the Development

Site. It was regularly cleaned out by a vac-tanker and transported for off-site by a suitably licensed waste contractor.

A self-contained mobile welfare unit installed in 2007 for the authorised quarry operations was continued to be used for the unauthorised operational phase since 2012 that was emptied by an authorised contractor as required.

Water was not abstracted from surface water courses.

There were no direct discharges to ground or surface water from the quarry operations.

7.5 Potential Impacts of the Unauthorised Development

The procedure for determination of potential impacts on the receiving hydrological and hydrogeological environment is to identify potential receptors within the boundary of the existing quarry and surrounding environment and use the information gathered during the desk study and site walkover to assess the degree to which these receptors which have occurred, which are occurring or which can reasonably be expected to occur as a result of the existing quarry are described in terms of quality, significance, duration and type as detailed in Table 6-1

7.5.1 Construction Phase

No construction activities were proposed or undertaken as part of previous quarrying and restoration works at the Site. It was verified during the site inspection by Enviroguide that there were no built structures at the existing quarry and therefore there are no impacts identified which have occurred, are occurring or will occur.

7.5.2 Operational Phase

7.5.2.1 Direct

At the time of the site walkover all quarrying related operations onsite had ceased.

Groundwater Quality

As was permitted during previous quarrying operations, the continued use of the existing authorised settlement lagoons since 2012 for treating the wash water generated in the screening and washing plant prior to discharge back into the existing sump will ensure that there was no significant impact on the underlying groundwater quality. It is noted that at the time of inspection the settlement lagoons were observed to comprise low permeability subsoil materials as was required as part of mitigations measures outlined in the previous EIS (EIS, 2004).

The groundwater vulnerability rating assigned to groundwater in the bedrock aquifer beneath the existing quarry floor is ‘high’ (H) (GSI, 2021). However, give that much of the soil and subsoil has been removed during historic quarrying activities it is considered that the underlying groundwater body would be at an ‘extreme’ risk from potential contamination at

surface. Progressive restoration of the quarry was undertaken as the extraction of the existing quarry continued using any surplus material retained onsite that was not suitable for sale. It is considered that the restoration of the quarry will have had a 'positive', 'slight' and 'long term' impact on the groundwater vulnerability of the underlying aquifer.

The storage of fuel onsite has been within the bunded diesel tanks installed at the Site in accordance with the conditions of the authorised development for the operational phase of the existing quarry. There are no reported incidents and there was no evidence of soil contamination identified during the site investigations at the Site.

Groundwater monitoring and sampling was undertaken from on-site groundwater monitoring wells (MW1 and MW3) on the 15th October 2021. There were no impacts to groundwater identified, associated with the unauthorised quarrying activities. As reported by the EPA, there was no change in the WFD classification of the groundwater quality for the New Ross GWB, in which the Site is located, between 2007 and 2018.

Furthermore, there were no reported problems in terms of groundwater quality with the groundwater supply well for the residential dwelling and farmyard adjoining the northeast boundary of the Development Site and within the overall landholding of the Applicant.

Overall, it is considered that the unauthorised quarrying activities at the Site has not, is not and will not have a significant impact of the underlying groundwater quality.

Groundwater Resource and Flow Regime

As was permitted during previous quarrying operations, water for washing of aggregates since 2012 was sourced from the existing sump located in the eastern portion of the quarry and there were no other groundwater abstractions during the quarrying operations. The design and finish floor level of the of the lagoons and sump were such that treated wash water during processing of aggregates was gravity fed back to the sump. Therefore, any potential impacts on the groundwater resource and groundwater flow regime within a very localised zone of the aquifer are considered negligeable and there are no long-lasting impacts as a result of quarrying activities.

The groundwater elevation beneath the existing quarry was measured at between 111.5mOD and 112.5mOD on the 22nd October 2021 (refer to Figure 7-9). With the exception of the authorised sump used to supply water to the washing and screening plant, excavation works at the existing quarry did not extend below 115mOD. Therefore, all works were undertaken above the existing groundwater level with no requirement for dewatering and no impact on the local groundwater resource and groundwater flow regime.

Furthermore, and as mentioned above, there were no reported problems in terms of groundwater resource with the groundwater supply well for the residential dwelling and farmyard adjoining the northeast boundary of the Site and within the overall landholding of the Applicant.

Surface Water Quality

There were no emissions to the nearby surface water receptors (i.e., the Broadstown Stream and the River Graney) for the duration of the unauthorised quarry operations undertaken since 2012.

As the quarry progressed, surplus soils and subsoils were used to progressively restore areas where quarrying operations were completed (i.e., the restored quarry area). The soil was infilled in a manner to minimise compaction, ensuring that there was adequate drainage through soils and in accordance with relevant Environmental Protection Agency (EPA) restoration guidelines.

As identified during the site walkover, a minimum buffer of 0.07m was maintained between the stockpiled materials onsite and surface water receptors (i.e., the Broadstown Stream and the River Graney) to prevent solids entering the receiving watercourses during periods of high rainfall.

It is considered that the groundwater beneath the Site is hydraulically connected with the Broadstown Stream. Groundwater monitoring and sampling was undertaken from on-site groundwater monitoring wells (MW1 and MW3) on the 15th October 2021. With the exception of ammonia at MW1, which was attributed to offsite impacts (i.e., agriculture), the groundwater analytical results were observed to be less than the applicable SW EQS and hence there were no potential impacts to surface water identified as a result of unauthorised quarrying activities. In addition, the EPA surface water quality monitoring data at the 'Bridge in Graney' monitoring station, located approximately 0.26km downstream of the Site indicates a slight improvement in water quality downstream of the Site between 2000 and 2020.

Overall, it is considered that the unauthorised quarrying activities have not, are not and will not have a significant impact of the receiving surface water quality of the Broadstown Stream and the River Graney.

7.5.2.2 Indirect

There were no indirect impacts on the receiving water environment associated with the Operational Phase of the Unauthorised Development.

7.5.2.3 Secondary

There were no secondary impacts on the receiving water environment associated with the Operational Phase of the Unauthorised Development.

7.5.3 Potential Cumulative Impacts

Cumulative Impacts can be defined as "impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the cumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

A review of other off-site developments and Developments was completed as part of this environmental assessment. There were no cumulative impacts identified as a result of the Unauthorised Development.

7.5.4 "Do Nothing" Impact

In the 'Do Nothing' scenario the potential impact on the receiving hydrological and hydrogeological environment of the Development did not proceed is considered.

In the 'Do Nothing' scenario the quarrying activities would have ceased in 2012 and the potential positive impact on the groundwater vulnerability in the restored area of the quarry would not have occurred.

7.6 Avoidance, Remedial & Mitigation Measures

The measures outlined in this section of the report will ensure that there will be no significant impact on the receiving groundwater and surface water environment and associated receptors (e.g., Natura 2000 sites). Therefore, the Development will not have any impact on compliance with the EU Water Framework Directive, European Communities (Environmental Objectives) Surface Water Regulations, 2009 (SI 272 of 2009, as amended 2012 (SI No 327 of 2012), and the European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010), as amended 2012 (SI 149 of 2012) and 2016 (S.I. No. 366 of 2016) individually or in combination.

7.6.1 Construction Phase

There was no Construction Phase for the unauthorised development and therefore no requirement for mitigation measures.

7.6.2 Operational Phase

Overall, there were no significant impacts to the receiving hydrological and hydrogeological environment which have occurred, which are occurring, or which can be reasonably expected to occur as a result of the existing quarry and restoration works at the Development Site. Onsite operations have ceased and there is no requirement for mitigation measures.

7.6.3 "Worst Case" Scenario

In a 'Worst Case' scenario, the potential accidental release and impact to the receiving land, soils and geology environment would have occurred in the event of a failure of the mitigation measures. Had this occurred there would have been a negative impact on the receiving environment. There is no evidence that this occurred during the operational period of the unauthorised development.

7.7 Residual Impacts

Residual Impacts are defined as 'effects that are predicted to remain after all assessments and mitigation measures. They are the remaining 'environmental costs' of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts.

Following a review of the available information for the existing quarry, it is considered that there are no significant residual impacts on hydrology and hydrogeology which have occurred, which are occurring, or which can be reasonably expected to occur as a result of the unauthorised quarry and restoration works.

The restoration of the existing quarry will have an overall 'positive', 'slight', and 'permanent' impact on underlying groundwater and receiving surface water environment.

The predicted impacts of the Construction Phase and Operational Phases are described in Table 7-16 in terms of quality, significance, extent, likelihood and duration. The relevant mitigation measures are detailed, and the residual impacts are determined which take account of the mitigation measures.

Table 7-16: Summary of Residual Impacts

Activity	Attribute	Predicted Impact	Quality	Significance	Duration	Type	Mitigation	Residual Impact
Construction Phase – Unauthorised Development								
There was no Construction Phase for the Unauthorised Development.								
Operational Phase – Existing Quarry and Restoration								
There are no, nor will there be any residual impacts associated with Operation Phase of the Unauthorised Development.								

7.8 Monitoring

7.8.1 Construction Phase

There are no monitoring requirements for the Construction Phase of the Unauthorised Development.

7.8.2 Operational Phase

There are no monitoring requirements for the Operational Phase of the Unauthorised Development.

7.9 Interactions

7.9.1 Public Health

Appropriate industry standard and health and safety legislative requirements will be implemented during the construction and operational phases of the Development that will be protective of Site workers.

Continued monitoring of the groundwater supply well will ensure that there are no associated human health issues. However, there are no anticipated impacts to groundwater, surface water and nearby potable water supply sources associated with the Unauthorised Development.

It is noted that specific issues relating to Public Heath associated with the Development are set out in Chapter 4 of this EIAR.

7.9.2 Land Soil and Geology

An assessment of the potential impact of the Development on the existing land, soils and geological environment are set out in Chapter 6 Land, Soil and Geology.

7.9.3 Biodiversity

An assessment of the potential impacts of the Unauthorised Development on the Biodiversity of the Site, with emphasis on habitats, flora and fauna which may be impacted are included in Chapter 5 of this EIAR. A hydrological connection has been identified between the Development Site and the Broadstown Stream which discharges to the River Barrow and River Nore SAC (002162). However, the rNIS report for this Application concluded that as the Unauthorised Development implemented the mitigation measures outlined in the EIS (EIS, 2004) and with the implementation of the recommended mitigation measures for the Development detailed in the NIS report, there have not, are not and will not be any significant adverse effects on the River Barrow and River Nore SAC (002162).

7.9.4 Other Interactions

Hydrology and hydrogeology interact with other environmental attributes such as waste (Chapter 12) are examined in the relevant chapters of this rEIAR.

7.10 Difficulties Encountered When Compiling

There were no difficulties encountered in compiling this hydrology and hydrogeology assessment.

7.11 References

British Standards Institution, July 2015. BS 5930:2015+A1:2020 Code of Practice for Ground Investigations

Council Directive 80/68/EEC, 1979. On the protection of groundwater against pollution caused by certain dangerous substances. Council of European Communities.

Council Directive 2006/118/EEC, 2006. On the protection of groundwater against pollution and deterioration. European Parliament and the Council of European Communities.

Construction Industry Research and Information Association, 2000. Environmental Handbook for Building and Civil Engineering Projects.

Construction Industry Research and Information Association, 2001. Control of Water Pollution from Construction Sites (CIRIA – C532).

Construction Industry Research and Information Association, 2011. Control of Water Pollution from Construction Sites, Guidance for Consultants and Contractors.

Construction Industry Research and Information Association, 2005. Environmental Good Practice on Site (CIRIA – C650).

Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy with amendments 2455/2001/EC, 2008/32/EC and 2008/105/EC.

Enviroguide Consulting, November 2021. Appropriate Assessment Screening Report for Historic and Proposed Extraction and Infilling Works at Maplestown, Co. Carlow.

Enviroguide Consulting, November 2021. Natura Impact Statement for Historic and Proposed Extraction and Infilling Works at Maplestown, Co. Carlow.

Enviroguide Consulting, October 2021. Borehole Logs.

Enviroguide Consulting, October 2021. Trial Pit Logs.

Enviroguide Consulting, November 2021. Site Location Map (Drawing No. P-01).

Enviroguide Consulting, November 2021. Area of Substitute Consent (Drawing No. P-02).

Enviroguide Consulting, November 2021. Area of Proposed Quarry Extension (Drawing No. P-03).

Enviroguide Consulting, November 2021. Area of Proposed Infill (Drawing No. P-04).

Enviroguide Consulting, November 2021. Proposed Excavation, Plan and Section (Drawing No. P-05).

Enviroguide Consulting, November 2021. Proposed Quarry, Plan and Section (Drawing No. P-06).

Enviroguide Consulting, November 2021. Proposed Area of Infill Phasing Plan (Drawing No. P-07).

Enviroguide Consulting, November 2021. Proposed Area of Extension Phasing Plan (Drawing No. P-08).

Enviroguide Consulting, November 2021. Rego Pod (Drawing No. P-09).

Enviroguide Consulting, November 2021. Weighbridge & Wheelwash (Drawing No. P-10).

Enviroguide Consulting, November 2021. Monitoring Locations (Drawing No. M-01).

Environmental Protection Agency, 2004. IPC Guidance Note on Storage and Transfer of Materials for Scheduled Activities.

Environmental Protection Agency, August 2017. Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2017).

Environmental Protection Agency, September 2015. Draft Advice Notes for preparing Environmental Impact Statements (EPA, 2015).

Environmental Protection Agency, 2000. EPA Landfill Manuals – Landfill Site Design (EPA, 2000).

Environmental Protection Agency, 1999. EPA Landfill Manuals – Landfill Restoration and Aftercare (EPA, 1999).

Environmental Protection Agency, 2021. Catchments webmapping https://www.catchments.ie/maps/. Consulted on 13/10/2021.

Environmental Protection Agency, 2021. EPA HydroNet webmapping and databases. http://www.epa.ie/hydronet/#Water%20Levels. Consulted on 13/10/2021.

Environmental Protection Agency, 2021. EPA Envision Maps. https://gis.epa.ie/EPAMaps/. Consulted on 13/10/2021.

Element Materials Technology Ltd., October 2021. Laboratory Analytical Results. Laboratory Report No. 20-16428.

Geological Society of Ireland, 2021. GSI webmapping. https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228. Consulted on 13/10/2021.

Geological Survey of Ireland, 2021. Groundwater Body Reports, New Ross GWB. https://secure.dccae.gov.ie/GSI_DOWNLOAD/Groundwater/Reports/GWB/NewRossGWB.pdf. Consulted on 13/10/2021.

Google Earth Pro, 2021. Consulted on 13/10/2021.

Institute of Geologists of Ireland, 2013. Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements.

Met Éireann, 2012. Séamus Walsh, 'Long-term climate averages for Ireland 1981 - 2010', [IE_RR_8110_V1] (Walsh, 2012).

National Parks and Wildlife Services (NPWS) webmapping 2021. https://dahg.maps.arcgis.com/apps/webappviewer/index.html?id=8f7060450de3485fa1c1085536d477ba. Consulted on 13/10/2021.

National Roads Authority, 2009. Guidelines on Procedures for the Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.

Ordnance Survey Ireland, 2020 (OSI, 2021). Ordnance Survey Ireland webmapping http://map.geohive.ie/mapviewer.html. Consulted on 13/10/2021.

Office of Public Works, 2021. OPW Flood Risk webmapping. https://www.floodinfo.ie/map/floodmaps/. Consulted on 13/10/2021.

S.I. No. 9/2010 - European Communities Environmental Objectives (Groundwater) Regulations 2010 and as amended.

S.I. No. 272/2009 - European Communities Environmental Objectives (Surface Waters) Regulations 2009 and as amended.

SI. No. 122/2014 - European Union (Drinking Water) Regulations 2014 and as amended.

Teagasc, 2021 webmapping. http://gis.teagasc.ie/soils/map.php. Consulted on 13/10/2021..

Water Framework Directive, 2021. Water Framework Directive web mapping - http://watermaps.wfdireland.ie/NsShare_Web/. Consulted on 13/10/2021.

8 AIR QUALITY AND CLIMATE

8.1 Introduction

This Chapter of the rEIAR will retrospectively assess the impact on the receiving environment as a result of unauthorised extraction and infilling activities which historically took place on the Proposed Developed Site lands. This follows a notice issued under Section 261A to submit a Substitute Consent application to An Bord Pleanála, requiring a remedial Environmental Impact Assessment Report (EIAR).

In addition, taking into account Ambient Air Quality Standards, the existing current air quality of the proposed facility will be examined. This Chapter will also describe and assess the potential impacts on micro and macro-climate as a result of the Unauthorised Development; attention will be focused on Ireland's obligations under the Kyoto Protocol in the context of the overall climatic impact of the presence and absence of the Development.

8.1.1 Ambient Air Quality Standards

For the protection of health and ecosystems, EU Directives apply air quality standards in Ireland and other EU member states for a range of pollutants. These rules include requirements for monitoring, assessment and management of ambient air quality. The first major instrument in tackling air pollution was the Air Quality Framework Directive 96/62/EC and its four daughter Directives, which prescribed standards for various pollutants:

- **1st Daughter Directive:** Sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter and lead
- **2nd Daughter Directive:** Carbon monoxide and benzene
- **3rd Daughter Directive:** Ozone
- **4th Daughter Directive:** Polyaromatic hydrocarbons, arsenic, nickel, cadmium and mercury in ambient air.

The Air Quality Framework Directive sets out a number of objectives as follows:

- Implements an EU-wide system for setting and binding air quality objectives for specified pollutants to protect human health and the environment;
- Requires Member States to put systems in place for assessing the quality of ambient air in accordance with common assessment criteria;
- Requires Member States to maintain ambient air quality where it is good and improve it in other cases through plans and programmes of action;
- Lays down requirements for a system of gathering, reporting and publicising information inclusive of data to be reported to the European Commission and information to be circulated to the public.

Ambient air quality monitoring and assessment in Ireland is carried out in accordance with the requirements of the Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) which was published in May 2008. This Directive replaced the Air Quality Framework Directive and the first, second and third Daughter Directives. The CAFE Directive has been transposed into Irish legislation by the Air Quality Standards Regulations (S.I. No. 180 of 2011); replacing the Air Quality Standards Regulations (2002) and the Ozone in Ambient Air Regulations (2004). The CAFE Directive required EU member states to designate 'Zones' reflective of population density for the purpose of managing air quality. Four zones were defined in the Air Quality Standards Regulations (2011) and subsequently amended in 2013 to account for 2011 census population counts and to align with coal restricted areas in the 2012 Regulations (S.I. No. 326 of 2012).

The main areas defined in each zone are:

- **Zone A:** Dublin Conurbation
- **Zone B:** Cork Conurbation
- **Zone C:** Other cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise.
- **Zone D:** Rural Ireland, i.e., the remainder of the State excluding Zones A, B and C.

The Site of the Historic (unauthorised) Development is located in Maplestown, Co. Carlow and falls under the 'Zone D' category based on the EPA CAFE Directive.

The Cleaner Air for Europe (CAFE) Directive outlines certain limit or target values specified by the five published directives that apply limits to specific air pollutants. These limits, outlined in Table 8-1, will be referred to as part of the assessment with respect to air quality.

Table 8-1: Limit Values of Cleaner Air for Europe (CAFE) Directive 2008/50/EC (Source: EPA, 2020)

Pollutant	Limit Value Objective	Averaging Period	Limit Value µg/m3	Limit Value ppb	Basis of Application of the Limit Value	Limit Value Attainment Date
SO_2	Protection of Human Health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1 Jan 2005
SO_2		24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1 Jan 2005
SO_2	Protection of vegetation	Calendar year	20	7.5	Annual mean	19 July 2001
SO_2		1 Oct to 31 Mar	20	7.5	Winter mean	19 July 2001

Pollutant	Limit Value Objective	Averaging Period	Limit Value µg/m3	Limit Value ppb	Basis of Application of the Limit Value	Limit Value Attainment Date
NO_2	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1 Jan 2010
NO_2		Calendar year	40	21	Annual mean	1 Jan 2010
NO + NO_2	Protection of ecosystems	Calendar year	30	16	Annual mean	19 July 2001
PM10	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1 Jan 2005
PM10		Calendar year	40	-	Annual mean	1 Jan 2005
PM2.5 - Stage 1		Calendar year	25	-	Annual mean	1 Jan 2015
PM2.5 - Stage 2		Calendar year	20	-	Annual mean	1 Jan 2020
Lead		Calendar year	0.5	-	Annual mean	1 Jan 2005
Carbon Monoxide		8 hours	10,000	8,620	Not to be exceeded	1 Jan 2005
Benzene		Calendar year	5	1.5	Annual mean	1 Jan 2010

The EPA is the competent authority for the purpose of the CAFE Directive and is required to send an annual report to the Minister for Environment and the European Commission. The regulations further provide for the distribution of public information. This includes information on any exceedances of target values, the reasons for exceedances, the area(s) in which they occurred, and the relevant information regarding effects on human health and environmental impacts.

8.1.2 Climate Agreements

Climate change is recognised as one of the most serious global environmental problems and arguably the greatest challenge facing humanity today. While natural variations in climate over time are normal, anthropogenic activities have interfered greatly with the global atmospheric system by emitting substantial amounts of greenhouse gases (GHGs). This has caused a discernible effect on our global climate system, with continued change expected due to current and predicted trends of GHG emissions. In Ireland this is demonstrated by rising sea levels, changes in the ecosystem, and extreme weather events.

In March 1994, the United Nations Framework Convention on Climate Change (UNFCCC) was established as an intergovernmental effort to tackle the challenges posed by climate change. The Convention membership is almost universal, with 197 countries having ratified. Under the Convention, governments gather and share information on GHG emissions, national policies, and best practices. This information is then utilised to launch national

strategies and international agreements to address GHG emissions. Following the formation of the UNFCCC, two major international climate change agreements were adopted: The Kyoto Protocol, and the Paris Agreement.

In April 1994, Ireland ratified the United Nations Framework Convention on Climate Change (UNFCCC) and subsequently signed the Kyoto Protocol in 1997. The Kyoto Protocol is an international agreement linked to the UNFCCC which commits its parties to legally binding emission reduction targets. In order to ensure compliance with the protocol, the Intergovernmental Panel on Climate Change (IPCC) has outlined detailed guidelines on compiling National Greenhouse Gas Inventories. These are designed to estimate and report on national inventories of anthropogenic GHG emissions and removals. Under Article 4 of the Kyoto Protocol, Ireland agreed to limit the net anthropogenic growth of the six named GHGs to 13% above the 1990 level, spanning the period 2008 to 2012.

The second commitment period of the Kyoto Protocol, the Doha amendment, was adopted *in extremis* on the 8th of December 2012, to impose quantified emission limitation and reduction commitments (QELRCs) to Annex I (developed country) Parties during a commitment period from 2013 to 2020. 38 developed countries, inclusive of the EU and its 28 member states, are participating. Under the Doha amendment, participating countries have committed to an 18% reduction in emissions from 1990 levels. The EU has committed to reducing emissions in this period to 20% below 1990 levels. Ireland's QELRCs for the period 2013 to 2020 is 80% of its base year emissions. Ireland's compliance with the Doha amendment will be assessed based on the GHG inventory submission in 2022 for 1990-2020 data. As of October 2020, the Doha Amendment has received the required number of ratifications to enter force. Once in force, the emission reduction commitments of participating developed countries and economies in transition (EITs) become legally binding.

In December 2015, the Paris Climate Conference (COP21) took place and was an important milestone in terms of international climate change agreements. The Paris Agreement sets out a global action plan to put the world on track to mitigate dangerous climate change by setting a global warming limit not to exceed 2°C above pre-industrial levels, with efforts to limit this to 1.5°C. As a contribution to the objectives of the agreement, countries have submitted comprehensive national climate action plans (nationally determined contributions, NDCs). Under this agreement, governments agreed to come together every 5 years to assess the collective progress towards the long-term goals and inform Parties in updating and enhancing their nationally determined contributions. Ireland will contribute to the Agreement through the NDC tabled by the EU on behalf of Member States in 2016, which commits to a 40% reduction in EU-wide emissions by 2030 compared to 1990. All Parties are required to submit new or updated NDCs in 2020.

The EU has set itself targets for reducing its GHG emissions progressively up to 2050, these are outlined in the 2020 climate and energy package and the 2030 climate and energy policy framework. These targets are defined to assist the EU in transitioning to a low-carbon economy, as detailed in the 2050 low carbon roadmap. The 2020 package is a set of binding legislation to ensure that the EU meets its climate and energy targets for the year 2020. There are three key targets outlined in the package which were set by the EU in 2007 and enacted in legislation in 2009:

- 20% reduction in GHG emissions from 1990 levels.

- 20% of EU energy to be from renewable sources.
- 20% improvement in energy efficiency.

The 2030 climate and energy framework builds on the 2020 climate energy package and was adopted by EU leaders in October 2014. The framework sets three key targets for the year 2030:

- At least 40% cuts in GHG emissions from 1990 levels;
- At least 32% share for renewable energy;
- At least 32.5% improvement in energy efficiency.

The EU has acted in several areas in order to meet these targets, including the introduction of the Emissions Trading System (ETS). The ETS is the key tool used by the EU in cutting GHG emissions from large-scale facilities in the power, industrial, and aviation sectors. Around 45% of the EU's GHG emissions are covered by the ETS. The 2020 target for total GHG emissions from these sectors is set at 21% below 2005 levels.

The Irish Government recently published its Climate Action Plan (2019) which provides a detailed framework identifying how Ireland will achieve its 2030 targets. The Plan also puts Ireland on a trajectory which is consistent with achieving net zero emissions by 2050.

In Ireland, provisional national GHG emissions are estimated at 59.90 million tonnes carbon dioxide equivalent (Mt CO_2e) in 2019 which is 4.5% lower than 2018 emissions (62.70 Mt CO_2e) and follows a 0.9% increase in emissions reported for 2018. According to data provided by the EPA's Provisional Greenhouse Gas Inventory Report 1990-2019 (2020), agriculture remains the single largest contributor at 35.3% of Ireland's overall emissions. The second largest contributor is transport at 20.3%, with the energy industry following at 15.8%. Residential emissions account for 10.9%, and manufacturing combustion emissions 7.7%. These 5 sectors accounted for close to 90% of Irelands total emissions in 2019. The remainder consists of industrial processes at 3.8%, f-gases at 1.8%, commercial services at 1.5%, waste at 1.5%, and public services at 1.5%.

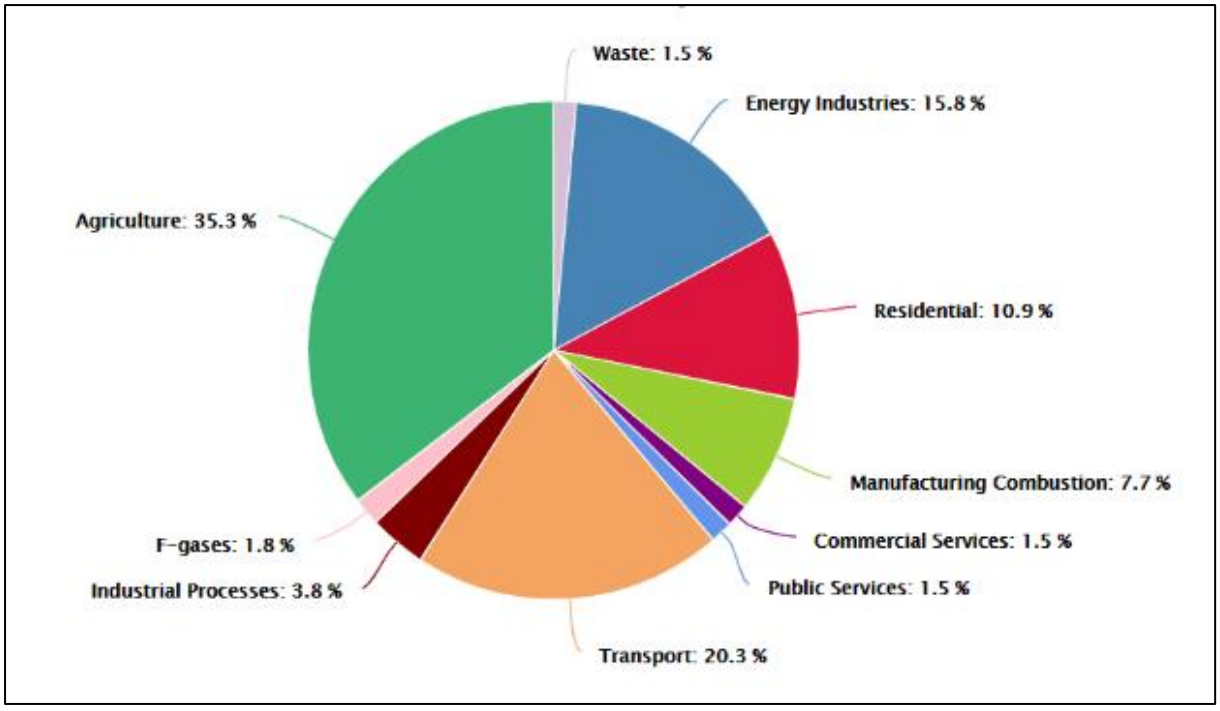


Figure 8-1: Ireland's Greenhouse Gas Emissions by Sector for 2019 (Source: EPA, 2020)

8.1.2.1 National Policy Position in Ireland

National climate policy in Ireland recognises the threat of climate change to humanity and supports mobilisation of a comprehensive international response to climate change, and global transition to a low-carbon future. A fundamental national objective aims to achieve transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy by 2050. The evolution of climate policy in Ireland will be an iterative process which is based on the adoption of a series of national plans by the Government over the period to 2050. The National Policy Position envisages that policy development will be guided by a long-term vision based on:

- An aggregate reduction in carbon dioxide (CO_2) emissions of at least 80%, compared to 1990 levels, by 2050 across the electricity generation, built environment, and transport sectors;

- An approach to carbon neutrality in the agriculture and land-use sector, including forestry, which will not compromise the capacity for sustainable food production.

Parallel national plans will address greenhouse gas mitigation, and adaptation to climate change impacts, in the form of National Low-Carbon Roadmaps and National Climate Change Adaptation Frameworks. The enactment of the Climate Action and Low-Carbon Development Act (2015) was considered to be a national milestone in the evolution of climate policy in Ireland. The 2015 Act provides the statutory basis for the national transition objective laid out in the national policy position (DCCAE, 2020); it provides the legislative framework for the development and submission to Government for approval of national mitigation plans and national adaptation frameworks.

The first National Mitigation Plan (2017) signified the initial step to set Ireland on a pathway to achieve the level of decarbonisation required. The Plan begins the process of development of medium to long term mitigation choices for the next and future decades. Additionally, the National Adaptation Framework (2018) articulates a strategic policy context for appropriate action at sectoral and local level, in response to the impacts of climate change in Ireland in the shorter and longer term. It exists to inform and mobilise an integrated approach, involving all stakeholders on all institutional levels, to ensure that adaptation measures are taken and implemented.

8.2 Study Methodology

8.2.1 Historic (unauthorised) Quarry and Infill Operations

An Environmental Impact Statement (EIS) was compiled for the existing quarry (EssGee Consultants, August 2004) in which air quality and climate baselines were established. This investigation also explored potential impacts relating to air quality arising from the historical quarry development. This remedial assessment has utilised the historical EIS in order to retrospectively assess the impacts, if any, on the receiving environment as a result of unauthorised extraction and infilling activities which historically took place on the Site.

8.3 The Existing and Receiving Environment (Baseline) Situation

The subject site is located in the northern part of County Carlow in the townland of Maplestown. The Site is on the border with counties Kildare and Wicklow and is approximately 4.5km southwest of Baltinglass, 2.6km northeast of the village of Kiltegan and 6km east of the town of Castledermot.

The Site covers an area measuring 15.21 hectares and comprises the following:

1) The historic quarry and infill, for which substitute consent is being sought, measuring approximately 15.21 hectares and located in the western portion of the Site. The unauthorised section of the quarry (excavated post 2012) is 4.18 hectares.

2) Restoration of the existing quarry:

    - approximately 4.18 hectares already infilled

8.3.1 Historic (unauthorised) Quarry

Air quality and climate baselines were established as part of the Environmental Impact Statement (EIS) which was compiled for the existing quarry (EssGee Consultants, August 2004). This investigation also explored potential impacts relating to air quality arising from the historical quarry development. In relation to air quality, the previous assessment considered the potential magnitude of the dust emissions over a full calendar year using meteorological data from Dublin Airport (Year 1999). Modelling using ISCST3 was then used to predict the dust deposition rate for each scenario investigated for comparison with the TA Luft nuisance criteria. ISCST3 is a Gaussian plume model which accepts a variety of source geometries and emissions schedules in order to compute ambient air concentrations and surface deposition fluxes at specified receptor points. The cumulative dust deposition level is estimated to have peaked at 130 mg/m^2/day, which is only 36% of the LA Luft Limit Value.

The EIS established a climatic baseline using data for Dublin Airport synoptic weather station. An automatic weather station (AWS), which records hourly data, was installed in Oak Park, Co. Carlow in 2003 and replaced a manual climate station which has taken daily readings since 1957. Therefore, the current assessment has utilised climatic data from Oak Park station, as it is in closer proximity to the Site and due to its geographic location, can be considered more representative of actual weather conditions experienced at the Site. Data collected for wind direction and windspeed is inclusive of the years in which unauthorised activity is expected to have taken place onsite.

No monitoring in the vicinity of the Site was routinely undertaken for air pollutants regulated under the Air Quality Standard Regulations. When assessing air quality, the EPA focuses on two main pollutants: particulate matter and nitrogen oxides. For the purpose of this report, a summary of the most recent compiled Air Quality data obtained from Zones C and D has been provided in Table 8-2:

Table 8-2: Summary of the 2019 Air Quality Data Recorded at Zone C and D Stations (Source: Air Quality in Ireland, 2019)

Pollutant	Regulation	Limit Type	Limit Value	EPA Monitoring Data 2018
Nitrogen Dioxide (NO_2)	2008/50/EC	Annual limit for protection of human health	40 µg/m^3	4-23 µg/m^3
Particulate Matter (as PM_{10})	2008/50/EC	Annual limit for protection of human health	40 µg/m^3	7-28 µg/m^3
Particulate Matter (as $PM_{2.5}$)	2008/50/EC	Annual limit for protection of human health	20 µg/m^3	4-23* µg/m^3

* Annual mean of 23 µg/m^3 for $PM_{2.5}$ concentrations recorded at Tralee station. It is noted that this station was newly installed and had partial coverage for the year (13/12/2019 - 31/12/2019).

Based on the data summarised in Table 8-2, existing baseline air quality for the area in which the subject site is located (Zone D), and neighbouring large towns (Zone C), may be characterised as being of good quality with no exceedances of the Air Quality Regulations limit values of specific pollutants.

8.3.1.1 Macroclimate

Ireland has a typical maritime climate, largely due to its proximity to the Atlantic Ocean and the presence of the Gulf Stream. Due to the moderating effects of the Gulf Stream, Ireland does not suffer the temperature extremes that are experienced by many other countries at a similar latitude. Mean annual temperatures generally range between 9^{o}C and 10^{o}C. Winters tend to be cool and windy while summers are mostly mild and less windy. The prevailing wind direction is between the south and west with average annual wind speeds ranging between 6 knots in parts of south Leinster to over 15 knots in the extreme north. Rainfall in Ireland occurs throughout the year with reasonable frequency. The highest rainfall occurs in the western half of the country and on high ground; and generally, decreases towards the northeast. As the

prevailing winds are from the west-southwest, the west of Ireland experiences the largest number of wet days. The area of least precipitation is along the eastern seaboard of the country.

8.3.1.2 Microclimate

The synoptic meteorological station at Oak Park, Co. Carlow is located approximately 12.5km southwest of the Site; for the purposes of this chapter, weather data collected here may be considered similar to that which is experienced in the area of the subject Site. The weather in the area of the subject Site is influenced predominantly by the Irish Sea which results in damp, mild weather that is dominated by cool oceanic air masses. The predominant average hourly wind direction in Carlow varies throughout the year. The expected annual rainfall for the eastern half of the country ranges between 750 and 1000 mm.

8.3.1.2.1 Rainfall

Rainfall is a key indicator of changes in climate, as measurements of rainfall are fundamental to assessing the effects of climate change on the water cycle and water balance. Table 8-4 illustrates the monthly and annual rainfall data collected over a 3-year period (2018-2020) at Oak Park Weather Station. The annual rates of precipitation ranged from 821.5mm in 2018 to 910.1mm in 2020 with distribution of the highest monthly rainfall values falling mainly in the autumn and winter months. The long-term annual average rainfall is 840.2mm; this is within the expected range of the eastern half of the country.

Table 8-3: Monthly Rainfall Values (mm) for Oak Park from 2018 to 2020 (Source: Met Eireann)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2020	61.4	172.8	51.8	29.7	12.9	40.5	76.5	100.1	57.0	96.6	87.6	123.2	910.1
2019	30.9	36.8	122.9	72.5	14.1	55.0	42.6	86.4	116.7	102.3	117.2	68.0	865.4
2018	108.1	38.7	98.1	73.0	24.3	5.2	42.5	39.8	53.7	58.3	160.5	119.3	821.5
LTA[5]	80.4	57.3	63.4	55.9	59.8	60.8	58.7	71.9	69.6	92.9	85.9	83.6	840.2

8.3.1.2.2 Wind

Wind at a particular location can be influenced by a number of factors, such as obstructions by trees or buildings, the nature of the terrain, and deflection by nearby mountains or hills. Wind blows most frequently from the south and west for open sites while winds from the northeast and north occur less often. The analysis of hourly weather data from Oak Park synoptic weather station over a period of 10 years suggests that the predominant wind direction varies throughout the year, with a high frequency of winds blowing from the southeast, south and northwest. Winds between 4 and 10 knots occur most frequently.

Figure 8-2 provides a wind speed frequency distribution which represents wind speed classes and the frequency at which they occur (% of time) at Oak Park weather station over a period

[5] The 'LTA' is average for the climatological long-term-average (LTA) reference period 1981-2010

of 10 years. Wind speeds of 4 knots have the highest frequency, occurring approximately 9% of the time.

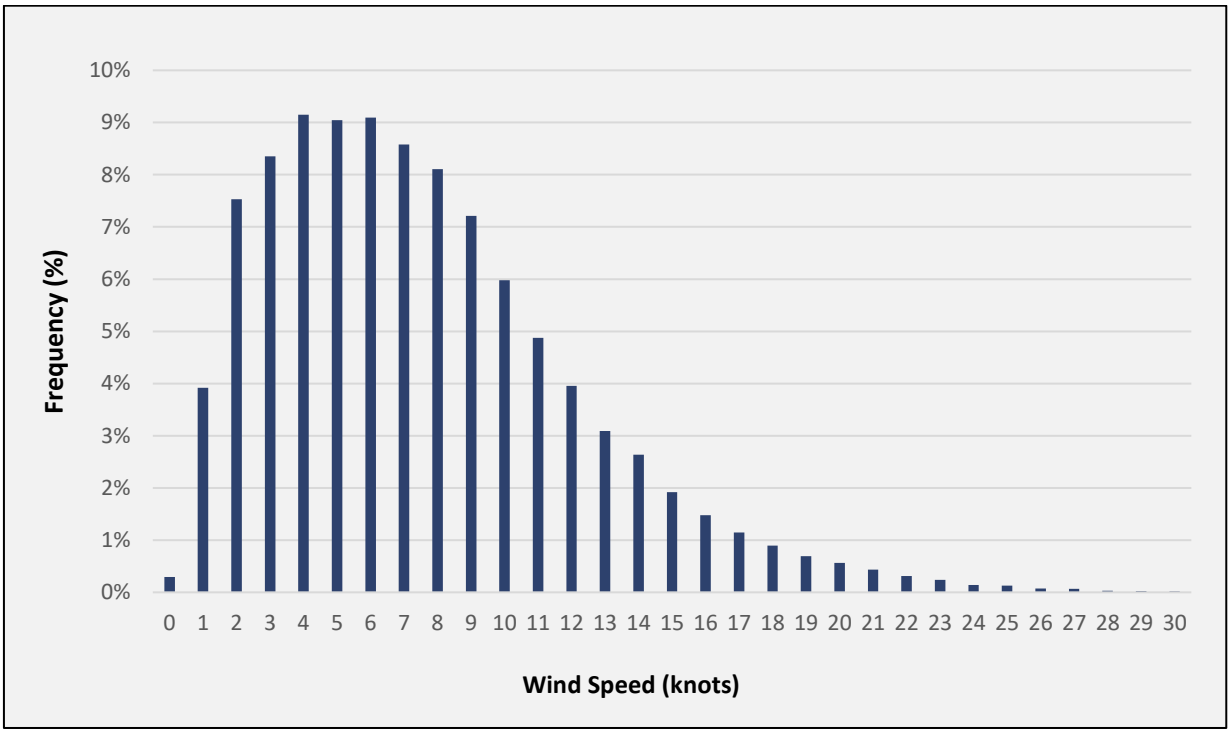


Figure 8-2: Wind Speed Frequency Distribution at Oak Park Synoptic Weather Station over 30 years (2011-2020)

Figure 8-3 provides a wind rose of the predominant wind directions and associated wind speeds at Oak Park. As is visible from Figure 8-3, the prevailing winds at Oak Park station vary throughout the year, with winds from the southeast, northwest, and south occurring at a frequency of 20.89%, 18.97%, and 18.71%, respectively. The lowest frequency is for winds blowing from the eastern quadrant at approximately 2.04% of the time. The influence of topography can be seen in the low frequency of winds from an easterly direction at Oak Park; this is due to the sheltering effect of the mountains to the east.

The most frequent wind speed associated with winds from the southeast and northwest is between 4 and 6 knots which is a ‘light breeze’ in terms of the Beaufort scale. The most frequent windspeed associated with winds from the south is between 7 and 10 knots which is a ‘gentle breeze’ in terms of the Beaufort scale. The overall most common windspeed is between 7 and 10 knots, occurring in 29.87% of incidences, and wind speeds of between 4 and 6 knots occurring in 27.27% of incidences. The frequency of wind between 1 and 3 knots is about 18.82% with wind speeds of above 17 knots (8.7 m/s) occurring in just 4.79% of incidences.

This wind rose is broadly representative of the prevailing conditions experienced at the subject Site.

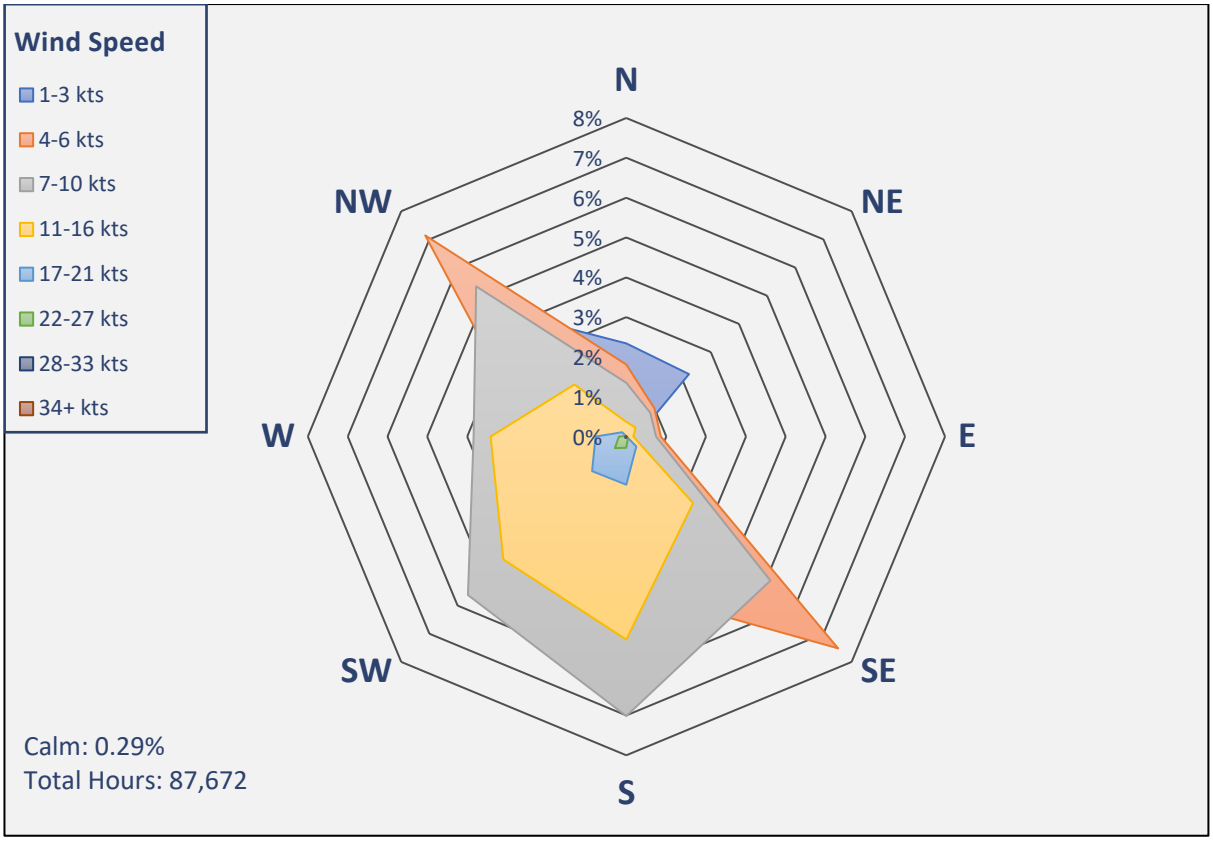


Figure 8-3: 10-year Windrose at Oak Park Weather Station 2011-2020 (Developed using Met Eireann Hourly Data)

8.4 Characteristics of the Development

8.4.1 Construction Phase

There will be no Construction Phase for the proposed restoration and proposed quarry.

The mobile washing plant and site office/welfare (portacabins) and ancillary equipment were established at commencement of the authorised development for the existing quarry the use of which continued throughout the operational phase of the unauthorised development.

8.4.2 Operational Phase

The unauthorised development is part of an existing quarry site with the intended extraction of 700,000 to 900,000 tonnes of sand and gravel within approximately 11 hectares of the 11.97-hectare quarry site at an average rate of 60,000 tonnes per annum up to a maximum of 100,000 tonnes per annum over 10 years. Planning was granted for the extraction five years from 2007 to 2012, there was however unauthorised development at the Site and quarrying continued after 2012. The unauthorised development comprised of the quarrying of an area of approximately 4.18 hectares in the eastern part of the Site; this was subsequently restored during 2018.

Sand and gravel was excavated and processed from this area of the Site using the existing plant and equipment installed at the Site. There was no excavation of bedrock during any phase of authorised or unauthorised development.

The plant and equipment on site included excavator and dumper trucks, washing/rinsing plant, dry screener weighbridge, wheelwash and diesel generator and a bunded diesel fuel tank. The existing settlement ponds and groundwater sump were used for the washing of sand and gravel.

A self-contained mobile welfare unit installed in 2007 for the authorised quarry operations continued to be used for the unauthorised operational phase since 2012 and was emptied by an authorised contractor as required.

Potential Impact of the Development

8.4.3 Potential Impacts on Air Quality

8.4.3.1 Construction Phase

No construction activities were proposed or undertaken for the unauthorised development and accordingly there are no associated impacts as identified which have occurred, are occurring or will occur. It was verified during the site inspection by Enviroguide on the 14th October 2021 that there were no built structures at the Site and no impacts associated with a Construction Phase had occurred. Operational Phase

8.4.3.2 Dust

Dust emissions are deemed to be the predominant impact on air as a result of quarrying. This dust can cause nuisance and impact on plant and equipment, buildings and vegetation. In general, the largest dust depositions are likely to occur in close proximity to the source activity; distribution and deposition from there will depend on a variety of factors including the nature and extent of the activity, particle size, climatic conditions (especially prevailing winds and dry days) and mitigation measures employed.

The primary sources of dust identified include site preparation, extraction of materials, stockpiling, handling, and loading of materials, traffic movements on internal and external haul routes, stripping, overburden storage, and restoration. They are generally dispersed sources rather than specific point sources, which dictates the measures required to mitigate potential dust-related impacts. Dust typically becomes airborne due to the action of wind or activities such as excavating, drilling, or screening. Dust emissions associated with vehicular movements would largely be due to the resuspension of particulate materials that are present on road surfaces. The movement of vehicles within the facility and to and from the facility to the external road network also had potential to cause dust due to deposition from the vehicles themselves if appropriate mitigation measures were not considered.

The extraction and infilling operations had the potential for an increased temporary impact on air quality. This would have increased or decreased depending on local weather conditions, the level of activity, the location of the works within the site and the mitigation measures employed. Dust deposition typically occurs in close proximity to the dust-generating source. Only a small number of sensitive locations were identified as being potentially affected by dust deposition in the previous EIS and these are presented in Figure 8-4. The proposed location of the facility was in an area with a low population density and the nearest sensitive locations beyond the site boundary were generally greater than 60m from the extract and processing of material. The following Figure 8-4 identifies the sensitive receptors which were included in this assessment:

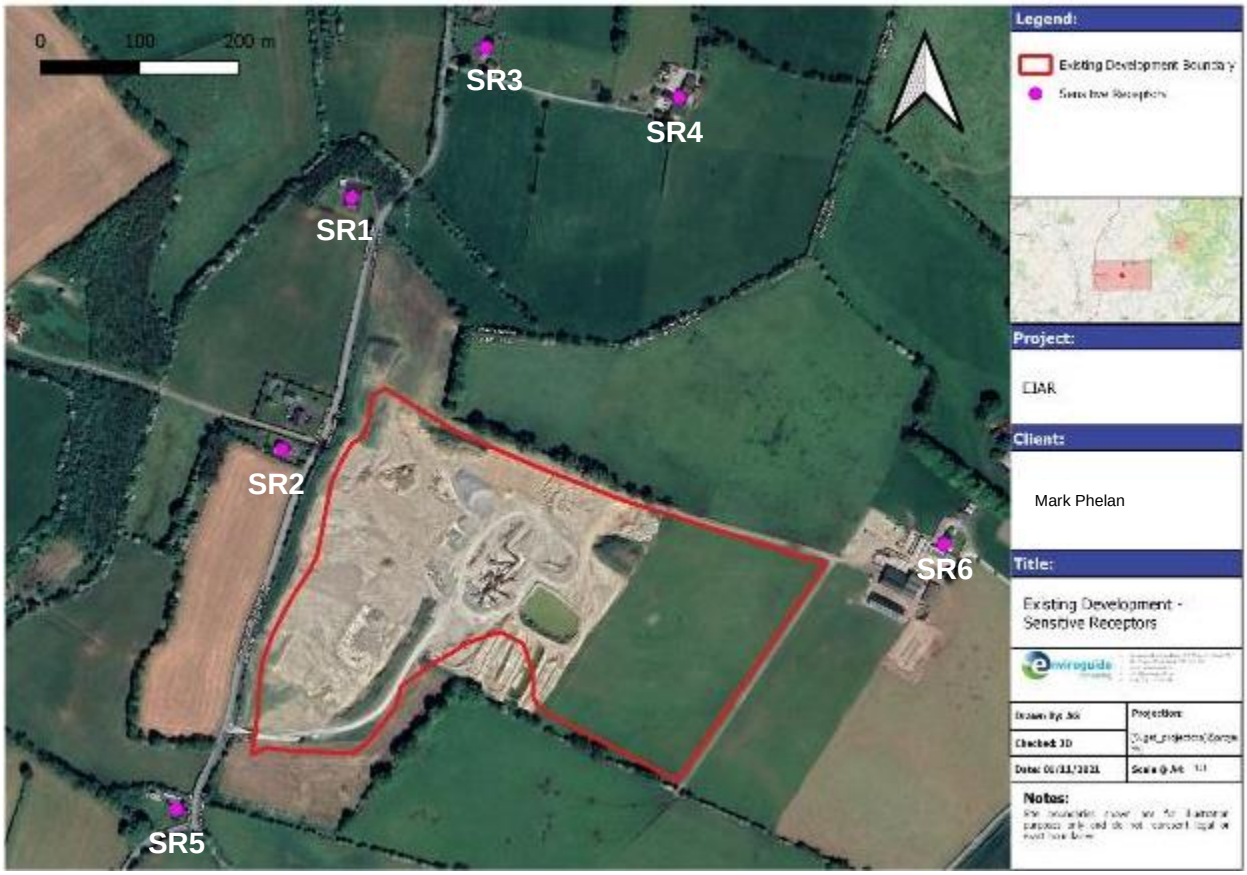


Figure 8-4: Area of unauthorised development – Sensitive Receptors

Generally, the potential for severe dust impacts is greatest within 100m of dust generating activities, though residual impacts can occur for distances beyond 100m. The nearest residential receptors have previously been considered as low sensitivity locations within the historical EIS, whereas high sensitivity locations were classified as a hospital, high density residential, school or crèche. Bigstone National School, which is located approximately 0.25 km southwest of the plant area, was considered a high sensitivity receptor. However, due to the distance from the dust generating sources, there has been no impact on this receptor.

The assessment for the proposed 10-year operations carried out in 2004 considered the potential magnitude of the dust emissions over a full calendar year using meteorological data from Dublin Airport (Year 1999). Modelling using ISCST3 was then used to predict the dust deposition rate for each scenario investigated for comparison with the TA Luft nuisance criteria. ISCST3 is a Gaussian plume model which accepts a variety of source geometries and emissions schedules in order to compute ambient air concentrations and surface deposition fluxes at specified receptor points. The cumulative dust deposition level (inclusive of all onsite activities and transportation) is estimated to have peaked at 130 mg/m^2/day, which is just 36% of the LA Luft Limit Value. Thus, no dust nuisance is predicted to have occurred as a result of the operation of the facility at the nearest residential receptors.

The sensitive receptors as contained within Figure 8-4 have also been included within the Disamenity Dust Assessment which has been carried out for the proposed infill and quarry operations contained in the following sections. This assessment has concluded an overall Negligible impact on all sensitive receptors in the vicinity of the overall Site boundary (inclusive

of existing and proposed site boundaries), when assessed based on proximity and location relative to prevailing conditions. Meteorological data has been sourced from Oak Park station (spanning the years 2011-2020) which is considered to be more representative of actual climatic conditions at the Site due to its geographic location. This assessment has taken account of all Site operations and classified residual emissions as 'Medium'; this would be a worst-case scenario in terms of the unauthorised development due to the size of the site and the overall magnitude of operations. It is also noted that the assessment has utilised measurements which have been taken from the overall Site boundary as opposed to the operational areas, thus the potential for impacts is likely to be less than what is predicted.

To conclude, due to the nature of the activities previously carried out at the unauthorised development, it is considered likely that there may have been some generation of dust emissions in the past. However, in the absence of quantitative data there is no evidence to either support or disprove this. It is noted, however, that predicted dust concentrations were estimated to peak at 130 mg/m^2/day at nearby receptors, which is just 36% of the LA Luft Limit Value. Furthermore, the remedial measures employed by the operators would have ensured that any such emissions would be low level and very localised. It is therefore concluded that it is extremely unlikely that the unauthorised development has had an adverse impact on the surrounding environment in terms of air quality.

8.4.3.2.1.1 Dust Containing Silica

Exposure to fine respirable dust which contains silica is considered to be a major health risk encountered by quarry industry employees. Silica is a natural mineral found in the majority of rocks, sands and clays, therefore workers in the quarrying industry are particularly susceptible. Silica dust exposure to quarry workers may arise from the quarrying, crushing, screening and processing of stone into various sizes, and dust resuspension and circulation within cabs of vehicles. Workers are at risk from fine airborne particles, which are often not visible to the naked eye, and therefore pose no obvious hazard to workers, entering the respiratory tract. Exposure to silica dust over a number of years can result in the development of a condition known as silicosis; a lung disease which interferes with oxygen uptake in the bloodstream. New evidence also suggests that long-term exposure to silica can increase the risk of lung cancer (Health and Safety Authority, 2020). Silica dust exposure has been managed in line with the appropriate mitigation measures as set out for all dust impacts on the existing Site.

8.4.3.2.1.2 Traffic-Related Air Emissions

The movement of vehicles at the site during the operational phase of the unauthorised development will have generated exhaust fumes and consequently potential emissions of volatile organic compounds, nitrogen oxides, sulphur dioxide and PM_{10}. While the levels of these pollutants will have increased locally on site during this phase, strict adherence to 'good site/engineering practices' such as switching all vehicles off when not in use will have minimised the generation of any unnecessary air emissions. In any event it is considered that the level of any contamination emitted will have been minimal and of short duration. Similarly gaseous emissions from static or mobile diesel-powered plant operated on site are deemed to have been insignificant.

Table 8-5 outlines the criteria that are prerequisite for an air quality assessment:

Table 8-4: Indicative Criteria for Requiring an Air Quality Assessment (Source: IAQM, 2017)

Potential Change resulting from Development	Indicative Criteria to Proceed to an Air Quality Assessment
Cause a significant change in Light Duty Vehicle (LDV) traffic flows on local roads with relevant receptors	A change of LDV flows of more than 1000 Annual Average Daily Traffic (AADT)
Cause a significant change in Heavy Duty Vehicle (HGV) flows on local roads with relevant receptors	A change of HGV flows of more than 100 Annual Average Daily Traffic (AADT)
Realign roads, i.e., changing the proximity of receptors to traffic lanes	Where the change is 5m or more
Cause a change in Daily Average Speed (DAS)	Where the DAS will change by 10 km/h or more
Cause a change in peak hour speed	Where the peak hour speed will change by 20km/h or more.

The criteria presented in Table 8-5 have not been met by the existing extraction and infill operations. It is therefore considered unlikely for significant air quality impacts to have occurred due to increased traffic flow, and an associated air quality assessment would not have been required.

8.4.4 Potential Impacts on Climate

8.4.4.1 Construction Phase

No construction activities were proposed or undertaken the for the unauthorised development and accordingly there are no associated impacts as identified which have occurred, are occurring or will occur. It was verified during the site inspection by Enviroguide on the 14th of October 2021 that there were no built structures at the Site and no impacts associated with a Construction Phase had occurred. Therefore, no considerable impact on climate is predicted to have occurred during the existing quarrying and infill operations.

8.4.4.2 Operational Phase

8.4.4.2.1 Historic (unauthorised) Operations

It is likely that combustion emissions from onsite machinery and traffic derived pollutants of CO_2 and N_2O were emitted during this phase of the development. However, due to the overall size and magnitude of site activities, and the mitigation measures proposed, the effect on national GHG emissions would have been insignificant in terms of Ireland's obligations under the Kyoto Protocol and therefore will have no considerable impact on climate. Furthermore, the development did not result in a significant change to traffic movements. Therefore, no significant increases in associated greenhouse gas emissions are expected to have taken place.

8.4.5 Potential Cumulative Impacts

Cumulative Impacts can be defined as "*impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project"*. Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the cumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer. The indirect effects will not give rise to uncontrolled adverse effects.

The cumulative effects on the air quality and climate of the Unauthorised Development and other existing developments have been considered, in particular through the generation of air pollutants and greenhouse gas emissions. There are a number of operational and non-operational sand and gravel quarries in the surrounding areas. The most significant potential for adverse cumulative impacts in combination with this these offsite facilities, in the context of Air Quality and Climate, is the potential for nuisance dust. The Disamenity Dust Assessment carried out in Section 8.5.1.2.2.1.1. has concluded that there was a potential for overall Negligible impact on sensitive receptors as a result of the Unauthorised Development. However, the adherence and full implementation of the appropriate control and mitigation measures have ensured there was potential for cumulative impacts to arise.

8.4.6 "Do Nothing" Impact

A 'Do Nothing' scenario would result in the Site continuing to exist in its current physical capacity with no restoration. It is considered that future restoration of the quarry would result in a positive residual impact in terms of air quality due to the infill of exposed sand and gravel surfaces. Therefore, a "Do Nothing" scenario is not considered to be beneficial.

8.5 Avoidance, Remedial & Mitigation Measures

8.5.1 Air Quality

8.5.1.1 Construction Phase

No Construction Phase is proposed; therefore, no remedial and mitigation measures were applicable in this instance.

8.5.1.2 Operational Phase

As the operational phase has ceased no future mitigation measures are proposed in respect of this rEIAR.

8.5.2 Climate

Negative climatic impacts associated with the Construction and Operational Phases of the unauthorised development were deemed to be negligible.

8.5.3 Worst Case Scenario

Worst case scenario would have involved failures of mitigation measures for the unauthorised development. In the event of this, it is considered that localised dust would not have caused any dust nuisance to nearby receptors.

8.6 Residual Impacts

Residual Impacts are defined as '*effects that are predicted to remain after all assessments and mitigation measures'*. They are the remaining '*environmental costs'* of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts. Potential residual impacts from the Development were considered as part of this environmental assessment.

No negative residual impacts in the context of air quality and climate are anticipated regarding this Development.

8.7 Monitoring

8.8 As the operational phase of the unauthorised development has ceased no monitoring is proposed. Interactions

Interactions between Air Quality and Climate and other aspects of this Environmental Impact Assessment Report have been considered and are detailed below.

8.8.1 Population and Human Health

Interactions between Air Quality and Population and Human Health have been considered as the Operational Phase had the potential to cause health issues as a result of impacts on air quality from dust nuisances, including silica dust, and potential traffic derived pollutants. However, the mitigation measures employed at the Development will have ensured that all impacts were compliant with ambient air quality standards and human health was not affected.

8.8.2 Traffic

Traffic derived pollutants which may affect Air Quality and Climate are deemed insignificant due to the marginal change in traffic volume and movement associated with the Unauthorised Development as outlined in Chapter 12, Section 2.1 *Traffic.*

8.9 Difficulties Encountered When Compiling

No difficulties were encountered when compiling this chapter.

8.10 References

Air Pollution Act 2012 (S.I. No. 326 of 2012) Irish Statute Book.

Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011) Irish Statute Book.

Air Quality, Clean Air for Europe Directive (2008/50/EC) EUR-Lex.

Department of Environment, Heritage, and Local Government (2004) Quarries and Ancillary Activities: Guidelines for Planning Authorities.

Department of the Environment, Transport and the Regions, 1995. The Environmental Effects of Dust from Surface Mineral Workings- Volume 2. Technical Report.

Environmental Protection Agency (2006) Environmental Management in the Extractive Industry (Non-Scheduled Materials).

Environmental Protection Agency (2018) Ireland's Final Greenhouse Gas Emissions 1990-2016.

Environmental Protection Agency (2020) Air Quality in Ireland 2019 Annual Report on Air Quality in Ireland from the Environmental Protection Agency.

Environmental Protection Agency (2019) Ireland's Final Greenhouse Gas Emissions 1990-2017.

Environmental Protection Agency (2019) Irelands National Inventory Report: Greenhouse Gas Emissions 1900-2017

European Commission (2007) 2020 Climate & Energy Package,

European Commission (2011) A Roadmap for Moving to a Competitive Low Carbon Economy in 2050.

European Commission (2014) 2030 Climate & Energy Framework.

German VDI (2002) Technical Guidelines on Air Quality Control – TA Luft.

Health and Safety Authority (2020) Dust Including Silica Dust.

Institute of Air Quality Management (IAQM) 2016, Guidance on the Assessment of Mineral Dust Impacts for Planning, London, United Kingdom.

Intergovernmental Panel on Climate Change (2006) IPCC Guidelines for National Greenhouse Gas Inventories.

Intergovernmental Panel on Climate Change (2019) Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories.

Met Eireann (2021) Monthly Meteorological Data for Oak Park Synoptic Weather Station

Met Eireann (2021) Hourly Meteorological Data for Oak Park Synoptic Weather Station

United Nations Framework Convention on Climate Change (1998) Kyoto Protocol to the UNFCCC.

United Nations Framework Convention on Climate Change (2012) The Doha Amendment to the Kyoto Protocol.

United Nations Framework Convention on Climate Change (2015) The Paris Agreement.

9 NOISE & VIBRATION

9.1 Introduction

This Chapter of the (remedial)Environmental Impact Assessment Report describes and assesses the potential effects from noise of the Existing and Unauthorised Development, located at Maplestown, County Carlow, and was prepared by Laura Griffin, Environmental Consultant with Enviroguide Consulting.

The Site currently consists of an existing sand and gravel quarry. This was extended beyond the permitted timeframe and therefore Substitute Consent is required. This (r)EIAR assesses the following:

- Application to An Bord Pleanála for Substitute Consent for the currently unauthorised use of the quarry at Maplestown, Co. Carlow over and above what was permitted by Planning Reference PL01.221741.

The aim of this Chapter is to retrospectively assess the impacts of unauthorised extraction activities which took place since 2012 on noise levels at nearby sensitive receptors.

9.2 Study Methodology

This assessment will examine the likely impacts of sound pressure levels generated by the Unauthorised Development located at Maplestown Co. Carlow. Noise calculations will be used to predict and assess the likely historical impact of equipment on noise sensitive receptors.

For the purpose of the assessment ‘sensitive receptors’ terminology used describes any persons, locations or otherwise that may be susceptible to changes as a consequence of the Unauthorised Development.

The primary noise impacts associated with this Development are likely to be due to:

- Extraction by excavators and transfer to wash/screening plant by dumper;
- Washing and screening plant;
- Generator;
- Trucks entering and exiting the facility.

Documents consulted during the preparation of this rEIAR chapter are listed in the References section. The acoustics section has been compiled taking cognisance of:

- Design Manual for Roads and Bridges Volume 11 Section 3 Part 7 (HD 213/11 – Revision 1) (The Highways Agency et al., 2011);
- BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise;
- ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures
- ISO 1996-2:2017 Acoustics - Description, measurement and assessment of environmental noise Part 2: Determination of sound pressure levels;

- ISO 9613-1:1993 Acoustics - Attenuation of sound during propagation outdoors -- Part 1: Calculation of the absorption of sound by the atmosphere;
- ISO 9613-2:1996 Acoustics - Attenuation of sound during propagation outdoors -- Part 2: General method of calculation;
- Environmental Protection Agency (2016) Guidance Note for Noise (NG4): Licence Applications, Surveys and Assessments in Relation to Scheduled Activities; and
- Guidelines for the Treatment of Noise & Vibration in National Road Schemes, National Roads Authority, Revision 1, 25th October 2004.

The following noise indices, analysis and observations were reviewed.

- LA_{eq} - The A-weighted, equivalent continuous sound level of the measurement period. Represents an 'energy average' of the sound pressure levels measured.
- LA_{90} – The A-weighted, noise level exceeded for 90% of the measurement period. Calculated by statistical analysis of the measurement data.
- LA_{10} - The A-weighted, noise level exceeded for 10% of the measurement period. Calculated by statistical analysis of the measurement data.

9.2.1 Desk Study

The noise assessment will review all existing information relating to the Site and its environs, which involves a desk-based study of the following:

- An evaluation of the Site and the surrounding area to assess certain changes that are likely to impact the surrounding environs was carried out. Sensitive receptors were identified and are discussed in this chapter.

- Typical noise limits associated with quarry operations as outlined in the EPA Guideline Document for Extractive Industries (Non-Scheduled Minerals, 2006) and the then Department of Environment, Heritage, and Local Government (DoEHLG) Quarries and Ancillary Activities: Guidelines for Planning Authorities (2004).

- The original Environmental Impact Statement completed by EssGee Consultants for the original quarry development was also reviewed and assessed as part of the desk-based study.

9.3 The Existing and Receiving Environment (Baseline Situation)

9.3.1 Historical

The Site of the Historic Development consisted of a rural farm property in Maplestown, Co. Carlow. The site was bound to the west by a country road (L-8097), and to the South, East and North by agricultural lands. The surrounding land use was predominantly rural agricultural land uses including livestock and arable farming, as well as forestry plantation.

9.3.2 Present

The Development with an address at Maplestown, Co. Carlow. The Site is on the border with counties Kildare and Wicklow and is approximately 4.5km south west of Baltinglass, 2.6km

north east of the village of Kiltegan and 6km east of the town of Castledermot. The quarry is set back ca. 20m from the public road via a private lane and is set within surrounding agricultural lands.

The overall Site area is 15.21 hectares (ha) in area and contains an area of land which was quarried and infilled outside of the granted planning permission period (4.18 ha) for which substitute consent is being sought.

9.3.3 Quiet Area Screening

The location of the Development was screened in order to determine if it is located in or near an area that could be considered a 'Quiet Area' in open country according to the Environmental Protection Agency's publication *Environmental Quality Objectives - Noise in Quiet Areas, 2003.*

The following criteria were assessed for this determination:

- At least 3 km from urban areas with a population >1,000 people;
- At least 10 km from any urban areas with a population >5,000 people;
- At least 15 km from any urban areas with a population >10,000 people;
- At least 3 km from any local industry;
- At least 10 km from any major industry centre;
- At least 5 km from any National Primary Route, and;
- At least 7.5 km from any Motorway or Dual Carriageway.

If the Site does not meet these criteria, it is not considered to be a quiet area as per the definition of the Environmental Protection Agency. 'Quiet Areas', according to NG4 (2016), they have a much more stringent noise criterion set out in the guidelines. Before relevant noise criterion can be applied, 'Quiet Area Screening' must be performed to identify or rule out the Site as a Quiet Area. Quiet Area screening results can be viewed in Table 9-1 below.

Table 9-1: Quiet Area Screening of the Development Location

Quiet Area Screening of the Development Location			
Screening Question	**Answer (Yes/No)**		**Screening Results**
Is the site >3km away from urban areas with a population >1,000 people?	Yes ✓	No □	The Proposed Development is not located within 3km of an area with a population >1,000 people.
Is the site >10km away from urban areas with a population >5,000 people?	Yes ✓	No □	The Proposed Development is not located within 10km of an area with a population >5,000 people.
Is the site >15km away from urban areas with a population >10,000 people?	Yes ✓	No □	The Proposed Development not located within 15km of an area with a population >10,000 people.
Is the site >3km away from any local industry?	Yes □	No ✓	Keatley Concrete Ltd. is located 390m to the west of the Proposed Development.

Quiet Area Screening of the Development Location			
Screening Question	**Answer (Yes/No)**		**Screening Results**
Is the site >10km away from any major industry centre?	Yes ✓	No □	The Proposed Development is not located within 10km of any major industry centre.
Is the site >5km away from any national primary route?	Yes □	No ✓	The N81 is located circa 2.7km to the east of the Proposed Development.
Is the site >7.5km away from any motorway or dual carriageway?	Yes ✓	No □	The Proposed Development is not within 7.5km of a motorway or dual carriageway.
QUIET AREA?	**No**		**The Site does not meet these criteria it is not considered to be a quiet area.**

According to the EPA Guidance, *NG4*, where an area is determined not to be a 'quiet area' baseline monitoring should be conducted to determine if there is a low background noise. As the Development is located circa 390m from Keatley Concrete Ltd. and 2.7km from the N81, a low background noise would not be predicted.

9.3.4 Recommended Noise Limits

In relation to quarry developments and ancillary activities, it is generally recommended that noise from quarrying activities shall not exceed the following noise ELVs at the nearest noise-sensitive receptor, as outlined in Table 9-2:

Table 9-2: Recommended Noise Limits based on Appropriate Guidance (Source: EPA)

Parameter	Emission Standard	Basis of Standard
Noise – Day (08.00 to 20.00 hours)	<55 dB(A) $_{LAeq\ 1\ Hour}$	EPA Guideline Document for Extractive Industries (2006)
Noise – Night (20.00 to 08.00 hours)	<45 dB(A) $_{LAeq\ 1\ Hour}$	

Note: 95% of all noise levels shall comply with the specified limit value(s). No noise level shall exceed the limit value by more than 2 dBA.

9.3.5 Noise

Noise is defined as any sound, that has the potential to cause disturbance, discomfort or psychological stress to a person exposed to it, or any sound that could cause actual physiological harm to a person exposed to it, or physical damage to any structure exposed to it. In summary noise can be defined as any unwanted sound. Sound levels are expressed in decibels (dB) on a logarithmic scale, where 0dB is nominally the "threshold of hearing" and 120dB is nominally the "threshold of pain" (refer to Figure 9-1 below).

Background noise is defined as '*the steady existing noise level present without contribution from any intermittent sources. The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 per cent of a given time interval, T (LAF90,T)*'. According to the EPA Noise Guidance NG4, an area of low background noise is one where

the existing background noise levels measured during an environmental noise survey are as follows:

- Average Daytime Background Noise Level ≤40dB LAF90, and;
- Average Evening Background Noise Level ≤35dB LAF90, and;
- Average Night-time Background Noise Level ≤30dB LAF90.

The Development, though situated in a rural area, is considered to be a non-quiet area as per EPA screening guidelines. The site is bounded by industrial and commercial sites.

Figure 9-1 below depicts typical sounds and their noise levels on a decibel scale.

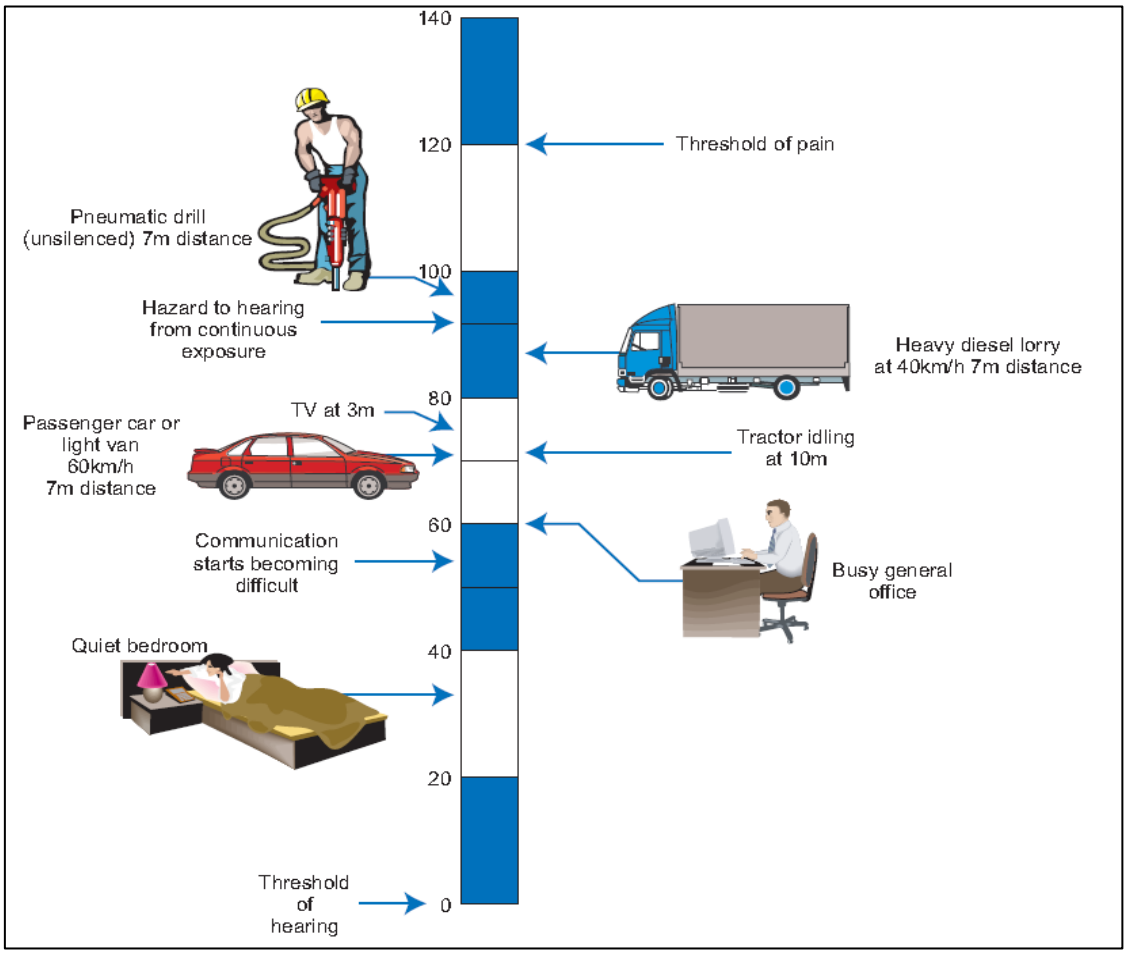


Figure 9-1: Scale and Indicative Noise Levels on the dB(A) Scale (Based on guidance taken from: Design Manual for Roads and Bridges, Volume 11 Consolidated Edition 1993)

Extractive industries are associated with a number of noise-generating activities, such as removal of topsoil and overburden, excavation using machinery, drilling and blasting of rock, crushing and screening of aggregates, transport of raw materials and finished products (DoEHLG, 2004). No blasting is to take place at the Site and the noise-generating activities associated with the current Site are as follows:

- Extraction by hydraulic excavators and transfer to wash/screening plant by dumper trucks;

- Washing and screening plant;
- Generator;
- Trucks exiting and entering the facility;

9.4 Characteristics of the Development

9.4.1 Operational Phase

The plant and equipment required at the site for the extraction and loading of material for the duration of the Operational Phase include: a loading shovel, a screener, an excavator and a dumper truck. These are already in situ and operated for the duration of on-site activities at the Historic and Unauthorised Development.

9.5 Potential Impact of the Historic and Development

This section assesses the impact of the Unauthorised Development on the human environment. The noise-generating activities associated with the Site are as follows:

- Extraction by hydraulic excavators and transfer to wash/screening plant by dumper trucks;
- Semi-mobile washing and screening plant;
- Generator;
- Traffic movements on internal haul roads;
- Trucks entering and exiting the quarry

9.5.1 Noise Sensitive Locations

The EPA define noise sensitive locations as '*any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels*'.

Identified noise sensitive locations 250m of the Development can be viewed in Figure 9-3 below. A 250m buffer has been chosen for this assessment due to the plant machinery associated with the Development and its improbable exceedance of noise limit criteria at this distance. This has been assessed and discussed in further detail in Section 9.5.3.

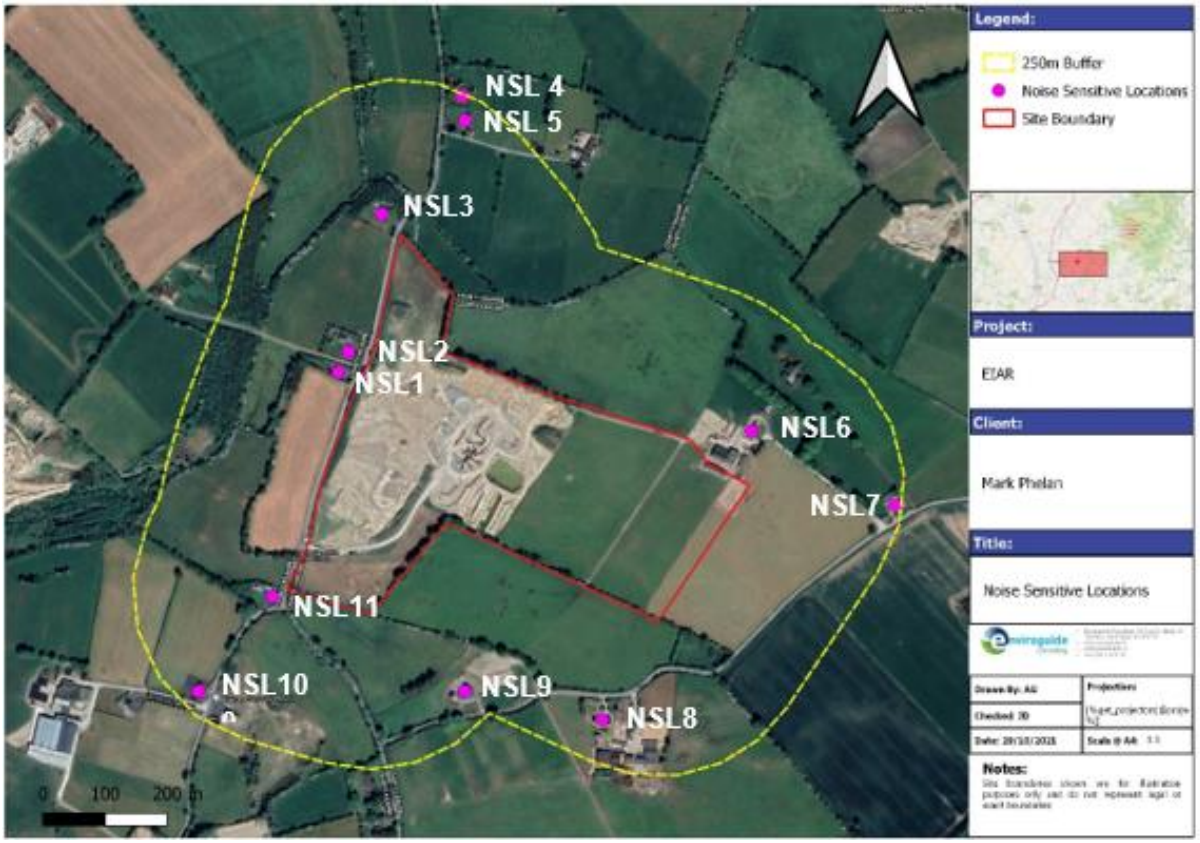


Figure 9-2: Location of Noise Sensitive Locations in relation to Project Site

As shown in Figure 9-2, 11 noise sensitive locations (NSL) have been identified within 250m of the Development Site. The boundary of the closest two NSLs to Site operations is located approximately 62m from the operational site boundary; these have been identified as NSL 1 and NSL 2 as per Figure 9-2 above. As part of the original EIS noise measurements were carried out outside the houses to the southwest corner, to the west and northwest of the Site and outside the school to the south west corner. These receptors have been included in the assessment for the Development.

9.5.2 Noise from Operational Traffic

A Traffic and Access Assessment was carried out as part of the original EIS and this assessment concluded that although the development would cause an increase in traffic movements, there would be no significant negative traffic impacts associated with the Development (*EssGee Consultants*, 2004).

The Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 7 (HD 213/11 – Revision 1) (The Highways Agency et al., 2011) states that "*changes in traffic volume on existing roads or new routes may cause either of the threshold values for noise to be exceeded. A change in noise level of 1dB LA10, 18h is equivalent to a 25% increase or a 20% decrease in traffic flow, assuming other factors remain unchanged and a change in noise level of 3dB LA10, 18h is equivalent to a 100% increase or a 50% decrease in traffic flow*".

No traffic routes were predicted to experience increases of more than 25% in total traffic flows during the duration of the Historic Development and therefore no detailed assessment is

required as per the DMRB Guidelines. Refer to Chapter 12 of the EIAR for a detailed traffic assessment report.

The impact of noise from operational traffic was predicted to be unnoticeable and not considered to have a negative impact.

9.5.3 Noise from Onsite Plant & Equipment

Noise and vibration can arise from the operation of fixed or mobile machinery onsite. Onsite activity involves the removal of underlying sand and gravel. Excavators extract material which is transported around the Site via dumper truck and wheeled loaders. Plant and machinery which operate onsite include excavators, wheeled loaders, screening plant and dumper trucks. Ancillary equipment such as wheel wash are utilised as required for dust suppression.

BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise sets out sound level data for items associated with sand and gravel quarries based on machinery specifications.

Details on both the Site Equipment for the historical infill and extraction activities are described in Table 9-3 and Table 9-4 below.

Table 9-3: Plant and Equipment associated with Historically Permitted Activities

Plant/Machinery Item	Description
Front-end Loading Shovel	This is a heavy equipment machine used in the quarry to load aggregate into storage or transport receptacles e.g., dumper trucks, lorries etc. The machine is a wheeled front-end loader, sometimes fitted with an extendable boom, which makes it suitable for loading materials in a quarry environment.
Back Hoe Excavator	A hydraulic excavator is a heavy machine that has various sizes, a hydraulic arm with a blade at the tip, designed to move on wheels or chains and also has the ability to rotate 360 degrees on its own axis. Its functions in a quarry environment are to excavate, rotate, move and load aggregate.
Dumper Truck	The Volvo A25 Dumper Truck is a 6-wheeled vehicle that has its cab in front of the dump box which contains the load. A dumper truck is designed for transporting and unloading loads of bulk material around the quarry environment. The dump box is raised using hydraulic pistons in order to release the load through the tail gate.
Dry Screener	A screener is a large, fixed machine that is used to separate mixed aggregates and sand into different grades. These machines are at the core of most construction and quarrying operations and are one of the most used pieces of equipment onsite. They work after an excavator, which feeds material into the screener for sorting. Screeners have vibrating meshes which are stacked in tiers, and the mixed aggregate is dumped on top. As the screens shake, smaller material falls through the holes in the mesh, leaving larger pieces on top. Any material that doesn't fall through each tier can tumble onto a conveyor to be carried away.
Wheel Wash	A wheel washing system is a device for cleaning the tires of trucks when they are leaving a site, to control and eliminate the pollution of public roads. The installation can be made in or above the ground for either temporary or permanent applications.
Bulldozer/Dozer	A bulldozer or dozer is a large, motorized machine that travels on continuous tracks or large tires and is equipped with a metal blade to the

	front for pushing material: soil, sand, snow, rubble, or rock during construction or conversion work.
Low Loader	A low loader is a semi-trailer with two drops in deck height: one right after the hitch and one right before the wheels. This allows the deck to be extremely low compared with other trailers. It offers the ability to carry legal loads up to 12 ft tall, which other trailers cannot. They are often used on sites for equipment transport.
Washing Plant	A washing plant is designed to remove silt/clay impurities by washing, tumbling, or scrubbing, as well as size and dewater sand before drying, sizing and blending it into final products.

Noise prediction calculations have been completed for noise from the use of onsite plant up to 250m from the source. According to the inverse square law, for each doubling of distance from a point source, the sound pressure level decreases by approximately 6 dB. The reference levels were calculated and projected for a range of distances from the source to the appropriate receptor using the following formula:

$$L_{Source} \approx L_{Ref} - 20 \cdot \text{Log10}(R2/R1)$$

Where:

L_{Source} = Sound Pressure Level at Initial Location

L_{Ref} = Sound Pressure Level at the new Location

R1 = Distance from the noise source to initial location

R2 = Distance from noise source to the new location

The calculations make a number of assumptions such as:

1. There is a straight line between the source and observer.
2. Meteorological conditions are static.
3. There are no natural barriers that affect attenuation of noise other than distance.
4. All plant items are operating from a single source simultaneously and at full capacity.
5. All plant items are operating at the edge of the work area closest to the sensitive receptor.

The inverse square law is the logical first estimate of the sound you would get at a distant point in a reasonably open area. It is noted that the sound intensity from a point source will obey the inverse square law if there are no reflections or reverberation. If there are barriers between the source and the point of measurement, you are likely to get less than what the inverse square law predicts.

Table 9-5 sets out the mobile machinery and fixed plant associated with the Historical Development (i.e., that requiring substitute consent) and retrospectively assess the associated dB(A) levels according to *BS 5228-1* recommendations, the inverse square law, and accounting for noise reduction associated with building materials where relevant:

Table 9-5: Plant and Equipment associated with historical activities and corresponding noise values

Plant Item	Ref	dB(A) @10m	dB(A) @50m	dB(A) @ 100m	dB(A) @ 150m	dB(A) @ 200m	dB(A) @ 250m
Loading Shovel	BS 5228-1	76.5	62	56	52.5	50	48
Dumper Truck	BS 5228-1	73.5	59.5	53.5	50	47.5	45.5
Excavator	BS 5228-1	80	66	60	56.5	54	52
Screener	BS 5228-1	81.5	67.5	61.5	58	55.5	53.5
Washing Plant	NIOSH[6]	81	67.5	61.5	58	55	53.5
Generator	BS 5228-1	65	51	45	41.5	39	37
Bulldozer/Dozer	BS 5228-1	81	67	61	57.5	55	53

Table 9-5 outlined the noise emissions from the equipment used for the historical activities and detail the predicted noise levels for the Historic and Unauthorised Development and the relevant LAeq values at the reference distances. The nearest noise sensitive locations to Unauthorised Development is located approximately 62m from the extraction area. As is evident from Table 9-5, the predicted noise levels at 50m exceed the recommended daytime noise level of 55dB(A) for all plant items except the generator. A qualitative noise assessment was carried out as part of the original Environmental Impact Statement (EIS), and this predicted that there would be no adverse noise impacts (*EssGee Consultants*, 2004). No noise complaints were made throughout the duration of the operations undertaken at the Site to date.

It is important to recognise that the sound intensity from a point source will obey the inverse square law if there are no reflections or reverberation. If there are barriers between the source and the point of measurement, you are likely to get less than what the inverse square law predicts. It is noted that there are a number of treelines and hedgerows along the boundaries of the Site and on the intervening lands between the Site and the closest NSLs. Therefore, when taking account of local terrain, predicted noise levels at the closest NSLs are expected to have been lower than what is outlined in Table 9-5.It is not expected that actual noise levels did exceed the recommended criteria of 55dB.

[6] National Institute for Occupational Safety & Health

9.5.4 Potential Cumulative Impacts

Cumulative Impacts can be defined as "*impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the project*". Effects which are caused by the interaction of effects, or by associated or off-site projects, are classed as indirect effects. Cumulative effects are often indirect, arising from the cumulation of different effects that are individually minor. Such effects are not caused or controlled by the project developer.

The cumulative effects of noise and vibrations from the Development and other existing developments have been considered, in particular through the generation of nuisance noise. There is an operational sand and gravel quarry located ca. 930m to the west of the Development Site. Section 9.5.3 of this chapter has concluded that noise from facility operations will not cause adverse impacts at nearby sensitive receptors. Therefore, there was no potential for cumulative impacts to arise.

9.5.5 "Do Nothing" Impact

A do-nothing scenario would have resulted in the working sand and gravel quarry ceasing operations in 2012. Noise and vibration levels would not have given rise to any noise nuisance at nearby sensitive receptors as predicted.

9.6 Avoidance, Remedial & Mitigation Measures

In order to control likely noise impacts caused by the proposed external operations, mitigation measures as set below were adopted as much as possible during the site operations:

- Selection of plant with low inherent potential for generating noise.
- Siting of plant as far away from sensitive receptors as permitted by site constraints.
- Avoidance unnecessary revving of engines and switch off plant items when not required.
- Plant, machinery and vehicles were adequately maintained and serviced.
- Proper balancing of plant items with rotating parts occurred.
- Internal routes were well maintained and avoid steep gradients.
- Drop heights for materials were minimised where possible.
- Alternative reversing alarm systems on plant machinery used where possible.
- Limited the hours during which site activities likely to create high levels of noise are permitted.

9.6.1 "Worst Case" Scenario

The worst-case scenario where mitigation measures fail for the Development, it is considered that localised noise would not have caused any noise nuisance to nearby receptors.

9.7 Residual Impacts

No residual impacts were identified.

9.8 Monitoring

Noise monitoring was not required as part of the planning permission granted for the facility.

9.9 Interactions

9.9.1 Population and Human Health

The impact assessment of noise and vibration has concluded that the noise associated with the operation of on-site machinery was intermittent and did not create any major negative impacts beyond the Site boundary.

It is noted that specific issues relating to Population and Human Health associated with the Development are set out in Chapter 4 of this EIAR.

9.9.2 Traffic

The Development was predicted to have no significant impact on overall traffic volumes and therefore traffic would not result in any significant increases of noise at sensitive receptors.

9.10 Difficulties Encountered When Compiling

No difficulties were encountered.

9.11 References

BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise.

Department of Environment, Heritage, and Local Government (2004) Quarries and Ancillary Activities: Guidelines for Planning Authorities.

Design Manual for Roads and Bridges Volume 11 Section 3 Part 7 (HD 213/11 – Revision 1) (The Highways Agency et al., 2011);

Environmental Protection Agency (2006) Environmental Management in the Extractive Industry (Non-Scheduled Materials).

Environmental Protection Agency (2016) Guidance Note for Noise (NG4): Licence Applications, Surveys and Assessments in Relation to Scheduled Activities.

Guidelines for the Treatment of Noise & Vibration in National Road Schemes, National Roads Authority, Revision 1, 25th October 2004.

ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures.

ISO 1996-2:2017 Acoustics - Description, measurement and assessment of environmental noise Part 2: Determination of sound pressure levels.

ISO 9613-1:1993 Acoustics - Attenuation of sound during propagation outdoors -- Part 1: Calculation of the absorption of sound by the atmosphere.

ISO 9613-2:1996 Acoustics - Attenuation of sound during propagation outdoors -- Part 2: General method of calculation.

10 LANDSCAPE AND VISUAL ASSESSMENT

10.1 Introduction

This Chapter retrospectively assesses the effects of the the Unauthorised Development requiring substitute consent on the landscape and visual amenities of the area and details the potential direct and indirect effects on landscape fabric, character and quality, and the resulting impact on visual amenity.

The aim of a landscape and visual assessment is to identify the elements of the landscape which make it unique and the extent to which it is possible to alter these landscapes before unacceptable consequences arise. Landscape character represents the individuality of an area based on its particular combination of features and elements. The purpose of this assessment is to evaluate the existing landscape character of the Site and surroundings, to assess the visual impact of the Unauthorised Development and to identify landscape designations and planning policies that may concern the subject Site and its environs.

The assessment has been undertaken in accordance with best practice, legislation and guidance notes. The methodology used is based on the Environmental Protection Agency Documents; The draft *Revised Guidelines on the Information to be contained in Environmental Impact Statements (2015)* and subsequent Advice Notes, and their precursor *The Guidelines on the Information to be contained in Environmental Impact Statements (2002)* and *Advice notes on current practise in the preparation of Environmental Impact Statements (2003).* It is also based on the Department of the Environment, Heritage and Local Governments Document; *Architectural Heritage Protection, Guidelines for Planning Authorities, 2004* and the Landscape Institute and Institute of Environmental Management & Assessment Document *Guidelines for Landscape and Visual Impact Assessment* (2013).

The aforementioned documents recommend baseline studies to describe, classify and appraise the existing landscape and visual properties, focusing on any sensitive receptors in the area which will determine the impact of the Historic and Unauthorised Development. This is established through a collective process of desktop study and onsite survey work. Once the existing conditions are established it allows for the identification of impacts, and a retrospective assessment of their magnitude and significance on the landscape character and visual amenities of the area.

A judgement on the sensitivity of the landscape is made from a combination of the susceptibility of the landscape to development, and therefore change, and the value attached to that landscape. This is determined by way of existing designations, both legislative and non-legislative for scenic beauty, landscape quality, recreational value, significant importance, rarity etc. Visual sensitivity is determined by a combination of judgements about the susceptibility of visual receptors such as dwellings, roads, scenic spots etc. to changes in visual amenity and the value attached to these views. The *Guidelines for Landscape and Visual Impact Assessment* state that the aim is "*to establish the area in which the development will be visible, the different groups of people who may experience views of the development, the places where they will be affected and the nature of the views and visual amenity at those points*".

10.2 Study Methodology

The following documents were reviewed as part of the baseline study:

- The Carlow County Development Plan 2015-2021;
- The Carlow County Development Plan 2009-2015;
- The Heritage Council: Historic Landscape Characterisation in Ireland: Best Practice Guidance 2013;
- Published and unpublished literature and data from relevant national guidelines, studies, surveys and reports; and
- The National Parks and Wildlife Service (NPWS) website, www.npws.ie.

10.2.1 Assessment Criteria

The EPA *"Guidelines on the information to be contained in an environmental impact statement"* gives an indication of the range of environmental topics which may be organised under the heading of landscape i.e., character, context, historical landscapes, views and prospects. These headings can be simplified into "Visual impacts" and "Landscape impact". "Landscape impacts" deal with how the character or "feeling" of the area will be affected while "Visual impacts" describes how and whether the development will be visible and how the appearance of the area will change.

There are four key aspects of any impact;

1. its quality/character
2. its significance/magnitude or intensity
3. its duration
4. its consequence (who will be affected and their sensitivity, can it be avoided mitigated or remedied

Tables 10-1 to 10-2 outline the criteria and terminology used to make the landscape and visual impact evaluations in this report. Table 10-3 – Table 10-5 outlines Visual Sensitivity Criteria and Landscape Magnitude Criteria and Visual Magnitude Criteria, respectively.

Table 10-1: Landscape Sensitivity Criteria

Class	Criteria
High	Landscape characteristics or features with little or no capacity to absorb change without fundamentally altering their present character. Landscape designated for its international or national landscape value. Outstanding example in the area of well cared for landscape or set of features
High-Medium	Landscape characteristics or features with a low capacity to absorb change without fundamentally altering their present character. Landscape designated for regional or county-wide landscape value where the characteristics or qualities that provided the basis for their designation are apparent. Good example in the area of reasonably well cared for landscape with notable landscape features.

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

Table 10-2: Visual Sensitivity Criteria

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

Table 10-3: Landscape Magnitude Criteria

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

Table 10-4: Visual Magnitude Criteria

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

Table 10-5: Categories of Landscape and Visual Significance of Impact

Degree of significance	Description of Landscape	Impact Description of Visual Impact
Major	Substantial alteration to elements /features of the baseline (pre-development) conditions. Notably affect an area of recognised national landscape quality. Substantial alteration to the character, scale or pattern of the landscape.	Major/substantial alteration to elements/features of the baseline(pre-development) conditions. Where the proposed development would cause a very noticeable alteration in the existing view. This would typically occur where the proposed development closes an existing view of a landscape of regional or national importance and the proposed development would dominate the future view.
Moderate-Major	This category is a combination of descriptions of Major listed above and Moderate below. These combinations are discussed within the assessment of each landscape or visual receptor when they occur.	
Moderate	Alteration to elements/features of the baseline conditions. Affects an area of recognised regional landscape quality. Alteration to the character, scale or pattern of the local landscape.	Alteration to one or more elements/features of the baseline conditions such that post development character/attributes of the baseline will be materially changed. This would typically occur where the proposed development closes an existing view of a local landscape, and the proposed development would be prominent in the future view.
Moderate-Minor	This category is a combination of descriptions of Moderate listed above and Minor below. These combinations are discussed within the assessment of each landscape or visual receptor when they occur.	
Minor	A minor shift away from baseline conditions. The Development partially changes the character of the site without compromising the overall existing landscape character area.	A minor shift away from baseline conditions. This occurs where change arising from the alteration would be discernible, but the underlying character / composition / attributes of the baseline condition will be similar to the pre-development. It would also occur where the proposed development newly appears in the view but not as a point of principal focus or where the proposed development is closely located to the viewpoint but seen at an acute angle and at the extremity of the overall view.
Negligible	No or very little change from baseline conditions. Change not material, barely distinguishable or indistinguishable	Where there is no discernible improvement or deterioration in the existing view.
No Impact	The Development would not affect the landscape receptor.	The Development would not affect the view

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

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

The example matrix table below (Table 10-6) is used to summarise the findings from the criteria tables. By combining sensitively (along the top) with predicted magnitude of change (along the side) a predicted impact/ effect is reached. This format is applicable to both landscape impacts and visual impacts.

Table 10-6: Example Matrix

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

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

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

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

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

Development is often viewed as permanent and/or perceived to have a negative impact, it is therefore important to emphasise that change created by development can result in beneficial outcomes, and may also be temporary, short-term or indeed reversible. This assessment also considers and identifies both the 'Type' and 'Duration' of the potential impacts. The following terminology has been used were appropriate.

10.2.2 Type of Visual Impacts

Table 10-7: Type of Visual Impacts

Class	Criteria
Beneficial:	A positive impact which will improve or enhance the landscape character or viewpoint.
Neutral	A neutral impact which will neither enhance nor detract from the landscape character or viewpoint.
Negative	A negative impact which will detract from the existing landscape character or viewpoint.

10.2.3 Duration of Impacts

Table 10-8: Duration of Impacts

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

The intensity of the potential impact of the Historic Development on the landscape and the visual amenity of the area is assessed using the terminology as defined in Table 10-9.

Table 10-9: Criteria for Assessing Impact Magnitude and Extent

Impact Magnitude	Definition
Imperceptible Impact:	An impact capable of measurement but without noticeable consequences
Minor Impact:	An impact which causes noticeable changes in the character of the environment without affecting its sensitivities
Moderate Impact:	An impact that alters the character of the environment in a manner that is consistent with the existing and emerging trends

Impact Magnitude	Definition
Significant Impact:	An impact which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Profound Impact:	An impact which obliterates sensitive characteristics

The duration of the effect (i.e., permanent or temporary, short, medium or long-term) were also taken into account in this assessment and the following duration of impacts apply:

- Temporary Impact - Impact lasting for one year or less.
- Short Term Impact - Impact lasting one to seven years.
- Medium Impact - Impact lasting seven to fifteen years.
- Long Term Impact - Impact lasting fifteen to sixty years.
- Permanent Impact - Impact lasting over sixty years.

The classification of the quality of the impact as described by the EPA is as follows:

- Positive Impact – A change which improves the quality of the environment.
- Neutral Impact – A change which does not affect the quality of the environment.
- Negative Impact – A change which reduces the quality of the environment.

Table 10-10: Viewpoint Distance

Viewpoint Distance	Description
0-2km	It is generally accepted that a development located approximately 2km or less from a viewer would be close enough to allow identification of significant detail. Any positions within this range with open uninterrupted views of a development would generally receive the greatest visual impacts.
2-5km	At this distance, visibility of a development site becomes more general, with viewers in open uninterrupted positions able to identify general form, colour/tone and textural contrast, but losing the more focused detail achievable from closer positions. Impacts at this distance are generally less than those found between 0-2km.
5-10km	Beyond 5km visual prominence quickly diminishes. Certain circumstances/light conditions etc. have potential to allow certain types of development and material finishes to be perceived. The development increasingly becomes part of the general background/distance views. Upwards of 15km distance, developments quickly become minor features within the landscape and considered imperceptible to the average human eye. The impact of the development diminishes as the developments becomes part of the general background/distance views.

These distance categories were overlaid on a computer-generated Zone of Theoretical Visibility (ZTV) taken from a height of 0m above ordnance datum (AoD), towards the centre of the Development (Figure 10-1 below) 0m was chosen as this is the maximum height above ground level.

10.2.4 Zone of Theoretical Visibility

The term Zone of Theoretical Visibility (ZTV) is used to describe the area over which a development can theoretically be seen by using only contour analysis. A ZTV does not take account of localised landform (cuttings/embankments), buildings, vegetation or climatic conditions. True visibility will therefore affect a more restricted area within the ZTV as localised landform, buildings, vegetation or climatic condition will restrict views

The ZTV for this development was processed using a digital terrain model based on United States Geological Survey's Shuttle Radar Topography Mission (SRTM) and GeoNames.org. In order to verify the level of accuracy of this data it was visually cross referenced with Ordnance Survey Ireland (OSI) Discovery Series mapping, 1:50,000 scale and the osi.ie mapping viewer. Long sections were also produced to confirm the ZTV and a desk-based analysis of visibility was carried out to confirm the reliability of the final ZTV. All information was found to correspond.

10.2.5 Potential Receptors

Following the production of the ZTV the following possible receptors of impacts were noted.

10.2.5.1 Dwellings with views orientated towards the development

Dwellings with views orientated towards the development are generally accepted as having a high visual sensitivity. However, as the Historic Development has already been operational, any potential impact as a result of the Historic Development is considered negligible.

Figure 10-1: Site, Viewpoint Distance and Zone of Theoretical Visibility (red hatch)

10.3 The Receiving Environment (Baseline Situation)

The application Site consists of a working sand and gravel quarry in Maplestown, Co. Carlow

The site is 15.21 hectares (ha) in area and contains an area of land which was quarried and infilled outside of the granted planning permission period (4.18 ha) for which substitute consent is being sought.

10.3.1 The Existing Receiving Environment

The application Site is situated in Maplestown, Co. Carlow with access taken from the local road L-8097. The townland of Maplestown is located in the northern part of Co. Carlow bordering Co. Kildare and Co. Wicklow. It is located approximately 5 km northwest of the town of Rathvilly, Co. Carlow, and 4.5 km southwest of Baltinglass, Co. Wicklow. The larger urban centres of Carlow Town, Co. Carlow and Naas, Co. Kildare are situated approximately 15 km and 35 km away, respectively. The quarry is set back ca. 20m from the public road via a private lane and is set within surrounding agricultural lands.

It is bounded to the north by County Road L-3260 and two farmhouses (the home of the Applicant and his mother, respectively), to the east by a small south-flowing stream and agricultural land, to the south by agricultural land and coniferous plantation, and to the west by Fiddan proposed extraction area. The extraction area was open pasturage, with the exception of a single cultivated field toward the site's western boundary.

10.3.2 Historical Receiving Environment

The previously permitted development was accompanied by an Environmental Impact Statement (EIS) at application and appeal stage. Within this EIS, the subject baseline environment was assessed and found:

"*The site is located in the town land of Maplestown Co. Carlow. It measures some 16.76 hectares and comprises an area of undulating lands to the west of an existing farmhouse. It is one big field subdivided only by fences for livestock control purposes. Access to the pit is provided via Kildare county road L-8097 running along the western boundary with the entrance located on that boundary, shown in photo-view 1, Figure 11.1. There is a residential property beyond the east boundary of the pit associated with the existing farm along with a cluster of farm buildings.*

The site is a part of Maplestown stud farm and retains a pastoral character with mature stands of trees located beyond the site boundaries. To the north east of the site is a linear group containing Oak, while on the northern boundary of the pit is a group containing Ash and Spruce, shown in photo-view 2 and 4, Figure 11.1. There are also exotic tree species within the hedgerows along the north west corner boundary such as Sweet Chestnut, Beech and Norway Spruce, photo-view 8, Figure 11.3

The more elevated part of the site is quite open, photo-view 7, Figure 11.2 the only significant hedgerows occur on the lower reaches on the northern and part of the southern boundaries and to the west where the hedgerow runs alongside the county road. The site is predominately agricultural grassland.

Topography across the site varies with the middle portion of the site, rising to a level of between 129.50 – 130.00 m AOD forming a ridgeline running in a east - west direction. The lands slope from the top of this ridgeline towards the site boundary located at levels typically between 119- 120 m AOD .. This ridgeline effectively represents the lands to be excavated. The southern end of the site comprises lower lying land and is enclosed by the ridgeline to the north and a stream to the south.

From the most elevated part of the site there are open panoramic views extending north east to Keadeen Mountain as shown in photo-view 2, figure 11.1. There are also long views east extending across agricultural lands to a local hill in the Rahill area. This is shown on photo-view 6, Figure 11 .2.

The Carlow County Development 2003 is the statutory Development Plan controlling development in the area.

(i) Landscape Zones

Carlow County Council has not yet carried out a landscape assessment, to identify landscape zones across the county.

(ii) Policy Objectives in Relation to Landscape Zones

It is the policy of the planning authority to protect and enhance landscapes and landscape features of special environmental, archaeological, historic or cultural interest. These include

gardens, parks, demesnes, historic designed landscapes, views and prospects, places and features of natural beauty and/or cultural value.

(iii) Views of Special Amenity Value

The nearest view of Special Amenity Value to the site occurs in county Wicklow 7km to the north west and would not be affected by the proposed development.

(iv) Demense Houses Listed For Preservation

There are no Demense Houses listed for preservation within a 4 Km radius and therefore would not be affected by the proposed development.

(v) Area of Special Amenity

The nearest Area of Special Amenity occurs in Co. Wicklow. The Baltinglass Hills, located 6km to the north west of the site are zoned as an 'Area of Special Amenity'. They are remote from the site and therefore would not be affected by the proposed development."

Figure 10-2: Layout of the Historic Development

Figure 10-3: Layout of the Development

10.4 Characteristics of the Development

The applicant, Mr. Mark Phelan wishes to apply to An Bord Pleanála for Substitute Consent for the currently unauthorised quarry at Maplestown, Co. Carlow.

It is believed that substitute consent will allow for the regularisation of the unauthorised development, allow for future permission to be sought for remediation of the historic quarry. The Unauthorised Development is being retrospectively assessed by means of a remedial Environmental Impact Assessment Report.

10.4.1 Construction Phase

10.4.1.1 Historical

The Historic Development comprised of the development and operation of a sand and gravel pit, including a washing/rinsing plant, a dry screener; 3 no. settlement lagoons, one bunded fuel storage tank, a wheel wash, a weighbridge, areas of stockpiling, landscaping and all other site development works, including the restoration works of the final pit void (extractive area).

The Development for the existing quarry was to excavate between 700,000 tonnes and 900,000tonnes of sand and gravel within approximately 8.0 Ha of the 8.93Ha quarry site at an average rate of 60,000 tonnes per annum up to a maximum of 100,000 tonnes per annum over a period of 10years. Planning was granted for the extraction from 2007 to 2012, there was however unauthorised development at the Site and quarrying continued after 2012. The unauthorised development comprised of the quarrying of an area of 4.18Ha in the central part of the Site that has subsequently been restored.

10.4.1.2 Historical

The operational stage commenced with topsoil stripping, followed by the extraction, processing, and transport of sands and aggregates to delivery points. Restoration, the third and final stage, entailed reinstatement of part of the subject site to agricultural use.

10.4.2 Landscape Character Assessment

A Landscape Character Assessment of the whole of County of Carlow was undertaken as part of the Carlow County Development Plan 2015-2021. This assessment aimed to:

"to heighten awareness of the importance of landscape in all aspects of physical planning, to provide guidance to planners and to others as to how landscape considerations should be dealt with and to indicate specific requirements for Development Plans and for development control".

The Landscape Character Assessment for Carlow groups and maps the landscapes of the County into four major Landscape Character Areas (Figure X), and includes detailed recommendations for their management, protection and conservation. The Landscape Character Areas include:

- *Blackstairs and Mount Leinster Uplands*
- *Central Lowlands*

- *River Slaney/East Rolling Farmland*
- *Killeshin Hills*

Figure 10-4: Landscape Character Areas

The Assessment identifies and gives recognition to specific landscape features (7 no. in total), as follows:

- *Broad River Valley*
- *Narrow River Valley*

- *Built Up Areas*
- *Farmed Lowland*
- *Farmed Ridges*
- *Rolling Rough Grazing*
- *Uplands*

Figure 10-5 details the Landscape Types within County Carlow.

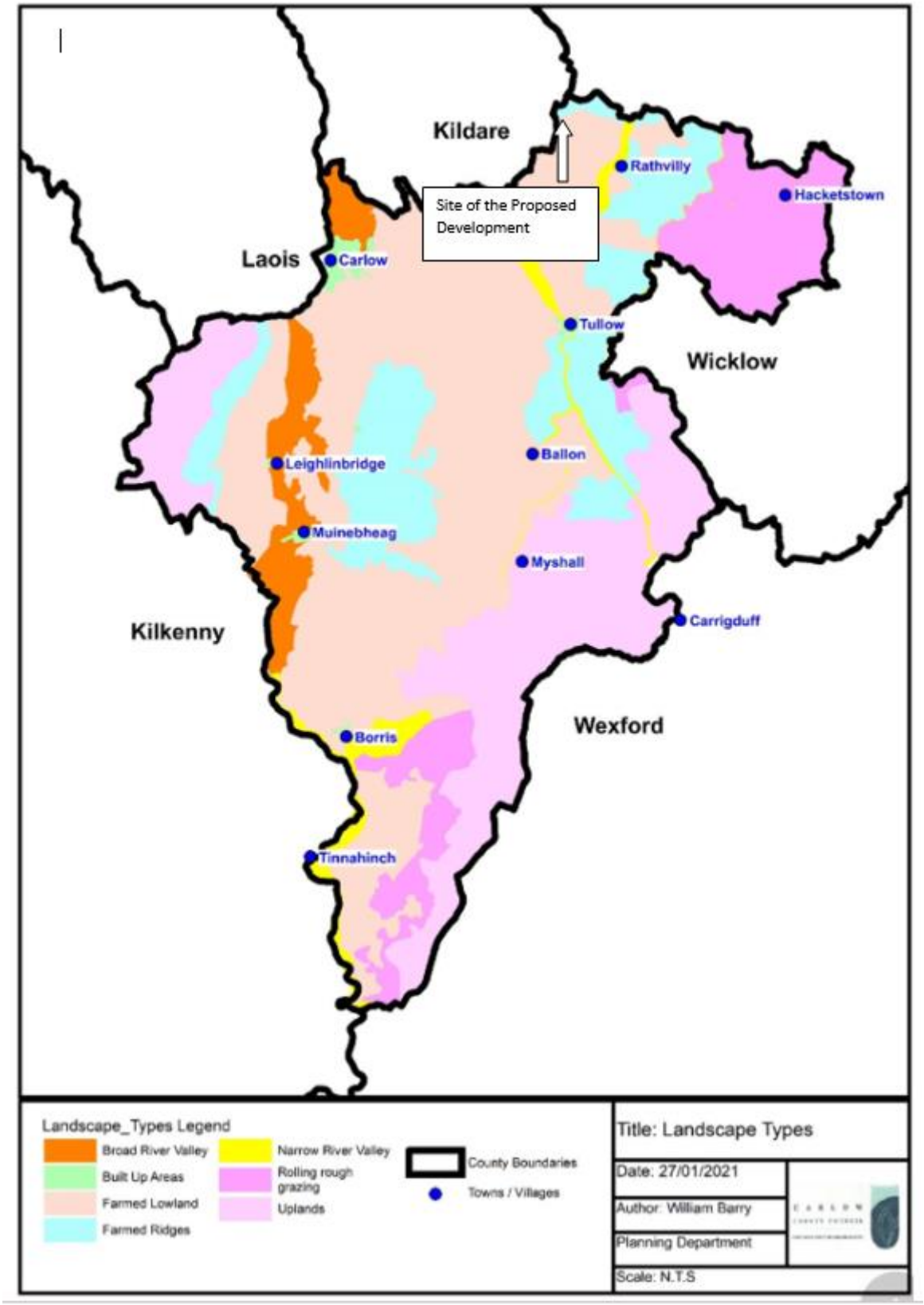


Figure 10-5: Character Types

The Development is located in an area known as 'Central Lowlands'. The central lowlands landscape character area occupies a substantial portion of the County and includes the

County's major settlements. The landscape is primarily rural, with medium to quite large fields defined by well maintained and generally low hedges and occasional to frequent hedgerow trees. Since the 1950s, field enlargement has taken place to accommodate larger farm machinery and has involved the removal of hedges and trees. A dense network of local roads traverses the area, as well as the M9 and the N80.

The Central lowlands has capacity to absorb most types of development subject to the implementation of appropriate mitigation measures. The area encompasses river valleys and ridges that are, however, more sensitive to development than other locations within the area. These include the Barrow, Slaney and Douglas River Valleys.

The Central Lowlands contain the following Landscape Types: broad and narrow river valleys, farmed lowlands and farmed ridges.

A landscape sensitivity map (Figure 10-6 below) and sensitivity rating was also prepared for the County Landscape Character Assessment. Landscape sensitivity is a way of measuring the ability of the landscape to accommodate change or intervention without suffering unacceptable loss of character or value. In addition to landscape sensitivity mapping and ratings, the County LCA also incorporates a land use capacity matrix. The matrix provides a breakdown of the capacity of the four main Landscape Character Areas to accommodate different land uses. According to the sensitivity map, the Site of the Unauthorised Development lies on land designated a sensitivity value of 4. According to the Land Use Capacity Matrix, the Unauthorised Development lies on land that has a 'Moderate' capacity to accommodate 'Extractive Industry'.

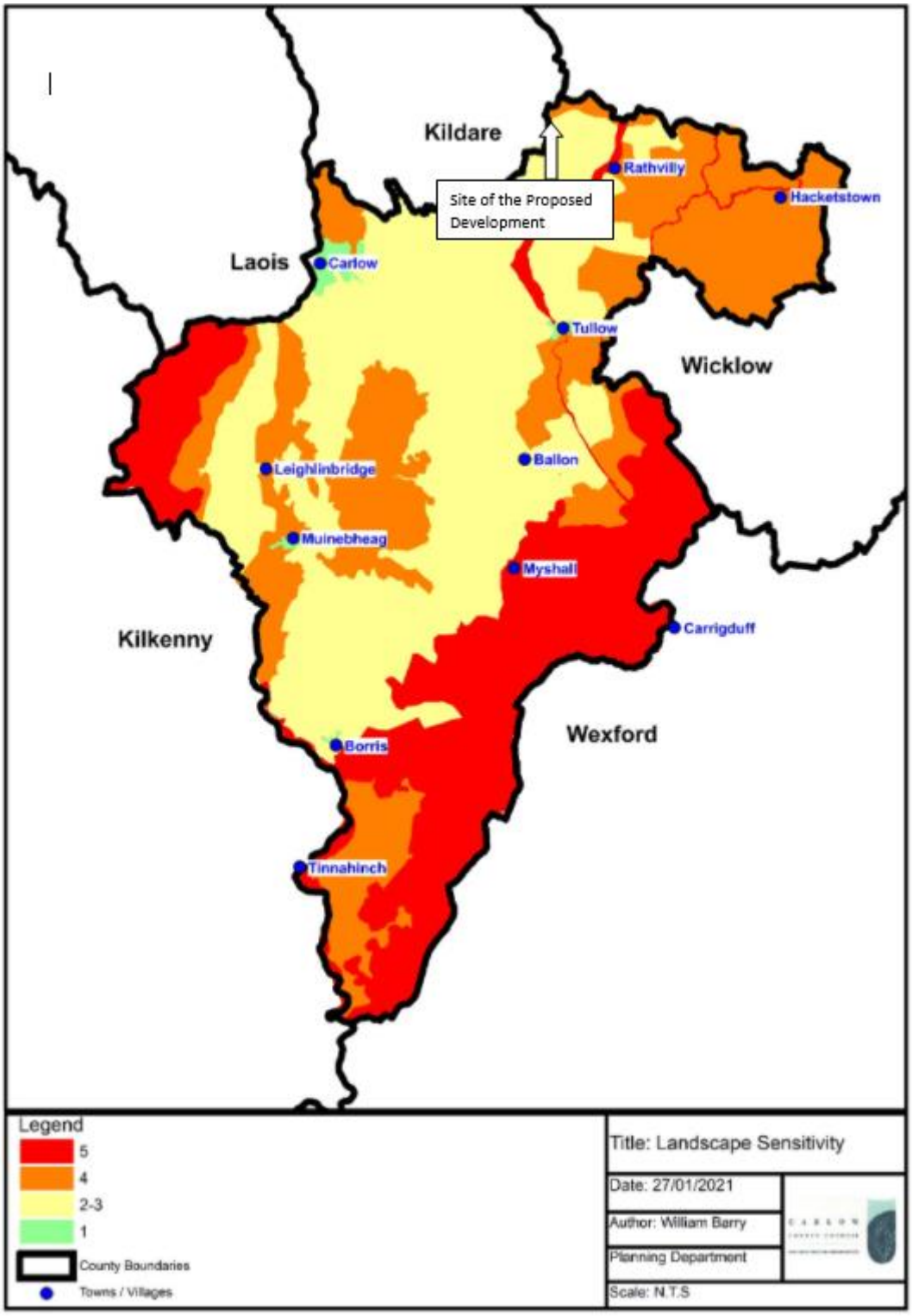


Figure 10-6: Landscape Sensitivity Map

It is not predicted that the Historic Development will negatively impact The Central Lowlands Area retrospectively, , as the Site is set back from the road and surrounded by hedgerows. Linear sections of hedgerow are located across the site, all of which occur along site boundaries. The largest section of hedgerows runs along the western boundary. On the northern and southern boundaries hedgerows occur beneath mature Ash and Beech treelines and consist mostly of Hawthorn. In addition, the eastern site boundary is composed of an immature hedgerow composed mostly on small hawthorn plants and transitions into a Bracken (*Pteridium spp*) bank moving south towards the southern boundary. In addition to this, Mature treelines occur along the northern and southern site boundaries. The treelines along the northern site boundary are mainly composed of Ash trees (Fraxinus spp), trees with smaller sections of Beech trees (Fagus spp), particularly on the north western boundary.

The Unauthorised Development has respected the natural amenity and character of the area. It has not impacted any listed views / prospects or scenic routes, due to the location of the development and the distance from the Site to key vantage points (see Figure 10-7 Views and Prospects and Figure 10-8 Scenic Routes below). The Unauthorised Development (including the area requiring substitute consent) is in line with the surrounding landscape, in addition to maintaining the favourable conservation status of existing natural habitats within or surrounding the Site. Further details on biodiversity protection measures are available in Chapter 5 of this rEIAR.

The Unauthorised Development is in line with Carlow's current Landscape and Views and Prospects Objectives (LA. P1 – LA.P10, and LA.O1- LA.O2). It is also in line with Carlow County Council's Green Infrastructure Policies.

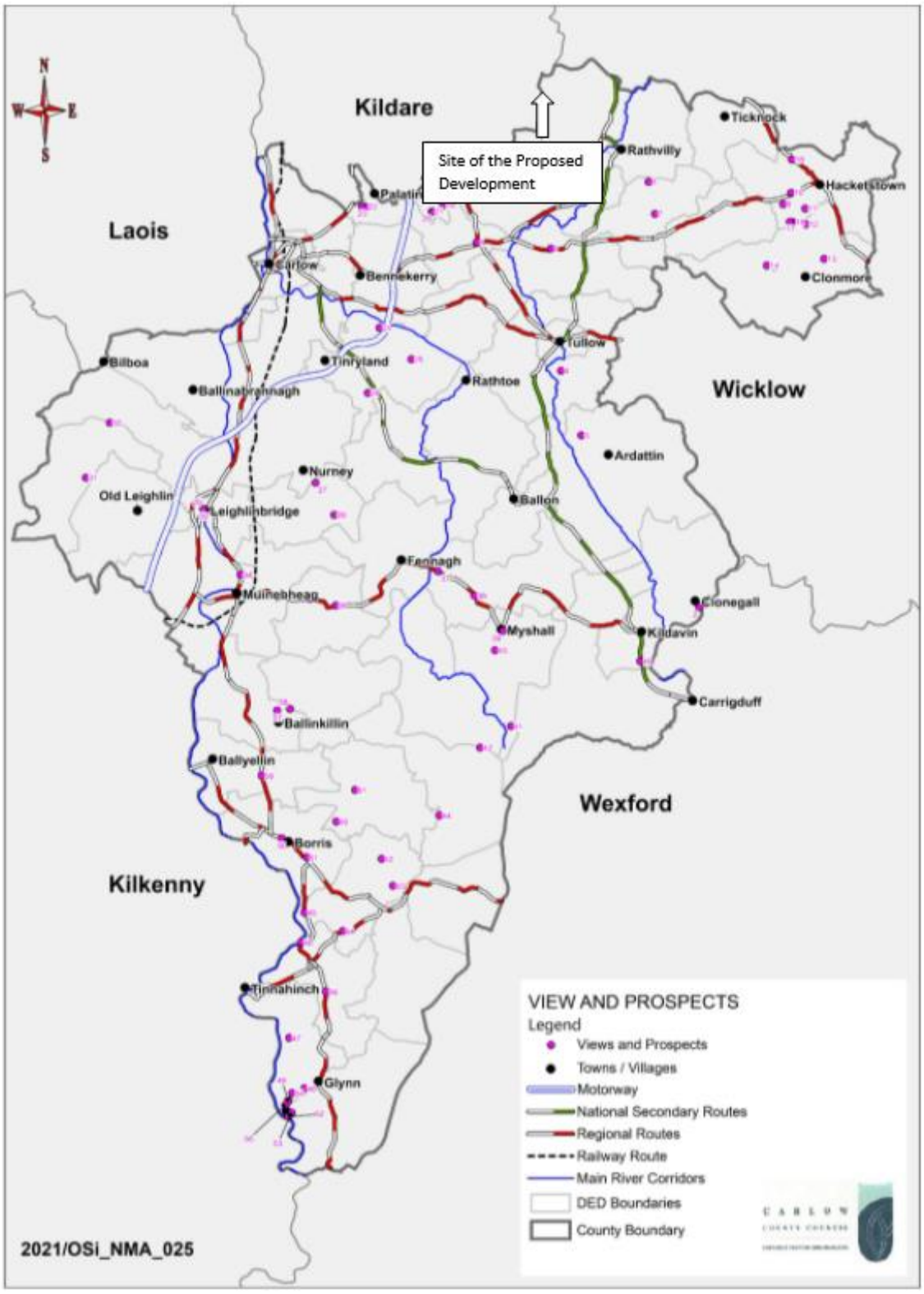


Figure 10-7: Views and Prospects Map

10.4.3 Scenic Routes and Viewpoints

Scenic routes and protected views can be considered views of importance and value within the County. There are no designated scenic routes or protected views located within the vicinity of the Site or within the wider vicinity of the Unauthorised Development.

10.5 Potential Impact of the Development

The historic unauthorised development took place since 2012 when unauthorised extraction and infill activities occurred at the site. This chapter will retrospectively assess the impact of unauthorised extraction and infill activities which took place during this period.

10.5.1 Landscape Impact

10.5.1.1 Historic extraction and infill (since 2012)

The proposed area of extraction occupied an inverted L-shaped area measuring approximately 454 m east to west by 355m and 255 m north to south at its maximum and minimum respectively. The subject site comprised agricultural grassland bounded to the West by the Kildare County access, L-8097; to the East by a fence and a farmhouse occupied by the Landowner and agricultural land; to the South by small west-flowing stream fences and agricultural land and to the North by fences, agricultural land and thin hedgerows. The high ground at the centre of the extraction area slopes steeply to the North and to the South toward a low-lying area of boggy ground, which is occupied by mature coniferous copse.

The historic development did not require the construction of permanent buildings. Instead, construction at the site was limited to the importation infrastructure such as washing/rinsing plant, a dry screener, one bunded fuel storage tank, a wheel wash, a weighbridge, Portacabin, chemical toilet, portable generator and water supply.

There will have been a ‘minor’ degree of impact on the landscape character of the development requiring substitute consent.

It is concluded that the development requiring substitute consent will, therefore, have had a minor impact on the landscape character of the Site.

10.5.2 Visual Impact

10.5.2.1 Historic extraction and infill (since 2012)

The development requiring substitute consent will have resulted in a ‘minor’ ‘medium-term’ visual impact.

An assessment was carried out and identified 7 key viewpoints at locations with public access established through a combination of contour examination on Ordnance Survey maps and site survey to assess local topography and built or vegetation cover. These viewpoints are important in determining the indicative and current visibility of the Site from these key points and the likely visual receptors. Once evaluated and classified, it allows a level of importance to be attached and against this the predicted changes can be assessed. Viewpoints were selected based on the following criteria:

- Locations where there are either significant views (e.g., elevated areas) or areas likely to have extensive views given scenarios such as no vegetation cover;
- Locations where there are likely to be a significant number of visual receptors (e.g., main roads or open space areas); and
- Locations where there are likely to be sensitive receptors (e.g., recreational areas).

The selected viewpoints for the Development are depicted in Figure 10-8.

Figure 10-8: Visual Reference Points

There are no protected views within this area that could be affected by the Unauthorised Development.

Photographs determining the existing visual amenity at the selected viewpoint locations are presented below. Photographs and the corresponding description depict the viewer types at each viewpoint and the nature of existing views.

The entrance to the site is taken from the local road L-8097. There are residential dwellings located sporadically along local unnamed roads that run adjacent to the west and east of the Site of the Unauthorised Development. There are some 8 dwellings (including the landowner), a school and a hall within ¼ km of the site boundary. The 2 dwellings nearest to the proposed extraction area are each approximately 38 m from the western boundary of the site and 62m of the proposed extraction area. The next nearest dwellings are 24 m and 36 m from the site boundary and 96 m and 185 m from the proposed extraction area respectively. The landowner's house is 91 m from the site boundary and 101 m from the proposed extraction area. All other dwellings are in excess of 220 m from the site boundary. The School and the Hall are 209 m and 225 m from the site boundary and 281 m and 287 m from the proposed extraction area respectively.

Visual Reference Point 1

Figure 10-9: Visual Reference Point 1 (source: https://www.google.ie/maps)

This viewpoint is along an unnamed road located west from the Site. Due to the presence of hedgerows and tree, there has been no impact on any receptors as a result of the Unauthorised Development works, either historically or at present.

Coordinates: 52.91079, -6.74676 Direction facing: E Impact: **Neutral**

Visual Reference Point 2

Figure 10-10: Visual Reference Point 2 (source: https://www.google.ie/maps)

This a view facing southwest from the subject Site. There is a hedgerow and trees along the roadside, with limited views of the Unauthorised Development. The subject Site is partially visible from the point through a small gap in the trees.

Coordinates: 52.90730, -6.74875 Direction facing: NE Impact: ***Neutral***

Visual Reference Point 3

Figure 10-11: Visual Reference Point 3 (source: https://www.google.ie/maps)

This view depicts the subject Site when viewed from the southwest of the Site. A number of agricultural fields are located in the intervening distance between this viewpoint and the Site of the Unauthorised Development, which is not visible from this location.

Coordinates: 52.90605, -6.75042 Direction facing: N Impact: ***Neutral***

Visual Reference Point 4

Figure 10-12: Visual Reference Point 4 (source: https://www.google.ie/maps)

This a view located south from the subject Site, located along a local unnamed road. A number of agricultural fields and hedgerows are visible from this point. The Unauthorised Development is not visible from this point.

Coordinates: 52.90552, -6.74411 Direction facing: N Impact: ***Neutral***

Visual Reference Point 5

Figure 10-13: Visual Reference Point 5 (source: https://www.google.ie/maps)

This a view located south from the subject Site, along a local unnamed road. Agricultural fields are visible when facing north to the Unauthorised Development. The Unauthorised Development is not visible from this point.

Coordinates: 52.90581, -6.74061 Direction facing: N Impact: ***Neutral***

Visual Reference Point 6

Figure 10-14: Visual Reference Point 6 (source: https://www.google.ie/maps)

This view depicts the subject Site when viewed from the northeast of the Site. The Unauthorised Development is not visible from this location due to the distance, as well as the undulating land between this point and the Site.

Coordinates: 52.90853, -6.73234 Direction facing: SW Impact: ***Neutral***

The potential visual impacts of the Historic Development were assessed by the examination of specific views to and from the Site of the Unauthorised Development. Overall, it is considered that the Historic Development will have an 'imperceptible' visual impact on nearby sensitive receptors.

10.5.3 Potential Cumulative Impacts

In the context of landscape and visual impact and given the agricultural nature of the location of the Unauthorised Development and its surrounding environment, no cumulative effects were identified from the introduction of the Historic Development.

10.5.4 "Do Nothing" Impact

Should the Proposed extraction works not have been undertaken, the area of improved agricultural grassland would not be impacted and would remain in agricultural use.

10.6 Avoidance, Remedial & Mitigation Measures

As the landscape and visual impacts of the Unauthorised Development did not cause any significant long-term negative impacts on the surrounding landscape or visual amenities, it is not foreseen that any avoidance, remedial or mitigation measures will be required for the Unauthorised Development.

10.6.1 "Worst Case" Scenario

The "worst case" scenario has been assessed in the rEIAR.

10.7 Residual Impacts

Residual Impacts are defined as '*effects that are predicted to remain after all assessments and mitigation measures'*. They are the remaining '*environmental costs'* of a project and are the final or intended effects of a development after mitigation measures have been applied to avoid or reduce adverse impacts. No negative residual impacts in the context of landscape and visual impact we identified regarding this Unauthorised Development.

10.8 Monitoring

No specific monitoring measures were required in relation to landscape and visual assessment for the Unauthorised Development during the Operation Phase.

10.9 Interactions

Interactions between Landscape and Visual Impact and other aspects of this Environmental Impact Assessment Report have been considered and are detailed below.

10.9.1 Population and Human Health

It is not considered that the Development by virtue of its visual appearance, caused any issues for the residential local population.

10.9.2 Biodiversity (Flora and Fauna)

It is not considered that the Development had a negative impact on the biodiversity of the local area.

10.9.3 Archaeology and Cultural Heritage

As there are no known archaeological, architectural or cultural heritage remains found during the desk top survey, it is not predicted that any changes in landscape or visual impact will affect in any way the archaeology and cultural heritage of the area. This is discussed further in Chapter 11 of this rEIAR.

10.10 Difficulties Encountered When Compiling

No difficulties were encountered in the preparation of this chapter.

10.11 References

EPA Maps, website, https://gis.epa.ie/EPAMaps/

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

Historic Landscape Characterisation in Ireland: Best Practice Guidance 2013 - The Heritage Council.

Carlow County Development Plan 2016-2021

Revised Guidelines (Draft) on the Information to be contained in Environmental Impact Statements (2015) Environmental Protection Agency.

The National Parks and Wildlife Service (NPWS) website, www.npws.ie.

11 ARCHAEOLOGY AND CULTURAL HERITAGE

11.1 Introduction

This chapter of the (remedial)Environmental Impact Assessment Report describes and assesses the potential effects of the Existing and Unauthorised Development, located at Maplestown, County Carlow, and was prepared by Laura Griffin, Environmental Consultant with Enviroguide Consulting.

The Site currently consists of an existing sand and gravel quarry. This was extended beyond the permitted timeframe and therefore Substitute Consent is required. This (r)EIAR assesses the following:

- Application to An Bord Pleanála for Substitute Consent for the currently unauthorised use of the quarry at Maplestown, Co. Carlow over and above what was permitted by Planning Reference PL01.221741.

The aim of this Chapter will retrospectively assess the Archaeological, Architectural and Cultural Heritage impacts of unauthorised extraction activities which took place since 2012.

The assessment comprised a paper survey and cartographic research. The sources used were the Record of Monument and Places (RMP), Department of Culture, Heritage and the Gaeltacht (DoCHG), the National Museum of Ireland topographical files, the county Development plans and various literature resources.

The RMP is comprised of manuals listing all known archaeological sites and monuments in each county with accompanying maps locating these sites and additional information from archaeological excavations and assessment records in the intervening period. All sites included in the RMP are protected under the National Monuments Acts (1930-2004). The record is continually updated with information from the results of on-going research and excavation, as new sites are discovered. The types of Recorded National Monuments, both within the study area and in the immediate vicinity, have served to inform the author in the development of a hypothesis as to the potential sub-surface archaeology within the study area. This is backed up by the results of previous archaeological excavations and investigations both within and without the study area published in excavation summary reports for each year (www.excavations.ie).

The National Museum maintains a register of finds of archaeological objects from each townland in the twenty-six counties of the Republic of Ireland. Detailed records are held for each find, many of which are regarded as ‘stray finds’ having been recovered by farmers in the course of ploughing or other such activities and received to the museum in accordance with national monuments legislation. The records contain information such as type and location of find, correspondence between the museum and the finder, and, where applicable, results of excavations carried out by museum staff at the location of the finds.

The Carlow County Development Plan (2015-2021) has a list of protected structures which has established the preservation of these structures including their settings. The Record of Protected Structures was established under the Local Government (Planning and Development) Act 2000 and comprises a listing of structures of architectural, historical, archaeological, artistic, cultural, scientific, social, or technical interest, along with

accompanying maps. It also safeguards the protected structures along with their curtilage against any development without the express permission of the Minister for the Department of Arts Heritage and the Gaeltacht.

A number of literary sources and Cartographic maps were also consulted. Literary sources are a valuable means of completing the written archaeological record of an area and gaining insight into the history of the environs of the proposed works. The principal sources consulted are listed in the bibliography at the end of this chapter. Cartographic maps consulted were the OS 6-inch first edition mapping (1837-1842), 25-inch mapping series (1889-1913) and third edition (1909) for Co. Carlow.

11.2 Study Methodology

11.2.1 Guidance and Legislation

The following legislation and guidance documents were consulted as part of this assessment. This legislation makes up the main legal mechanisms by which Archaeological, Architectural and Cultural Heritage resources are protected in Ireland.

- National Monuments Act, 1930-2014;
- Heritage Act, 1995;
- Architectural Heritage and Historic Properties Act, 1999;
- Local Government (Planning and Development) Act, 2000
- The Planning and Development (Strategic Infrastructure) Act, 2006;
- EPA 'Advice Notes for preparing Environmental Impact Statements' (Draft 2015);
- EPA ‘Guidelines on the Information to be Contained in Environmental Impact Statements’ (EPA, 2002);
- Frameworks and Principles for the Protection of the Archaeological Heritage, 1999, (formerly) Department of Arts, Heritage, Gaeltacht, and Islands.
- Architectural Heritage Protection: Guidelines for Planning Authorities, 2011, (formerly) Department of Arts, Heritage, and the Gaeltacht.

The assessment contained in this chapter has involved a desktop study / paper survey which considered all available archaeological, architectural, historical, and cartographic sources. This information was used in order to assess any potential impact on the receiving environment and to identify measures to ensure the conservation of any monuments or features.

11.2.2 Desk Study

The original Environmental Impact Statement completed in 2004 by EssGee Consultants for the original quarry development was also reviewed and assessed as part of the desk-based study, as well as the following archaeological, historical and cartographic sources were examined as part of the paper study:

Records of Monuments and Places (RMP) is a list of monuments recorded under Section 12 (1) of the National Monuments (Amendment) Act 1994.

Sites and Monuments Record (SMR) is a national baseline database of known archaeological sites and monuments in Ireland.

Topographical Files of the National Museum of Ireland is an archive containing records of all finds logged by the National Museum.

Aerial Photographs provide an important archaeological resource in terms of detecting new sites and identifying the exact location and extent of known sites. These features can be identified through surface anomalies such as earthworks or distinct vegetation marks.

Excavations Bulletin is an annual publication, started in 1970, which summarises all archaeological excavations carried out in Ireland each year (www.excavations.ie).

The National Inventory of Architectural Heritage is a comprehensive database of structures relating to the architectural heritage of Ireland.

Carlow County Development Plan contains a list of Architectural Conservation Areas and recorded Protected Structures for County Carlow.

Cartographic Sources are important in providing topographical information on areas of archaeological potential as well as tracing land use development within the Development area.

11.3 The Existing and Receiving Environment

The subject site is located in the northern part of County Carlow in the townland of Maplestown. The Site is on the border with counties Kildare and Wicklow and is approximately 4.5km south west of Baltinglass, 2.6km north east of the village of Kiltegan and 6km east of the town of Castledermot. The overall site size is approximately 15.21 ha and currently consists of an unauthorised sand and gravel quarry and surrounding agricultural lands.

Archaeological and historical sources were investigated as part of the EIS which was compiled for the existing quarry (*EssGee Consultants, August 2004*) and this investigation found that no recorded archaeological monuments were present within the Site; as a result of this, it was predicted that the unauthorised development would not have an impact on the Archaeology and Cultural Heritage of the area. No archaeological records were found during activities at the Site; therefore, the outcome was as predicted as the unauthorised quarrying had no impact on the Archaeology and Cultural Heritage of the area.

Ringforts and enclosures are undoubtedly the most common field monuments within the Irish landscape and there are no. 3 ringforts and no. 6 enclosures located within a 2km radius of the Unauthorised Development. A ringfort is a space surrounded by an earthen bank formed by material thrown up from a fosse or ditch located immediately outside the earthen bank. Generally, ringforts vary in size from 25–50 metres in diameter and are usually circular in plan but can also be oval or D-shaped. Figure 11-1 below indicates the location of the site in relation to archaeological monuments and architectural features.

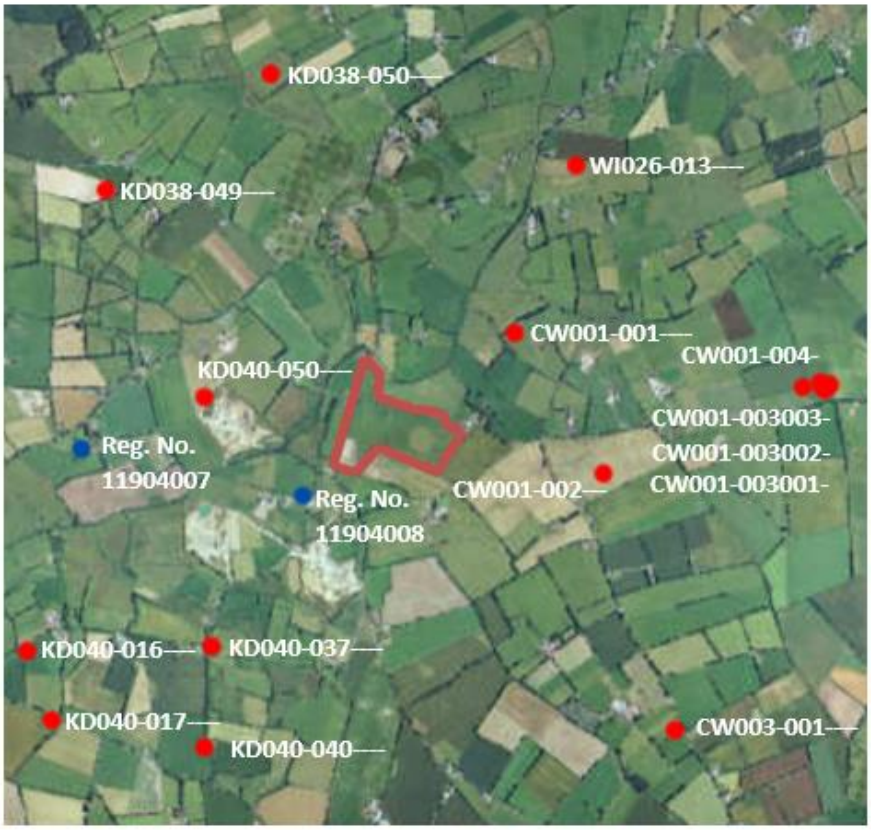


Figure 11-1: Location of the area applying for Substitute Consent and the area applying for Consent in relation to archaeological monuments and architectural features (red and blue dots)

11.4 Characteristics of the Unauthorised Development

11.4.1 RMP files (Record of Monuments and Places) close to the study area

Within a 2km radius of the overall Site there are fifteen recorded archaeological monuments. The monuments are listed below, and identified by townland, RMP number, site type, site status and distance of the site for the Unauthorised Development. The RMP reference consists of a three-letter county code, the relevant number of the Ordnance Survey six-inch sheet on which the Site is located, and the number of the individual monument. This information is gathered from the online Historic Environment Viewer provided by the Department of Culture, Heritage, and the Gaeltacht. These monuments are discussed below within the context of the historical and archaeological background of the surrounding area. No Recorded Monuments will be affected by the proposed development plans.

RMP No. KD040-050----

Townland Broadstown

Site Type Enclosure

Description Visible on GSI aerial photos. S 56, 55 as a possible circular enclosure, but not recorded on the OS 6-inch maps.

Distance This RMP site is located 0.8km east of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

RMP No. CW001-001----

Townland Maplestown

Site Type Enclosure

Description The following description is derived from the published 'Archaeological Inventory of County Carlow' (Dublin: Stationery Office, 1993). In certain instances, the entries have been revised and updated in the light of recent research.

Date of upload/revision: 17 July 2007

Shown on 1908 'OS 6-inch' map as oval rise (indicated by 400 ft contour) enclosed by bank (dims. c. 70m NW-SE, 60m NE-SW). Bank ploughed out c. 30 years ago. Appears to be a small drumlin-like gravel mound.

Distance This RMP site is located 0.6km north of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

RMP No. CW001-002----

Townland Garrettstown

Site Type Ringfort – rath

Description The following description is derived from the published 'Archaeological Inventory of County Carlow' (Dublin: Stationery Office, 1993). In certain instances, the entries have been revised and updated in the light of recent research.

Date of upload/revision: 17 July 2007

D-shaped area (diam. c. 23m N-S) enclosed by earthen bank (H 2m), now very eroded. Entrance in straight side at NE. No visible surface traces of fosse shown on 1908 'OS 6-inch' map from S to W. Interior used as dump for granite boulders.

Distance This RMP site is located 0.8km east of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

RMP No. KD040-037----

Townland Ballyraggan

Site Type House – 17th century

Description Shown on the 1837 OS 6-inch map as 'Ballyraggan Ho. (in ruins)' and described by Garner and Craig as probably the remains of a seventeenth century house with a barn (FF 1976, 82). There are extensive foundations and some wall fragments still visible, including dressed limestone and red brick.

Distance This RMP site is located 1.2 southwest of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

RMP No. KD040-017----

Townland Knockfield

Site Type Ringfort – rath

Description Circular area (diam. c. 34m) surrounded by an earthen bank with an entrance at the S. Levelled around 1981. Situated in pasture land. No visible surface traces.

Distance This RMP site is located 1.9km southwest of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

RMP No. KD040-016----

Townland Knockfield

Site Type Enclosure

Description Shown on Taylor's map of County Kildare (1783) as a circular feature. No visible surface traces.

Distance This RMP site is located 2km southwest of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

RMP No. WI026-013----

Townland Irongrange Upper

Site Type Enclosure

Description Cropmark of circular-shaped enclosure (approx. diam. 35m) visible on Google earth aerial imagery.

Distance This RMP site is located 1.5km north of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

RMP No. KD040-040----

Townland Ballyraggan

Site Type Standing stone

Description An irregular block of granite (est. H. c. 1.5m) standing in level pasture land. According to local information, it is known as 'The Rambling Stone'. The stone was removed some years ago.

Distance This RMP site is located 1.7km south of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

RMP No. KD038-049----

Townland Tankardstown

Site Type Children's burial ground

Description Approximately rectangular area (dims. 27m N-S x c. 27m E-W) surrounded by a low earthen bank (Wth. 2.5m; H. 0.5m) which rises at each corner (H. 1m). Surrounded by a fosse which is disturbed at the W side. The original entrance is possibly at the W side. There are traces of a mud cabin visible abutting the bank at the SE. Danaher (1955, no. 329) describes traces of an outer bank at the E, W, and S.

Distance This RMP site is located 1.7km northwest of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

RMP No. KD038-050----

Townland Carrigeen North

Site Type Ringfort – rath

Description Approximately circular area (diam. 43m E-W) surrounded by high, broad bank (H 2m; W2m) with shallow external fosse (max dims. c. 75m E-W x c. 85m N-S). Described in

1955 as having a causeway at the NE (Danaher 1955, no. 325). Entrance at E. Interior rises slightly towards centre. Situated on slight rise in pasture land.

Distance This RMP site is located 1.6km north of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

RMP No. CW001-003003-

Townland Rahill

Site Type Burnt Mound

Description A distinctive dark patch of soil (diam. c. 15m) on a slight rise, c. 20m to the NW of church and graveyard (CW001-003001- and CW001-003002-), was noted during inspection by the National Monuments Service in October 1988.

Distance This RMP site is located 1.9km northeast of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

RMP No. CW001-003001-

Townland Rahill

Site Type Church

Description Located in the N portion of a D-shaped graveyard the present remains consist of the foundation courses of a rectangular structure of granite rubble (max. H 1m) (dims. 20.3m E-W; 8.4m N-S; chancel L 11.2m), aligned E-W, and divided into two roughly equal chambers. To the NE of the graveyard, slag, burnt clay, and some medieval sherds were noted in the ploughsoil. To the NW of graveyard, a distinct circular patch (diam. 15m) of dark soil was noted on a slight rise after ploughing, possibly a fulacht fia (CW001-003003-).

The above description is derived from the published 'Archaeological Inventory of County Carlow' (Dublin: Stationery Office, 1993). In this instance the entry has been revised and updated in the light of recent research.

Distance This RMP site is located 1.9km northeast of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

RMP No. CW001-003002-

Townland Rahill

Site Type Graveyard

Description Shown on the 1839 and 1908 OS '6-inch maps'. The graveyard is depicted as being D-shaped (map dims. c. 37m N-S; c. 49m E-W along straight N side) with a church (CW001-003001-) running E-W forming the N boundary on the 1839 OS 6-inch map though on the 1908 map the church is depicted by a cross and the enclosing element of the graveyard itself forms the N boundary.

Distance This RMP site is located 1.9km northeast of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

RMP No. CW001-004----

Townland Rahill

Site Type Enclosure

Description In tillage. A roughly square enclosure (dims. c. 105m N-S; c. 91m E-W) visible as a cropmark on Google Earth (imagery date 14 July 2018) identified and reported by Simon Dowling. The E side is not clearly visible, only the return from the NE angle southward (L c. 20m). A church (CW001-003001-) and graveyard (CW001-003002-) are located c. 35m to the E.

Distance This RMP site is located 1.9km northeast of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

RMP No. CW003-001----

Townland Garrettstown

Site Type Ringfort - rath

Description The following description is derived from the published 'Archaeological Inventory of County Carlow' (Dublin: Stationery Office, 1993). In certain instances, the entries have been revised and updated in the light of recent research.

Distance This RMP site is located 1.9km southeast of the Site.

Impact This site has not/will not been/be affected by the Historic Development.

11.4.2 Topographical files, National Museum of Ireland (NMI)

There are no topographical files on the overall Site in the National Museum files. The closest recorded topographical files to the Site is a “Stone Lamp” and is located 1.9km east of the Site (0.4km south of the Site)- Name 1981:6.

11.4.3 Cartographic Analysis

11.4.3.1 Historic six-inch Ordinance Survey Map, 1837-1842

The first edition of the six-inch Ordnance Survey map was carried out from 1837-1842. This map shows the overall Site and surrounding areas as a series of agricultural land separated by field boundaries. This similar layout is recorded in all mapping consulted.

See Figure 11-2 OS mapping historic 6’’ First Edition Colour (GEOHIVE).

Figure 11-2: First Edition 6-inch Ordinance Survey Map, 1838-1842 with approximate project site (Red outline)

11.4.4 Carlow County Council Development Plan

The Carlow County Council Development Plan addresses Architectural Conservation Areas, historic areas and Protected Structures, and recognises the statutory protection afforded to all Records of Monuments and Places (RMP) and all archaeological heritage sites under the National Monuments Legislation (1930-2004), and the development plan lists a number of aims and objectives in relation to archaeological and architectural heritage.

11.4.4.1 Architecture

Protection is also recognised to areas of cohesive architectural value and these areas can be classified as Architectural Conservation Areas (ACA), and any works that may have a material effect on the special character of an ACA needs planning permission. An area can be designated an ACA often because it contains a group of historic buildings or has a distinctive street size/plot size that contributes to the distinct character of a town or village. In the Carlow area, there are nine Architectural Conservation Area Locations, as follows:

- Borris
- Montgomery Street
- Dublin Street
- Granby Row
- Brown Street
- Maryborough Street
- College Street

The Historical Unauthorised Development Site does not lie within the vicinity of any of the above designated areas.

11.4.4.2 Protected Structures

A protected structure is a structure or part of a structure that a planning authority considers to be a special interest from an "*architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest*".

In certain circumstances, some archaeological structures may also be considered as architectural heritage, meaning they may therefore appear on both the Record of Monuments and Places (RMP) and the Record of Protected Structures (RPS). These structures are protected by both the National Monuments Acts and the Planning and Development Acts 2000 (as amended).

According to Appendix 8 of the Carlow County Council Development Plan 2015-2021, there are no records of Protected Structures within the Site.

11.4.4.3 Inventory of Architectural Heritage

The National Inventory of Architectural Heritage (NIAH) was reviewed in order to identify any buildings/features of architectural significance within 2km of the Site. The NIAH Registration Number refers to the registration number on the National Inventory of Architectural Heritage building survey of Carlow. The NIAH is a section within the Department of the Arts Heritage and the Gaeltacht, and the work involves identifying and recording the architectural heritage of Ireland from 1700 to present day Ireland. It is important to note that there may be structures in the NIAH survey that are also included in the RPS, however not all of them are. There are two buildings of architectural significance located with 2km of the Site. Information from the National Inventory of Architectural Heritage on this building and its features are given below.

Reg. No. 11904008

Townland: Ballyraggan

Date: 1895 - 1900

Original Use: School

Categories of Special Interest: Architectural, Historical, Social

Description: Detached five-bay double-height national school, dated 1896. Extended, c.1960, comprising single-bay single-storey flat-roofed projecting block to rear to west. Refenestrated, c.1990. Gable-ended roof with slate. Clay ridge tiles. Roughcast chimney stacks. Timber eaves. Replacement aluminium rainwater goods, c.1960. Flat-roof to projecting block. Bitumen felt. Timber eaves. Roughcast walls. Painted. Cut-stone date stone/plaque. Square-headed openings. Stone sills (concrete to projecting block). Replacement uPVC casement windows, c.1990. Red brick piers to door opening with concrete canopy over. Replacement tongue-and-groove timber panelled door, c.1990. Set back from road in own grounds. Tarmacadam yard to site. Rubble stone boundary wall to front. Detached two-bay single-storey flat-roofed shelter, c.1960, to south with open front. Flat-roof with bitumen felt. Rendered walls. Painted. Square-headed openings with cast-concrete pier.

Distance: This is located 0.2km south of the Site.

Impact: This site has not/will not been/be affected by the Historical Development

Reg. No. 11904007

Townland: Graney East

Date: 1800 – 1826

Original Use: Farm house

Categories of Special Interest: Architectural, Artistic, Historical, Social

Description: Detached three-bay two-storey over part raised basement farmhouse, extant 1826, on a rectangular plan; three-bay full-height rear (east) elevation. Occupied, 1901; 1911. Hipped slate roof with clay ridge tiles, paired rendered central chimney stacks having cut-granite stepped capping supporting terracotta pots, and cast-iron rainwater goods on rendered cut-granite eaves retaining cast-iron octagonal or ogee hoppers and downpipes. Part creeper- or ivy-covered rendered, ruled and lined walls on lichen-spotted plinth. Segmental-headed central door opening approached by flight of four lichen-spotted cut-granite steps, cut-granite doorcase with engaged columns between engaged pilasters supporting shallow cornice on entablature, and cut-granite surround framing timber panelled double doors having sidelights below fanlight. Square-headed window openings with cut-granite sills, and concealed dressings framing six-over-six (ground floor) or three-over-six (first floor) timber sash windows. Square-headed window openings to rear (east) elevation with cut-granite sills, and concealed dressings framing six-over-six (ground floor) or three-over-six (first floor) timber sash windows centred on three-over-six timber sash window. Interior including (ground floor): central hall retaining carved timber surrounds to door openings framing timber panelled doors; and carved timber surrounds to door openings to remainder framing timber panelled doors with carved timber surrounds to window openings framing timber panelled shutters. Set in landscaped grounds with cut-granite monolithic piers to perimeter having stringcourses below shallow pyramidal capping supporting tubular steel "farm gate".

Distance: This is located 1.4km west of the Site.

Impact: This site has not/will not been/be affected by the Historica Development.

11.4.5 Potential Cumulative Impacts

In the context of archaeology and cultural heritage impact, no cumulative effects are anticipated from the Development.

11.4.6 "Do Nothing" Impact

A do-nothing scenario would result in the Site remaining as a working sand and gravel quarry and surrounding agricultural lands. If the Historic Development were not to proceed, the existing Site would continue to be present. Archaeological or cultural remains have not been impacted upon, the same as the scenario for the Proposed Operational Phase of the Development.

11.5 Avoidance, Remedial & Mitigation Measures

11.5.1 Operational Phase

Since no known archaeological, architectural or cultural heritage remains were found during the desk top survey and quarrying at the site has not resulted in any additional impacts to the archaeology, architecture or cultural heritage of the area, it is likely that there are no further mitigation measures required for this development.

11.5.2 "Worst Case" Scenario

The worst-case scenario has been assessed in this rEIAR.

11.6 Residual Impacts

No negative residual impacts in the context of archaeology and cultural heritage were identified regarding this Unauthorised Development.

11.7 Monitoring

No monitoring is proposed.

11.8 Interactions

Interactions between Archaeology and Cultural Heritage and other aspects of this remedial Environmental Impact Assessment Report have been considered and are detailed below.

11.8.1 Landscape and Visual:

It is not predicted that any changes in landscape or visual amenities will affect in any way the archaeology and cultural heritage of the area.

11.9 Difficulties Encountered When Compiling

There were no difficulties in compiling the specified information with regard to archaeological, architectural and cultural heritage.

11.10 References

Archaeological Survey Database, available at: http://webgis.archaeology.ie/historicenvironment/.

Department of Arts, Heritage, Gaeltacht and the Islands (1999b). Policy and Guidelines on Archaeological Excavation. Dublin. Government Publications Office.

National Monuments of Ireland database available at: http://webgis.archaeology.ie/historicenvironment/.

National Inventory of Archaeological Heritage, available at: http://www.buildingsofireland.ie/Surveys/Buildings/.

OSI mapping (www.osi.ie)

https://heritagemaps.ie/WebApps/HeritageMaps/index.html.

Carlow County Development Plan 2015 – 2021.

www.excavations.ie.

12 MATERIAL ASSETS: TRAFFIC, WASTE AND UTILITIES

12.1 Traffic

12.1.1 Introduction

Transport Insights has been commissioned by Enviroguide Consulting, on behalf of Mr. Mark Phelan, to prepare a combined Remedial Environmental Impact Assessment Report (rEIAR) Traffic and Transport Chapter in respect of an application to An Bord Pleanála for Substitute Consent for a currently unauthorised quarry at Maplestown, Co. Carlow.

12.1.1.1 Competency of Chapter Authors

The Traffic and Transportation Chapter of the EIAR was prepared by Eoin Munn as Project Director and Gabriela Iha as Project Manager (both of Transport Insights Limited). Details of their experience and qualifications are provided within the following table (Table 12-1).

Table 12-1: Competency of Chapter Authors

Reviewer	**Eoin Munn**
Title	**Associate Director (Project Director)**
Relevant Experience and Qualifications	Experience: Over 10 years' experience working within Transport Planning and Engineering, including project management of a variety of projects from feasibility to detailed design stage. Recent EIAR experience includes undertaking Traffic and Transport Assessments for an anaerobic digestion facility in Co. Meath, an infill development in Co. Wicklow, and a waste treatment facility in Inchicore, Dublin 8. Qualifications: • BSc Transport Operations, Dublin Institute of Technology (2003-2007) • MSc Management Science, University College Dublin (2007-2008)
Professional Membership	• Member, Chartered Institute of Highways and Transportation (MCHIT) • Member, Transport Planning Society (MTPS)
Author	**Gabriela Iha**
Title	**Consultant Transport Planner (Project Manager)**
Relevant Experience and Qualifications	Experience: Over 3 years' experience working within Transport Planning and Engineering, on a variety of public and private sector projects. Recent EIAR experience includes the intensification of use of an existing waste facility at Haggardstown, Dundalk, County Louth, an expansion of a composting facility at Portlaw, Co. Waterford and development of a Borrow Pit at Aughinish Island, Co Limerick. Qualifications: • B.Eng in Civil Engineering, Centro Universitario da FEI, Brazil (2017) • MSc Sustainable Transport and Mobility, TU Dublin (Ongoing)
Professional Membership	• Member, Transport Planning Society (MTPS)

12.1.1.2 Contents

The remainder of the chapter is structured as follows:

- Section 12.1.2 sets out the site's recent planning history;
- Section 12.1.3 outlines the methodology pursued in undertaking the study;
- Section 12.1.4 describes the Development's receiving environment;

- Section 12.1.5 outlines the key traffic and transport related characteristics of the Development;
- Section 12.1.6 outlines potential construction and operational phases' traffic impacts arising from the Development;
- Section 12.1.7 details any avoidance, remedial & mitigation measures;
- Section 12.1.8 addresses any residual impacts;
- Section 12.1.9 addresses any monitoring measures;
- Section 12.1.10 states any interactions between the information presented in this EIAR Chapter and any other areas addressed as part of the EIAR;
- Section 12.1.11 states any difficulties in compiling the information set out within this chapter; and
- Section 12.1.12 provides a list of references.

12.1.2 Recent Site Planning History

An application for planning permission for a sand and gravel pit was submitted to Carlow County Council on 28 September 2006 (Carlow County Council (CCC) Reg. Ref. 06/842). Following consideration of the application including requesting and receiving further information, the application was granted permission following appeal to An Bord Pleanála (ABP) ABP Ref. PL01.221741. ABP granted the development for a 6-year period. The Grant of Permission from CCC stated a 10-year permission date. The discrepancy between the allowable duration of the development between ABP and CCC and associated confusion is understood to have led to this Substitute Consent application.

An Environmental Impact Statement (EIS) was prepared in support of the application to CCC, with a Traffic and Transportation Chapter included within Chapter 8 of the EIS. The EIS was prepared to assess the impacts of the proposed quarry over a 10-year period, with a 2016 Design Year included within the assessment. This EIS Chapter is referred to in the remainder of this combined rEIAR and EIAR report.

12.1.3 Study Methodology

This section of the rEIAR outlines the methodology followed in order to carry out the Traffic and Transport Assessment set out within this Chapter. The approach pursued in undertaking the Assessment has been guided by and is consistent with the national best practice, namely Transport Infrastructure Ireland's (TII's) *Traffic and Transport Assessment Guidelines* (May 2014).

The existing conditions on the surrounding road network were further informed by classified junction turning count surveys undertaken on Thursday 05 August 2021 at the following junctions;

- 3-arm L8097/ Site Access priority-controlled junction; and
- 4-arm L4016/ L8097 staggered priority-controlled junction.

Due to temporary changes in traffic volumes arising as a result of the Covid-19 pandemic, a local TII traffic counter on the N81 to the north of the site was used to grow 2021 traffic to pre-covid levels (i.e., 2019, the most recent representative year for traffic).

The results of the traffic surveys were then used to establish a baseline (adjusted to reflect potential impacts of COVID-19) with which to predict background traffic growth on the local

road network for the Year of Opening (YoO, 2022), Year of Opening+5 (2027) and Year of Opening + 10 years (YoO +15 2032). The YoO+5 and YoO +10 adjusted baseline years establish the Do-Nothing scenario (the scenario in which the Development does not proceed). This will then be followed by the Do Something scenario which applies the potential development traffic to the local road network in the YoO+5 and YoO +10 assessment years.

As this application constitutes a Substitute Consent application supported by a combined rEIAR (this document), the assessment is also informed by the previous EIS Traffic and Transportation Chapter referred to in Section 12.2 above.

A comprehensive list of guidance documents that have informed specific parts of the Assessment are set out in Section 12.1.12 of this EIAR Chapter.

12.1.4 The Existing and Receiving Environment (Baseline Situation)

12.1.4.1 Site Location

The unauthorised development site is located to the east of L8097 at Maplestown, Co. Carlow. The site is currently accessed via a 3-arm priority-controlled junction with L8097 at the western side of the site. The site is bounded by agricultural lands to the north, east and south of the proposed site, and L8097 to the west of the site. The site is located within County Carlow, however, is adjacent to the border with County Kildare (located immediately to the west of the site).

Site location is illustrated in Figure 12-1.

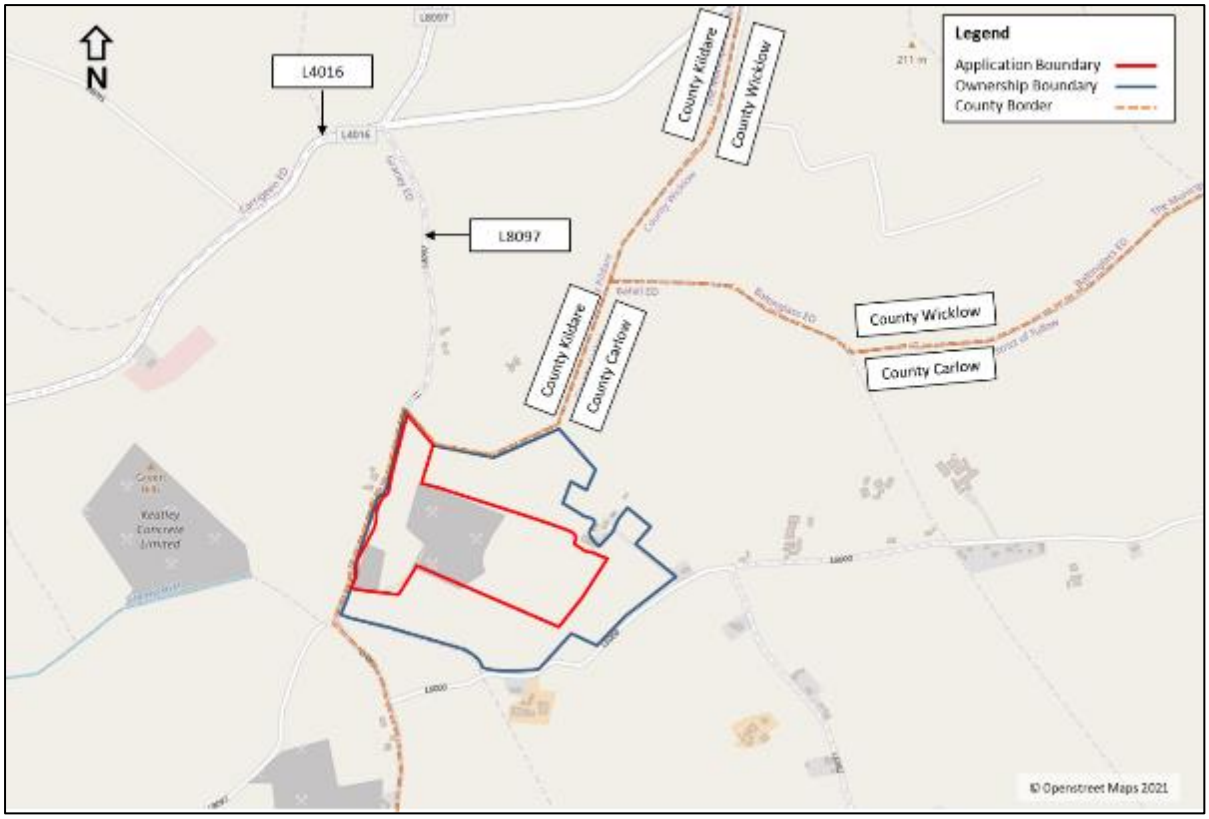


Figure 12-1: Development Site Location

12.1.4.2 Existing Site Access

The site is accessed exclusively via a priority-controlled junction with L8097 to the west of the site. The site access junction measures ca. 8.5-metres wide, with the existing site access gate set-back ca. 22 metres from the road edge. The existing layout is capable of simultaneously accommodating two-way traffic flows.

The site access road is ca. 70 metres in length and connects the L8097 with the remainder of the site. A wheel wash is located along the access road, ca. 35 metres from L8097. The access road is generally straight, with a bend ca. 45 metres from the L8097. The location of this existing site access is illustrated in Figure 12-2 which follows.

Figure 12-2: Existing Site Access

12.1.4.3 Existing Site Layout

The internal site layout is characterised by a series of unpaved internal haul roads, providing access to the various parts of the quarry. Within the site there are a number of set-down areas that connect the internal haul roads, allowing for machinery and vehicles to park if required.

The existing site layout is illustrated in Figure 12-3 which follows.

Figure 12-3: Existing Site Layout

As can be seen from Figure 12-3, the existing site layout features a site access road which provides access to the mobile plant and machinery. An office and toilet are located directly to the east of the weighbridge and a wheelwash is provided for vehicles egressing the site.

Local Road Network

The local road network in the immediate vicinity of the Development site is shown in Figures 12.1 and 12.2. The characteristics, layout and operation of these roads is described further in the following sub-sections.

12.1.4.3.1 L8097

The L8097 is a two-way local road that connects the L4016 to the north, with the L8099 at Ballyraggan, Co. Kildare to the south. In the vicinity of the site access, the L8097's

carriageway is ca. 5.3 metres wide, with numerous changes to the road's horizontal and vertical alignment noted (illustrated in Figure 12.3).

A speed limit of 80 km/ h is in operation on L8097 in the vicinity of the site access, however due to the road's layout and alignment traffic speeds are noted to be substantially lower than the maximum speed limit. As a local rural road, no footpaths or street lighting are present.

Figure 12-4: L8097 (directly outside site access)

12.1.4.3.2 L8097/ Site Access Junction

The site is accessed via an internal access road that intersects with the L8097 and operates as a priority-controlled junction. There are no road markings or signage located at the site access junction.

Figure 12-5: L8097/ Site Access Junction (Northbound and Southbound Visibility)

12.1.4.3.3 L4016

L4016 is a two-way local road that connects L3279 to the east at Irongrange Lower, Co. Wicklow, with L4016 to the west at Colstown, Co. Kildare. L4016's carriageway is ca. 5.5 to 6.0 metres wide and has a varying horizontal alignment along its overall length. A posted speed limit of 80 km/ h is in operation, and no footpaths or street lighting are provided.

12.1.4.3.4 L4016/ L8097 Junction

The 4-arm stop-controlled L4016/ L8097 junction is located ca. 1.4 kilometres to the north of Development site, and all development traffic is noted to pass through this junction.

The pavement surface of all arms at the junction was noted to be in good condition, with the junction layout incorporating suitable turning radii to allow for satisfactory vehicle movements through all arms of the junction.

It should be noted that the EIS Traffic Chapter prepared in support of the previous application for this site indicated that "*road widening, strengthening and sight distance improvement at junction of L-8097 and L-4016*" had recently taken place and supported development at the site.

Figure 12-6: L4016/ L8097 junction (looking northeast on L4016)

12.1.4.4 Road Collision Statistics

Data from the Road Safety Authority (RSA) collision database was used to assess the safety performance characteristics of the local road network. The database contains information on all reported collisions by severity of injury incurred (i.e., fatal, serious or minor) and by year the collision occurred. Figure 12-7 illustrates collisions recorded on the road network in vicinity of the site during the 12-year period from 2005 to 2016 inclusive.

No collisions occurred in the vicinity of the subject site over the 12-year period. Two minor collisions, both involving a single car are recorded as having occurred in 2009 and 2010 on L4016 to the north of the proposed access. No serious or fatal collisions were recorded in the vicinity of the site over the 12-year period.

From the review of historic road safety statistics, it can be inferred that there are no serious historical road safety performance issues on the road network in the vicinity of the subject site.

Furthermore, as road collision statistics date back to 2005 (i.e., prior to establishment of development on site), the collision analysis outlined above satisfies the requirements for the the rEIAR.

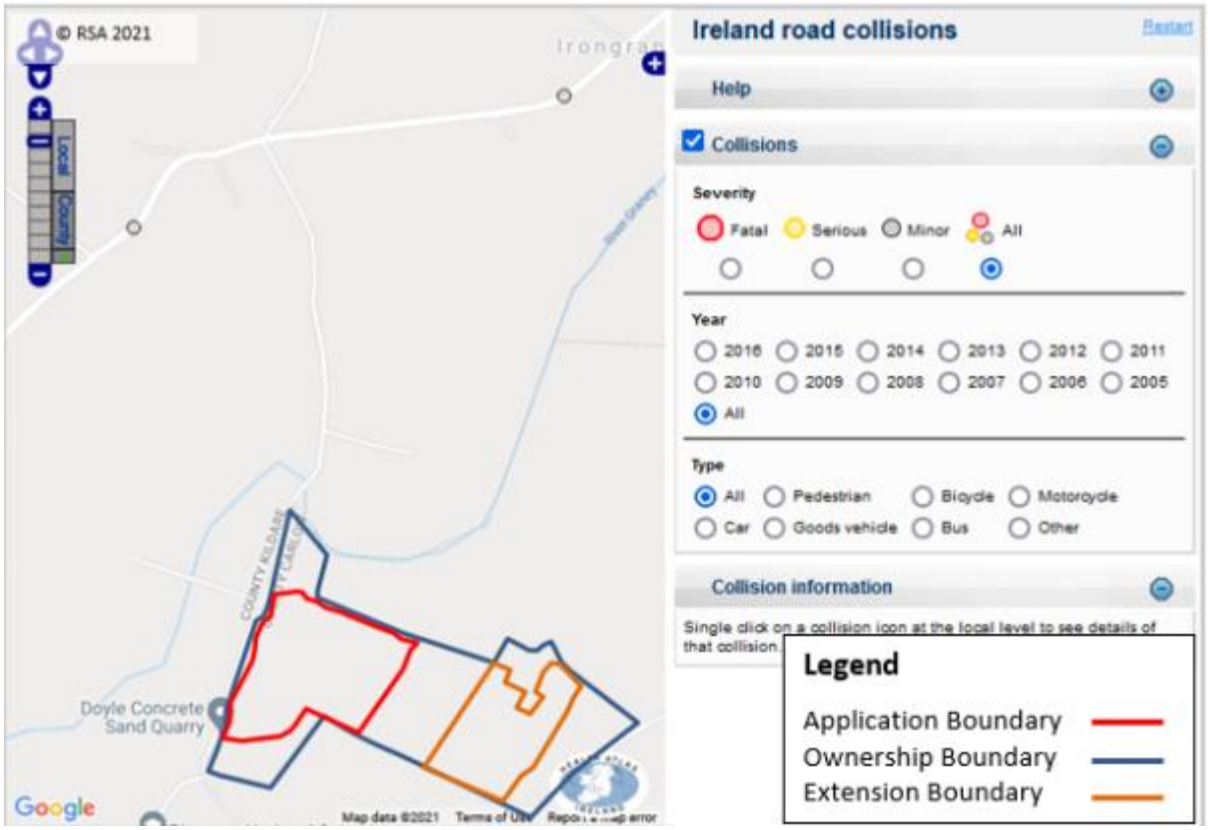


Figure 12-7: Road Collision Data (Source: Road Safety Authority)

12.1.4.5 Existing Traffic Flows

In order to determine baseline traffic conditions on the road network adjacent to the Development site, classified junction turning count surveys were undertaken on Wednesday 05 August 2021 at the following junctions;

- 3-arm L8097/ Site Access; and
- 4-arm L4016/ L8097 staggered junction.

The surveyed junctions are illustrated in Figure 12.7 which follows.

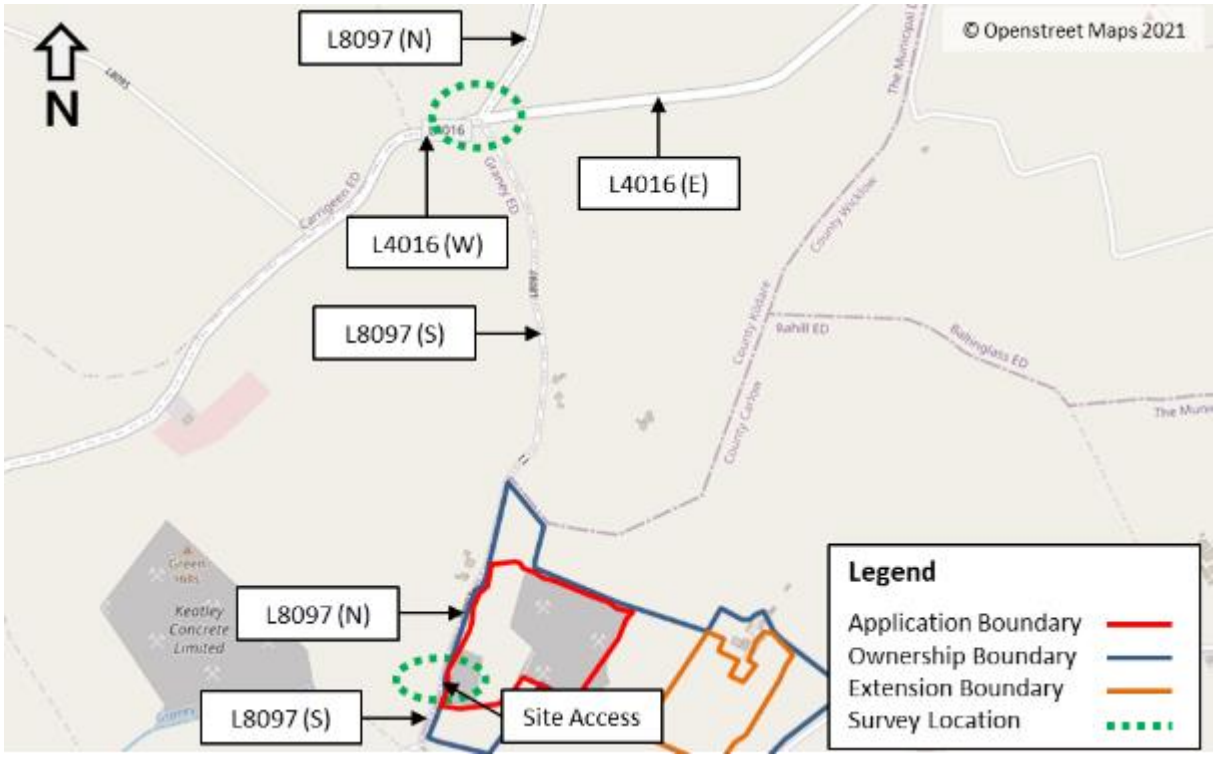


Figure 12-8: Survey Location

A summary of the survey results for the 12-hour survey period are presented in the following Table 12-2 for light vehicle (LV) and heavy vehicle (HV) categories.

Table 12-2: Junction Turning Count Surveys Results Summary (Link Flow)

Link Flows 12-hours (07:00hrs – 18:59hrs)				
Junction	**Link**	**Total (LV)**	**Total (HV)**	**Total**
L8097/ Site Access	L8097 (N)	145	18	163
	Site Access	6	10	16
	L8097 (S)	145	8	153
L4016/ L8097	L8097 (N)	261	18	279
	L4016 (E)	1,624	99	1,723
	L8097 (S)	164	17	181
	L4016 (W)	1,661	116	1,777

The previous EIS Traffic Chapter also made reference to traffic surveys undertaken at the L4016/ L8097 junction (Section 8.3.2 Traffic Surveys), however no date was provided for when the surveys were undertaken (assumed to be during 2004). The survey results appear to indicate a roughly equivalent quantum of traffic at the junction as outlined above.

12.1.4.5.1 Supplementary Traffic Analysis

Due to the ongoing COVID-19 pandemic and restrictions, traffic levels in the area at the time the survey was carried out may not fully reflect typical traffic levels pre-COVID circumstances. To account for the potential of higher traffic volumes, the 2021 survey results were factored upwards based on traffic counts from a permanent Transport Infrastructure Ireland (TII) counter in the area.

Traffic data was obtained from a local TII counter located on the N81 National Secondary Road to the east of the site between Hollywood and Baltinglass, Donard, Co. Wicklow (TMU N81 040.0 N) for the survey date, Thursday 05 August 2021 and the last equivalent date in pre-COVID circumstances (Thursday 08 August 2019).

Based on the traffic analysis information provided in Table 12.2, a COVID factor of 1.217 (i.e., ca. 21.7% more traffic would be envisaged to be on the road at that time of the survey) was applied to the number of vehicles recorded during the survey period. The following Table 12-3 presents the adjusted survey.

Table 12-3: Adjusted Junction Turning Count Surveys Results Summary

Link Flows 12-hours (07:00hrs – 18:59hrs)				
Junction	**Link**	**Total (LV)**	**Total (HV)**	**Total**
L8097/ Site Access	L8097 (N)	176	22	198
	Site Access	7	12	19
	L8097 (S)	176	10	186
L4016/ L8097	L8097 (N)	318	22	340
	L4016 (E)	1,976	120	2,096
	L8097 (S)	200	21	221
	L4016 (W)	2,021	141	2,162

The results of the adjusted traffic approach flows are used to establish a baseline from which to predict future background growth on the local road network (Section 12.5.2.1).

12.1.4.5.2 Annual Average Daily Traffic

In order to further understand the existing traffic flows on the local road network and establish a baseline to assess the traffic impact of the development proposals, it is first necessary to establish future levels of background traffic. The adjusted survey data summarised in preceding sections was expanded in accordance with TII's *Project Appraisal Guidelines for National Roads Unit 16.1 - Expansion Factors for Short Period Traffic Counts - PE-PAG-02039* (October 2016), to derive Annual Average Daily Traffic (AADT) on the local road network.

The following Table 12-4 outlines the expansion factors used in expanding the survey data to AADT using data for the South East (incl. Co. Carlow).

Table 12-4: 24-hour, WADT and AADT factors

Variable	Hour of Day	Day of Week	Month of Year
Data Recorded	12hours (07:00 to 19:00)	Thursday	August
Factor	1.175	0.95 (WADT factor)	0.92 (AADT factor)

Based on the recorded two-way 24-hour traffic flows, weekly average daily traffic (WADT) and AADT have been calculated using the factors in *Table 12-4* above. AADT data for roads in the vicinity of the site are presented in the following Table 12-5.

Table 12-5: AADT Traffic Data

Junction Location	Road Link	AADT		
		Total Vehicles	Of which Heavy Vehicles	% HGV
L8097/ Site Access	L8097 (N)	147	16	11%
	Site Access	14	9	64%
	L8097 (S)	138	7	5%
L4016/ L8097	L8097 (N)	253	16	6%
	L4016 (E)	1,559	89	6%
	L8097 (S)	164	16	10%
	L4016 (W)	1,608	105	7%

The data set out in Table 12-5 above is used in Section 12.1.6 as a baseline in order to assess the impact of the Development under the different prescribed scenarios. Previously undertaken analysis from the EIS is also referenced within Section 12.5 of the rEIAR.

12.1.5 Characteristics of the Development

12.1.5.1 Site Access

As outlined in Section 12.3.2.1 above, the existing access to the subject site is in the form of a priority-controlled junction with L8097. The existing site access arrangements are proposed to be retained as part of the Development. As noted within Section 12.3.2.1, the site access gate is set-back ca. 22.0 metres and in its existing layout is capable of simultaneously accommodating two-way traffic flows.

12.1.5.2 Site Layout

The general site layout is illustrated in Figures 12-9 (area of Substitute Consent) overleaf. The Development served commercial customers only.

Figure 12-9: Proposed Site Layout (Area of Substitute Consent)

Figure 12-10: Proposed Site Layout (Area of Proposed Quarry Extension)

12.1.6 Potential Impact of the Development

12.1.6.1 Construction Phase

There were no construction phase for the unauthorised development therefore there were no construction phase impacts.

12.1.6.2 Operational Phase

The EIS accompanying the original application concluded "*By analysing the traffic flows for the years 2006 and 2016, producing RFC values and queue lengths as shown by the PICADY AM and PM Results (Table 8.4 and 8.5, respectively), it is clear that, while overall the development of a sand and gravel pit will result in an increase in traffic movements on the network, the junctions that are significantly affected will operate well within their capacity.*

In short, this assessment has shown that the volumes of traffic generated by the Development will not have a significant impact on the surrounding road network. Junctions in the study area road network have ample capacity to cater for the development traffic through the lifetime of the operation.

It is not intended to use the county road L-8097 in southerly direction thus avoiding Bigstone School, Community Centre and the associated passenger set down areas and consequently these facilities will not be affected by the development"

In considering the conclusions of the original EIS along with the the accident statistics for the surrounding road infrastructure and the existing condition of the adjoining road infrastructure it is concluded that the unauthorised development did not result in any permanent negative traffic related impacts.

12.1.6.3 Potential Cumulative Impacts

No committed developments have been identified in the vicinity of the subject site which would potentially lead to cumulative impacts arising from the Development.

12.1.7 Avoidance, Remedial & Mitigation Measures

The junction improvement mitigation measures as identified in the original EIS have been completed. No further avoidance, remedial and/or mitigation measures are applicable or required with respect to the unauthorised development.

12.1.7.1 "Worst Case" Scenario

The worst-case scenario in terms of traffic and transportation, is the scenario which operations at the unauthorised development site resulted in deterioration of existing road conditions and/or resulting in an increase in road traffic incidents. The data presented in this chapter demonstrate that the worst-case scenario has not occurred.

12.1.8 Residual Impacts

The predicted residual impact of the Development in terms of traffic and transportation is that there will be a marginal increase in both light vehicles and HGVs on the adjoining road network due to the operation of the Development.

12.1.9 Monitoring

There are no monitoring measures proposed.

12.1.10 Interactions

The analysis contained within this chapter interacts with the Air and Noise Assessments contained within this rEIAR. This is primarily due to the potential for an increased HGV traffic movements on the surrounding road network due to development.

12.1.11 Difficulties Encountered When Compiling

As outlined in the introduction, due to ongoing COVID-19 restrictions, traffic levels in the area were understood to be lower than those that would have been present under pre-COVID circumstances. The results of this traffic survey were then factored up using publicly available survey data for the year 2019 (i.e., pre-COVID) from a local TII counter located on the M50 Motorway. This factoring informed baseline scenarios from which to predict traffic volumes on the local road network for the Development.

12.1.12 References

The rEIAR Traffic and Transport Assessment has been prepared taking into account the following policy, technical guidance documents and statistics:

- The requirements of EU Directives and national legislation (primary and secondary) concerning Environmental Impact Assessment (especially having due regard to the revised provisions of Directive 2014/52/EU);
- EPA (2003) *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*;
- EPA (August 2017) *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*;
- DHPCLG (15/05/17) *Circular Letter PL 1/2017 Implementation of Directive 2014/52/EU on the effects of certain public and private projects on the environment (EIA Directive): Advice on Administrative Provisions in Advance of Transposition*;
- DHPCLG (May 2017) *Transposition of 2014 EIA Directive (2014/52/EU) in the Land Use Planning and EPA Licencing Systems: Key Issues Consultation Paper*;
- Transport Infrastructure Ireland (TII) (2014) *Traffic and Transport Assessment Guidelines*;
- Transport Infrastructure Ireland (TII) *Project Appraisal Guidelines for National Roads Unit 16.1 - Expansion Factors for Short Period Traffic Counts* (October 2016);
- Transport Infrastructure Ireland (TII) *Project Appraisal Guidelines for National Roads Unit 5.3 – Travel Demand Projections* (May 2019);
- Transport Infrastructure Ireland (TII) *Rural Road Link Design Standards* (April 2017); and
- Transport Infrastructure Ireland (TII) *Guidance on Minor Improvements to National Roads (including Erratum No. 1, dated April 2013 and Erratum No. 2, dated June 2013)* (March 2013).
- Road Safety Authority (RSA) *A map of road collisions in Ireland.*

12.2 Waste and Utilities

12.2.1 Defining Material Assets

12.2.1.1 Historic extraction and infill (Permitted and unauthorised, i.e., that requiring substitute consent)

The Environmental Impact Statement (EIS) which was prepared for the Historic Development under the previous planning permission, Reg. Ref. PL01.221741, followed the requirements of Part X of the Planning and Development Act, 2000, Part 10, and Schedules 5, 6 and 7 of the Planning and Development Regulations, 2001. Schedule 6 of the Planning and Development Regulations 2001 established a standard list of areas of the environment that were to be addressed by an EIS at that time. These areas were as follows:

- Human Beings
- Flora
- Fauna
- Soil
- Water
- Air
- Climate
- Landscape
- Archaeological and Cultural Heritage,
- and the inter-relationship between the above factors.

There was no requirement at the time to address Material Assets. Hence, this Chapter will retrospectively assess the impact of the Historic Development on the Material Assets as much as is reasonably practical.

Material Assets have been defined as '*Resources that are valued and that are intrinsic to specific places, they may be either human or natural origin and the value may arise for either economic or cultural reasons*' (EPA 2002).

This definition was further expanded by the EPA in 2017 in *'Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports'* which states;

'The meaning of this factor is less clear than others. In Directive 2011/92/EU it included architectural and archaeological heritage. Directive 2014/52/EU includes those heritage aspects as components of cultural heritage. Material assets can now be taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes roads infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils.'

The scope and definition of Material Assets within the context of the EIA process has been defined by the EIA Directive as including Architectural and Archaeological Heritage or Cultural Heritage. These elements are assessed separately in Chapter 11 under Archaeology & Cultural Heritage.

This Chapter of the r(EIAR) provides an assessment of the potential impacts of the Historic and Unauthorised Development on Material Assets or physical resources in the environment of human origin including built services and infrastructure comprising;

- Local Settlement,
- Built Services & Infrastructure (Electricity, Water, Gas, Telecommunication Supply, Surface/ Storm Water drainage and Foul Water (Sewerage)); and
- Waste Management.

Natural resources (water, land, biodiversity, air etc) are addressed in their respective chapters.

12.2.2 Study Methodology

The methodology adopted for the assessment takes cognisance of the relevant guidelines the following:

- Environmental Protection Agency (EPA) (2017) *Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)* - DRAFT
- EPA (2003) *Advice Notes on Current Practice in the preparation of Environmental Impact Statements*.
- EPA (2002) *Guidelines on the information to be contained in Environmental Impact Statements.*

The scope of work undertaken for the assessment included a desk-based study of Material Assets, namely built services, utilities and infrastructure associated with the existing Site and the Development. All phases of the Unauthorised Development were considered in the assessment of potential impacts on Material Assets.

Information on built assets in the vicinity of the Site was assembled by the following means:

- A desktop review of ESB Networks Utility Maps, Irish Water Utility Plans, Gas Networks Ireland Service plans, EIR E-Maps

Assessment of the likely impact of features of the Unauthorised Development, including surface water runoff, foul water discharge and water usage was carried out in accordance with the following guidelines:

- IS EN752, “Drain and Sewer Systems Outside Buildings”

12.2.3 Prediction and Assessment of Impacts

Impacts were predicted and assess based on EPA guidance and by using the definitions detailed in the tables below. Impact will vary from negative to neutral or positive, and also will vary in significance on the receiving environment. The terminology and methodology used for assessing the impact significance and corresponding effects throughout this chapter are described in Table 12-1, 12-2 & 12-3 below:

Table 12-6: Terminology used to assess the quality potential impacts & effects

Quality of Effects / Impacts	Definition

Negative	A change which reduces the quality of the environment.
Neutral	No effects or effects that are imperceptible, within the normal bounds of variation or within the margin of forecasting error.
Positive	A change that improves the quality of the environment.

Source: EPA, 2017

Table 12-7: Terminology used to assess the significance of potential impacts & effects

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

Source: EPA, 2017

Table 12-8: Terminology used to assess the duration of potential impacts/effects

Duration of Effects / Impacts	Definition
Momentary	Effects lasting from seconds to minutes
Brief	Effects lasting less than a day
Temporary	Effects lasting one year or less
Short-term	Effects lasting one to seven years
Medium-term	Effects lasting seven to fifteen years
Long-term	Effects lasting fifteen to sixty years
Permanent	Effects lasting over sixty years
Reversible	Effects that can be undone, for example through remediation or restoration

Source: EPA, 2017

Where significant potential impacts were identified, mitigation measures are proposed, where possible in this remedial scenario, to minimise impacts.

12.2.4 The Existing and Receiving Environment

12.2.4.1 Site Location

12.2.4.1.1 Historic extraction and infill

The Site of the Historic Development consisted of a rural farm property in Maplestown, Co. Carlow. The townland of Maplestown is located in the northern part of Co. Carlow bordering Co. Kildare and Co. Wicklow. The Site was bound to the West by a country road (L-8097), and to the South, East and North by agricultural lands.

12.2.4.2 Land Use History

Historical mapping and aerial photography available from the Ordnance Survey of Ireland website (OSI, 2021) were reviewed and key observations on-site and off-site are summarised in Table 12-4 below.

Table 12-4: Historical Land Use

Date	Information Source	Site Description
1837-1842	**OSI map 6inch**	On-site: Agricultural field bordered by hedgerows or walls Off-site: Directly west is a Mill and Millrace
1888-1913	**OSI map 25inch**	On-site: No significant changes. Off-site: No significant changes.
1830-1930	**OSI Cassini map 6inch**	On-site: No significant changes. Off-site: The Mill and Millrace are gone
1830-1930	**OSI Cassini map 25inch**	On-site: No significant changes. Off-site: A school has been built to the southwest of the site
2005-2012	**OSI Aerial Photography**	On-site: Quarrying has begun at the site entrance Off-site: Active quarries are visible to the west, southwest and south of the site. The school is still present.
2021	**Google Maps Photography**	On-site: The quarry has extended to its present-day situation and the settlement ponds and plant area are visible. Off-site: The quarry to the west is still active. The quarry to the southwest has been fully restored and returned to agriculture. The quarry to the south has almost been fully restored and returned to agriculture. The school is still present.

12.2.4.3 Immediate Surroundings

12.2.4.3.1 Historic extraction and infill

The surrounding land use was predominantly rural agricultural land use including livestock and arable farming, as well as forestry plantation. A small stream lies in the South of the property and a broadleaf birch dominated woodland lies to the West of the property. The surrounding landscape was undulating, characterised by low ridges and knolls.

The landcover was predominately permanent pasture. Field patterns were irregular with boundaries defined by ditches or hedgerow belts. Residential properties in the vicinity of the Site of the Historic Development were primarily concentrated along the L-8097 to the West of

the site. There were some 8 dwellings (including the landowners), a school and a hall within ¼ km of the site boundary.

12.2.4.4 Local Settlement and Land Use

Residential properties in the vicinity of the Site of the Historic Development were primarily concentrated along the L-8097 to the West of the site. There were some 8 dwellings (including the landowners), a school and a hall within ¼ km of the site boundary. The 2 dwellings nearest to the proposed extraction area were each approximately 38 m from the western boundary of the site and 62m of the proposed extraction area. The next nearest dwellings were 24 m and 36 m from the Site boundary and 96 m and 185 m from the proposed extraction area respectively. The landowner's house was 91 m from the site boundary and 101 m from the proposed extraction area. All other dwellings were in excess of 220 m from the site boundary. The School and the Hall were 209 m and 225 m from the site boundary and 281 m and 287 m from the proposed extraction area, respectively.

12.2.4.5 Electricity Supply

12.2.4.5.1.1 Local Supply & Grid Connection

Kellistown 400/220 kV Station, Co. Carlow, lies approximately 14.5km South West of the Site.

12.2.4.5.1.2 Onsite Supply and Consumption

There was no electricity supply onsite.

12.2.4.6 Gas supply

Connection to gas pipelines was not available in Maplestown, Rathvilly, Co. Carlow.

12.2.4.7 Information and Communications Technology (ICT)

The telecommunications infrastructure in the Republic of Ireland provides Internet access to businesses and home users in various forms, including fibre, cable, DSL, wireless, Fixed Wireless and mobile.

There was no connection to ICT at the Site of the Historic Development, Maplestown, Rathvilly, Co. Carlow.

12.2.4.8 Water Supply and Demand

Prior to the extraction and infilling activities which took place at the Site of the Historic Development, the Site was not connected to a municipal water supply. A potable water well was drilled on the Site, which also supplied water for the wheel wash, (approximately 20,000 L/day). Process water was taken from the settlement lagoons and supplemented from a sump (located directly South-East of the lagoons) when required.

12.2.4.9 Local Hydrology and Hydrogeology

It is noted that specific details relating to Hydrology associated with the Development are set out in Chapter 7 of this EIAR.

The Broadstown Stream was the closest surface water feature which adjoined the Southern boundary of the Site of the Historic Development.

12.2.4.10 On-site Surface Water Drainage

Site drainage is described in detail in Chapter 7 – Hydrology.

Prior to the extraction and infilling activities which took place at the Site of the Historic Development, the landcover was predominately permanent pasture. Field patterns were irregular with boundaries defined by ditches or hedgerow belts. All surface water was at greenfield rates and volumes and discharged directly to ground and the surrounding rivers and streams.

12.2.4.11 Waste water management

Prior to the development of the sand and gravel quarry, the subject Site in Maplestown, Co. Carlow, was a greenfield site and therefore had no prior foul loading.

Wastewater from the washing and screening plant was directed to the 3 no. existing, interlinked, man-made settlement lagoons where the clay and silt settled out of the wastewater. The cleaned process water was then directed back to the existing sump by gravity.

12.2.4.12 Waste Management

Prior to the development of the sand and gravel quarry, the subject Site in Maplestown, Co. Carlow, was a greenfield site and therefore had no waste management requirements.

A small quantity (<1 tonnes per annum) of non-hazardous canteen waste was generated by the Historic site operations, which was stored in wheelie bins on site and collected by an appropriately authorised waste collector prior to being sent for recycling, recovery, or disposal to a suitably licensed or permitted waste facility.

Initial site development works involved stripping and stockpiling of overburden from lands, installation of a plant and construction of a haulage road. The topsoil that was excavated from the Site was stored appropriately onsite and used for reinstatement purposes.

12.2.5 Characteristics of the Development

The proposal for the Historic Development was to excavate 700,000 tonnes to 900,000 tonnes of sand and gravel site at an average rate of 90,000 tonnes per annum up to a maximum of 100,000 tonnes per annum over a period of 10 years. Planning was granted for the extraction from 2007 to 2012, there was however unauthorised development at the Site and quarrying continued after 2012. The unauthorised development comprised of the quarrying of an area of 4.18 hectares in the central part of the Site that was subsequently restored during 2018 using overburden from the quarried areas.

All plant and equipment that were operational on the Site associated with the historically permitted activities are listed below. All plant and equipment that was installed and used at the Site was permitted and authorised under previous permission Reg. Ref. 06/842 (An Bord Pleanála Ref. PL01.221741).

12.2.5.1.1 Plant and Equipment specific to the Historical Activities

- Front-end loading shovel (Volvo)

- Standby front-end loading shovel
- Back Hoe Excavator (Komatsu 400 40-tonne or similar)
- 2 no. 25-tonne dumper trucks (Volvo A25C or similar)
- 8 x 4 Dry Screener (of the type manufactured by Powerscreen, Finlay, or a similar manufacturer)
- Dozer (Cat or similar)
- Low Loaders
- Washing Plant (l0 x 5 screens with dewaterer) (of the type manufactured by Powerscreen, Finlay, or a similar manufacturer)

12.2.5.1.2 Plant and Equipment ancillary to the Historical Activities

- Diesel generator
- Fuel storage tank (600 gallon)
- Fuel bowser (for refuelling machinery in pit)
- Water bowser
- Tractor
- 3 - 4 no. Heavy Goods Vehicles (HGVs) (20-tonne rigid-body Note: HGVs may be contract haulers and not vehicles owned and operated by the Applicant)

12.2.6 Potential Impact of the Development

This section assesses the impact of the Historic Development and the Development on the Material Assets of the area.

12.2.6.1 Settlement and Property Prices

It is noted that specific issues relating to Population and Human Health associated with the Development are set out in Chapter 4 of this EIAR.

12.2.6.1.1 Construction Phase

The Historic Development did not require the construction of permanent buildings. Instead, construction at the site was limited to the already installed infrastructure such as washing/rinsing plant, a dry screener, one bunded fuel storage tank, a wheel wash, Portacabin, chemical toilet, portable generator and the drilling of a water supply. The construction phase for the permitted development also involved the excavation of 3 no. settlement lagoons, stockpiling area, truck and plant parking area and site access. Therefore, there was no construction phase required for the unauthorised development.

12.2.6.1.2 Operational Phase

Potential impacts to residential amenity were identified as nuisance and health/safety concerns related to emissions (dust and noise), impacts on water supply, traffic, and visual amenity.

12.2.6.1.2.1.1 Dust Generation

Potential sources of dust associated with the operation of a sand and gravel pit result from both the extraction and processing of material and the movement of trucks along the haul road and public roads. Chapter 9 of the 2004 EIS established that there would not be significant negative dust emissions impacts associated with the proposed. development.

12.2.6.1.2.1.2 Visual Impact

The landscape and visual impact assessment chapter of previous EIS prepared by AWN Consulting Limited (*August 2004*), anticipated that the Historic Development would have no negative or long-term impact on either the landscape or visual character. Chapter 10 of this rEIAR/EIAR concludes that the Historic Development has resulted in a 'minor' 'medium-term' visual impact.

12.2.6.1.2.1.3 Noise and Vibration Impact

Potential sources of noise and vibration impacts related to the proposed operation of a sand and gravel pit are associated with equipment and machinery operating on the site and heavy vehicles on local roads. The noise chapter of the previous EIS prepared by AWN Consulting Limited (*August 2004*), predicted that noise levels resulting from "worst-case scenario" modelling of pit operations would all be all below noise limits established by the Environmental Protection Agency. As detailed in Chapter 10 of the previous EIA, there would not be significant negative noise impacts associated with the Development.

No known effects on Local Settlement or Property Prices have been identified as a result of the Historic Development.

12.2.6.2 Water Environment

It is noted that specific issues relating to Hydrology associated with the Development are set out in Chapter 7 of this rEIAR.

12.2.6.2.1 Construction Phase

12.2.6.2.1.1

No buildings were constructed as part of previously permitted activities at the Development Site. Construction at the site was limited to the importation of prefabricated or precast infrastructure, the drilling of a water supply, the excavation of settlement lagoons, and the installation of paved/hard standing site access and haul roads, stockpiling area, and truck and plant parking area.

It was verified during the site inspection by Enviroguide that there were no built structures at the existing quarry and there are no impacts identified which have occurred, are occurring or will occur on the water environment as a result of the Historic Development.

12.2.6.2.2 Operational Phase

Water for washing of aggregates was sourced from the existing sump at the southern section of the existing quarry development, which was excavated to below the water table as authorised under the Grant of Planning (Planning Reference: 221741). Water was pumped

from this sump to the screening and washing plant. It is estimated that the plant used between 125m3 and 150m3 per hour, with a maximum of 200m3 per hour.

Water for the wheel wash and dust suppression was sourced from the onsite groundwater sump used for the authorised quarry development. All trucks exiting the Development Site were required to pass through the existing wheel wash at the entrance to the Site. It was regularly cleaned out by a vac-tanker and transported for off-site by a suitably licensed waste contractor. Water was not abstracted from surface water courses and there were no direct discharges to ground or surface water from the quarry operations.

The use of the authorised settlement lagoons from 2007 for treating the wash water generated in the screening and washing plant prior to discharge back into the existing sump has ensured that there was no significant impact on the underlying groundwater quality. The storage of fuel onsite was within the bunded diesel tanks installed at the Site in accordance with the conditions of the authorised development for the Operational Phase of the quarry. There are no reported incidents and there was no evidence of soil contamination identified during the site investigations at the Site. Furthermore, there were no reported problems in terms of groundwater quality with the groundwater supply well for the residential dwelling and farmyard adjoining the northeast boundary of the Site and within the overall landholding of the Applicant. Overall, it is considered that the unauthorised extraction and infilling activities at the Site has not had a significant impact on the surrounding water environment.

12.2.6.3 Foul Water

It is noted that specific issues relating to Hydrology associated with the Development are set out in Chapter 7 of this rEIAR.

12.2.6.3.1 Construction Phase

There was no Construction Phase associated with the unauthorised development.

12.2.6.3.2 Operational Phase

The site was not connected to a municipal foul water system. During the Operational Phase of the Historic Development, wastewater from the washing and screening plant was directed to the 3-no. existing, interlinked, man-made settlement lagoons where the clay and silt settled out of the wastewater. The cleaned process water was then directed back to the existing sump by gravity.

A self-contained mobile welfare unit installed in 2007 was used for the Operational Phase from 2012 that was emptied by an authorised contractor as required.

Hence there was no impact on the local municipal foul water system during the Operational Phase of the Historic Development.

12.2.6.4 Water supply

12.2.6.4.1 Construction Phase

There was no Construction Phase for the unauthorised development

12.2.6.4.2 Operational Phase

The site was not connected to a municipal water supply, hence there was no impact on the local mains water supply during the Operational Phase of the Historic Development.

12.2.6.5 Electricity Supply

12.2.6.5.1 Construction Phase

There was no Construction Phase for the unauthorised development.

12.2.6.5.1.1

12.2.6.5.2 Operational Phase

There was no connection to the local electricity supply at the Site of the Historic Development. Power for the washing and screening plant was provided by a diesel generator. Therefore, there were no impacts on electricity supply in the area as a result of the Operational Phase of the Historic Development.

12.2.6.6 Gas Supply

12.2.6.6.1 Construction Phase

There was no Construction Phase for the unauthorised development.

12.2.6.6.2 Operational Phase

There was no connection to the local gas supply at the Site of the Historic Development, hence there were no impacts on gas supply in the area as a result of the Operational Phase of the Historic Development.

12.2.6.7 Information and Communications Technology (ICT)

12.2.6.7.1 Construction Phase

There was no Construction Phase for the unauthorised development.

12.2.6.7.2 Operational Phase

There was no ICT requirement at the Site of the Historic Development, hence there were no impacts on ICT supply in the area as a result of the Operational Phase of the Historic Development.

12.2.6.8 Waste Management

12.2.6.8.1 Construction Phase

There was no Construction Phase for the unauthorised development.

12.2.6.8.2 Operational Phase

Initial site development works involved stripping and stockpiling of overburden from lands, installation of a plant and a haulage road. The topsoil that was excavated from the Site was stored appropriately onsite for reinstatement purposes. The use of excavated materials for landscaping/reinstatement ensured that the potential environmental impact of the development was minimised.

Any used absorbent materials was stored in a sealed container within the waste compound and collected by a licensed contractor along with completed C 1 consignment note certificate.

Waste produced on the site was minimal, as routine maintenance of machinery occurred off-site.

12.2.6.9 Potential Cumulative Impacts

12.2.6.9.1 Historic extraction and infill

As the use of, and impact on, Material Assets during the Construction and Operational Phases of the Historic Development has been demonstrated to have been negligible, when considered in conjunction with other permitted, planned and existing development in the vicinity of the Site of the Historic Development it can be considered that the cumulative effects the Development on surface water, foul water disposal, potable water supply, natural gas supply, electrical supply, telecoms, and municipal waste was also negligible.

12.2.6.10 "Do Nothing" Impact

12.2.6.10.1 Historic extraction and infill

If the development of the sand and gravel quarry is not advanced, the site would have remained for agricultural use, and would have continued to operate as a farm. The risks to Material Assets would have been from those associated with agriculture.

12.2.7 Avoidance, Remedial & Mitigation Measures

The Historic extraction activities were contained within a defined area of the site, principally concentrating on the hill located in the centre of the Site. Machinery operated only within the allocated area and the access route to the Site was confined to the existing track.

During dry windy days dust preventative measures were implemented in order to prevent any dust blow to areas outside the delimited preparation areas.

All fuels were contained within specially constructed bunds to ensure that all fuel spillages were fully contained and thus did not result in any off-site impacts.

The waste water from the washing / rinsing plant was fed by gravity to three settlement lagoons laid out in series, in the west of the Site. The settlement ponds prevented any silt laden surface water run-off to adjacent surface water bodies.

A significant amount of soil, sand and gravel was removed as a result of the extraction activities. Spoil heaps and temporary aggregate were not placed within 5 metres of any trees or hedgerows that were retained on-site.

All excavated topsoil was re-used for the reinstatement of the area once excavation was completed. The quarry management plan was structured so that each phase which was excavated was progressively restored using the topsoil stripped from the following phase, and so on until the final phase. Silts extracted from the settlement lagoons were also be used in the restoration process. The area of lost grassland habitat was re-seeded once the pit operations stopped.

12.2.7.1 "Worst Case" Scenario

The worst-case scenario would have been the development of a sand and gravel pit in an area that is less suitable if the historic extraction had not been permitted at Maplestown.

12.2.8 Residual Impacts

12.2.8.1 Historic extraction and infill

The 2004 EIS stated: "*The incorporation of the use of fuel bunding, excavated soil control, materials storage, construction exclusion zones and settlement lagoons, will result in the potential indirect effects from the excavation works, being reduced to imperceptible impacts."* No direct impacts on Material Assets were observed.

12.2.9 Monitoring

No monitoring was carried out for the Historic Development.

.

12.2.10 Interactions

The sand and gravel will be put to beneficial use in the construction industry. Material assets, utilities and waste interact with other environmental receptors as follows:

- Population and Human Health: In the event of uncontrolled releases of dust, noise or vibration, this could negatively impact on the surrounding human population and their overall health. Potential impacts on population and human health are addressed in Chapter 4. Additional potential impacts and interactions with the local population are addressed in detail in Chapters 8 (Air Quality), 9 (Noise and Vibrations) and 10 (Landscape and Visual Impact)
- Land and Soil: In the event of spillage/ leaks from waste storage areas, this could negatively impact on the land and soil. Potential impacts on land and soils are addressed in Chapter 6.
- Water (Hydrology & Hydrogeology): Uncontrolled releases from the quarry during the Operational Phase could negatively impact on the downstream Broadstown Stream or River Graney or New Ross groundwater body. Potential impacts on the surface water bodies and the underlying aquifer are addressed in Chapter 7.

12.2.11 Difficulties Encountered When Compiling

No difficulties were encountered in the preparation of this Chapter.

12.2.12 References

- Environmental Protection Agency (EPA) (2017) Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR) – DRAFT
- EPA (2003) Advice Notes on Current Practice in the preparation of Environmental Impact Statements.
- EPA (2002) Guidelines on the information to be contained in Environmental Impact Statements
- National Standards Authority of Ireland (NSAI), 2017. IS EN752, “Drain and Sewer Systems Outside Buildings – Sewer system Management. NSAI, 1 Swift Square, Northwood, Santry, Dublin 9
- Ordnance Survey Ireland, 2020 (OSI, 2021). Ordnance Survey Ireland webmapping http://map.geohive.ie/mapviewer.html. Consulted on 29/10/2021.
- https://siteviewer.comreg.ie/#explore (ComReg, 2021). Commission for Communications Regulation Mast Viewer. Consulted on 16/09/2021.
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Communities 1999)
- https://www.gasnetworks.ie/corporate/company/our-network/pipeline-map/ (Gas Networks Ireland, 2021). Gas Networks Ireland Pipeline Viewer. Consulted on 29/10/2021.
- https://www.gasnetworks.ie/home/get-connected/connect-now/ [Viewed online 29.10.2021]
- https://myplan.ie/ (DHLGH, 2021) Zoning and National Planning Applications Map Viewer. Consulted on 29/10/2021.

13 RISK MANAGEMENT

13.1 Study Methodology

13.1.1 Scope and Context

The Environmental Impact Statement (EIS) which was prepared for the Historic Development under the previous planning permission, Reg. Ref. PL01.221741, followed the requirements of Part X of the Planning and Development Act, 2000, Part 10, and Schedules 5, 6 and 7 of the Planning and Development Regulations, 2001. Schedule 6 of the Planning and Development Regulations 2001 established a standard list of areas of the environment that were to be addressed by an EIS at that time. These areas were as follows:

- Human Beings
- Flora
- Fauna
- Soil
- Water
- Air
- Climate
- Landscape
- Archaeological and Cultural Heritage,
- and the inter-relationship between the above factors.

There was no requirement at the time to assess the vulnerability of the Historic Development to major accidents and/or disasters, or the potential for the project to cause risks to human health, cultural heritage and/or the environment.

Site surveys and desktop studies as part of the current rEIAR indicate that no natural disasters or environmental incidents as listed in Table 13.1 occurred on the Site of the Historic Development during either the periods of authorised or unauthorised activities.

This Chapter will focus on whether any of the retrospectively predicted risks occurred during the operational phase of the of the Unauthorised Development.

The relevant legislation to which this chapter applies is Statutory Instrument (SI). No. 296/2018 - European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 and in particular Schedule 6 – Information to be contained in EIAR. The following paragraphs of Schedule 6, Paragraph 2(e)(i)(IV), specifically refers "*a description of the likely significant effects on the environment of the proposed development resulting from … the risks to human health, cultural heritage or the environment (for example due to accidents or disasters),*"

Paragraph 2(h) further expands with "*a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out*

pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for, and proposed response to, emergencies arising from such events."

13.1.2 Guidelines and Reference Material

This assessment, of major accidents and disasters is a relevantly new requirement in legislation and, as a result, national guidelines are not yet available. Cognisance has been taken of the Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA Draft, August 2017). Although this document predates the 2018 legislation it follows the requirements laid out in the Directive 2014/52/EU.

Specifically, the EPA Guidelines state that the EIAR must take account of "*the vulnerability of the project to risk of major accidents and /or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk)… The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g., the potential effects of floods on sites with sensitive plants. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required. The EIAR should refer to those separate assessments while avoiding duplication of their contents*."

Reference has also been made to the Department of Defence (DOD) Publication *'A National Risk Assessment for Ireland 2017'*. A consolidated list of national hazards for Ireland identified in the DOD document are identified in Table 13-1.

Table 13-1: Consolidated List of National Hazards (Source: A National Risk Assessment for Ireland (2017) Department of Defence)

Hazard: Civil • Infections Disease • Terrorist Incident • Animal Disease • Foodborne Outbreaks • Crowd Safety • Civil Disorder • Loss of Critical Infrastructure	**Hazard: Natural** • Storm • Flooding • Snow • Low temperatures • High temperatures • Volcanic Ash • Drought • Tsunami • Space weather
Hazard: Transportation • Road • Rail • Air • Maritime • Transport Hub	**Hazard: Technological** • Industrial Incident • Hazmat • Fire • Nuclear Incident (Abroad) • Radiation Incident (Domestic)

	• Disruption to electricity/gas supply • Disruption to oil supply • Network and Information Security/ Cyber Incident

13.1.3 Risk Assessment Methodology

The risk assessment methodology has been supported by general risk assessment methods. Hazard analysis and risk assessment are accepted internationally as essential steps in the process of identifying the challenges that may have to be addressed by society, particularly in the context of emergency management. Mitigation as a risk treatment process involves reducing or eliminating the likelihood and/or the impact of an identified hazard.

Table 13-2: Classification of National Likelihood Criteria (Source: A National Risk Assessment for Ireland (2017) Department of Defence)

National Likelihood Criteria		
Rating	**Classification**	**Average Recurrence Interval**
1	Extremely Unlikely	500 or more years between occurrences
2	Very Unlikely	100-500 year between occurrences
3	Unlikely	10-100 years between occurrences
4	Likely	1-10 years between occurrences
5	Very Likely	Less than 1 year between occurrences

13.2 Retrospective Predicted Impacts

The rEIAR chapters within this report identify that the Unauthorised Development had been designed in accordance with best practice and that the Unauthorised Development was safely undertaken without risk to health.

In order to understand the potential consequences and predicted impacts of any major accident or disaster due to the Unauthorised Development and the vulnerability of the project a desk study was undertaken. The assessment reviewed:

- The vulnerability of the project to major accidents or disasters.
- The potential for the project to cause risks to human health, cultural heritage and the environment, as a result of that identified vulnerability.

A methodology has been used including the following phases:

Phase 1 Assessment:

The DOD Consolidated List of National Hazards was used to identify a preliminary list of potential major accident and disasters. Receptors covered by legislation were not included within the assessment e.g., construction workers.

Phase 2 Screening:

The list was screened and major events, such as volcanoes were not included given the unlikely event of one occurring. Elements already addressed as a key part of the design e.g., risks of landslides are not repeated.

Phase 3: Mitigation and Evaluation

In the event that mitigation measures included did not mitigate against the risk, then, the potential impacts on receptors are identified in the relevant chapter. Table 13.3 lists the major accidents and/or disasters reviewed.

Table 13-3: Major Accidents and/or Disasters Reviewed

Major Accident or Disaster	Relevant for this Proposed Development?	Why relevant?	Potential Receptor	Covered within EIAR?
Civil				
Human disease/ Epidemic	N	Not considered vulnerable. No human disease/ Epidemic was recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Terrorist Attack	N	Not considered vulnerable. No Terrorist Attack was recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Animal Disease	N	Not considered vulnerable. No outbreak of animal disease was recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Foodborne Disease	N	Not considered vulnerable. No Foodborne disease was recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Waterborne Disease	N	Not considered vulnerable. No waterborne disease was recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Crowd Safety	N	Not considered vulnerable. No Crowd safety issues were recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Civil Disorder	N	Not considered vulnerable. No civil disorder was recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Loss of Critical Infrastructure	N	Not considered vulnerable. No loss of critical infrastructure was recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Transportation				

Road Accidents	N	Fuel spillage or road accidents are relevant to the historic development. No major fuel spills or road accidents were recorded during the Operational Phase of the Unauthorised Development.	Road users, land and soils, hydrology and water, aquatic environment	Chapters 6 (Land and Soils) and 7 (Hydrology) assessed the potential for spillages during the project timeframe and proposed mitigation measures within the chapter including the requirement for spill kits, bunds for refuelling. Chapter 12 details that no road accidents occurred during the Operational Phase of the Historic Development.
Rail accidents	N	Not considered vulnerable. The Site is approximately 14.12 KM from the closest train station at Rathnapish, Co. Carlow. No rail accidents were recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Aircraft disasters	N	Not considered vulnerable. Killamaster Airfield, Co. Carlow is the closest private airbase and is located approximately 8.15KM from the site. No aircraft disasters were recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Maritime Disaster	N	Not considered vulnerable, as the site is approximately 28.6 KM from the coast. No maritime disasters were recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Transport Hub	N	Not considered vulnerable. Area not considered a transport hub.	N/A	N/A
Natural				
Cultural, Archaeological and Architectural Heritage	N	No protected structure or conservation areas, archaeological, architectural or cultural heritage remains have been recorded or identified within the site boundary during the operational phase of the unauthorized development.	N/A	Chapter 11 assessed the impact of the Unauthorised Development on the Archaeological and Cultural Heritage.
Avalanche and landslides	N	There are no recorded landslides at, or within 2km of the Development Site recorded on the GSI database (GSI, 2021). Given the site topography and geological setting, landslide events are not likely to occur at the Site.	N/A	Chapter 6 (Land and Soils) of this report identifies the vulnerability of the project to landslides
Sinkholes	N	Geology not prone to sinkholes, no karst mapped nearby. No Sinkholes were recorded during the Operational Phase of the Unauthorised Development.	N/A	Chapter 6 (Land and Soils) of this report identifies the vulnerability of the project to sinkholes

Earthquakes	N	Area is not geologically active. No earthquakes were recorded during the Operational Phase of the Unauthorised Development.	NA	NA
Floods	N	The closest river network waterbody the Broadstown Stream is 0.07km from the Site. There is no risk of flooding affecting the site from fluvial, pluvial and/or groundwater sources. No floods were recorded during the Operational Phase of the Unauthorised Development.	Development	Chapter 7 of this report identifies the vulnerability of the project to flooding.
Storm surge/tidal flooding	N	No risk of tidal flooding. No flooding was recorded during the Operational Phase of the Unauthorised Development.	N/A	Chapter 7 of this report identifies the vulnerability of the project to flooding.
Blizzards	N	Not relevant. No blizzards were recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Droughts	N	Not relevant. No dorughts were recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Severe weather such as Tornados, heatwaves	N	Not relevant as severe weather events have not been recorded in the area.	N/A	N/A
Air Quality events	Y	Vehicular emissions Dust emissions	Residents/ workers	Chapter 8 (Air Quality) of this EIAR identifies the impact of the construction and operation of the unauthorised development on ambient air quality.
Wildfires	N	Not relevant. No wildfires were recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Dam, Bridge or Tunnel Failure	N	None present	N/A	N/A
Flood defence failure	N	Not relevant	N/A	N/A
Other				
Fire	Y	The risk of fire in machinery on-site which might lead to loss of life. The risk was very small and localised. No fires were recorded during the Operational Phase of the Unauthorised Development.	Employees	Maintenance checks system were employed when the facility was operational.

Cyber Attacks	N	Not considered vulnerable. No cyber-attacks were recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Utilities failure	N	Water, electricity, wastewater, sewage. The site is not connected to any utilities, so this is not relevant.	N/A	Chapter 12 contains information on utilities
Industrial accidents (defence, energy, oil and gas refinery, food industry, chemical industry, manufacturing, quarrying, mining)	N	There are no Upper Tier Seveso sites near the Development. The closest is located approximately 46KM from the Development at Grassland Fertilizers Ltd., Palmerstown, Co. Kilkenny. The closest Lower Tier Seveso site is located approximately 32KM from the Development at Zoetis Belgium S.A. Ireland Branch, Laragh Road, Rathdrum, Co. Wicklow. This facility has been operational since 2017. The Zoetis Site in Rathdrum was previously operated by Merck Sharpe & Dohme and was an Upper Tier Seveso Site until operations ceased in 2013.	N/A	N/A
Disruption to electricity/gas supply	N	Not relevant	N/A	N/A
Invasive species	N	Not relevant. No invasive species were recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Disruption to oil supply	N	Not considered vulnerable	NA	N/A
Nuclear accident	N	Not considered vulnerable. No nuclear accidents were recorded during the Operational Phase of the Unauthorised Development.	N/A	N/A
Road signs and masts failure	N	Designed to modern standards	Road users, population	NA
Crime or civil unrest	N	Not considered vulnerable. No crime or civil unrest recorded during the Operational Phase of the Unauthorised Development.	NA	NA
Building Failure	N	Not relevant. No buildings on-site.	NA	NA

13.3 Residual Impacts

The residual impacts are considered to be negligible as no there were no emergencies or disasters recorded during the Operational Phase of the Unauthorised Development.

13.4 Monitoring

No further monitoring is proposed.

13.5 Conclusion

The risk assessment conducted for the Development of a sand and gravel quarry at Maplestown, Rathvilly, Co. Carlow, concludes that:

- The vulnerability of the Development to major accidents and/or disasters is not considered significant.
- The potential for the project to cause risks to human health, cultural heritage and the environment, is not considered significant.
- On the same basis and given that the parameters have not changed it can be concluded that there would have been no significant from the unauthorised development as was proven by the non-occurrence of any such event.

14 INTERACTIONS

14.1 Introduction

As a requirement of Planning Regulations and the Environmental Protection Agency's '*Guidelines on information to be contained in Environmental Impact Assessment Reports'* (2017), interrelationships between various environmental aspects must be considered when assessing the impact of the Unauthorised Development, as well as individual significant impacts. The significant impacts of the Unauthorised Development and the proposed mitigation measures have been detailed in the relevant chapters of this report. However, as with all developments that pose potential environmental impacts, there also exists potential for interactions/interrelationships between the impacts of different environmental aspects. The results may exacerbate or ameliorate the magnitude of impacts. This chapter of the rEIAR addresses the interactions between the various environmental factors of the Unauthorised Development.

The following Section is directed by Article 3 section 1(e) of the EIA Directive. The EPA Guidelines on the information to be contained in Environmental Impact Assessment Reports (Draft, 2017) and Advice Notes for Preparing Environmental Impact Statements (Draft, September 2015) were also considered.

Article 3 of the Directive states:

1. The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:
    a) population and human health.
    b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC.
    c) land, soil, water, air and climate.
    d) material assets, cultural heritage and the landscape.
    e) the interaction between the factors referred to in points (a) to (d)

14.2 Study Methodology

The interactions between impacts on different environmental factors have been addressed throughout this rEIAR. Close co-ordination and management with the rEIAR team was carried out to ensure that all likely relevant interactions were addressed at the scoping stage of the rEIAR, and interactions have been adequately assessed.

Following an assessment of the rEIAR, a matrix was produced to display where interactions between impacts on different factors have been addressed. This has been carried out by use of chapter headings included in the rEIAR and details of any interaction during all phases of the Unauthorised Development.

14.3 Interactions

The following matrix has been produced to show where potential significant interactions between effects on different factors have been addressed, see Table 14-1.

As this rEIAR has been prepared by a number of specialist consultants, an important aspect of the EIA process was to ensure that interactions between the various disciplines have been taken into consideration. The principal interactions requiring information exchange between the environmental specialists and the design team are summarised below in Table 14-2 to Table 14-10.

Table 14-1: Interactions between Factors

Interaction	4. Population and Human Health	5. Biodiversity	6. Land, Soils and Geology	7. Hydrology and Hydrogeology	8. Air Quality & Climate	9. Noise & Vibration	10. Landscape & Visual Amenity	11. Archaeology, Architecture & Cultural Heritage	12a. Material Assets (Traffic)	12b. Material Assets (Waste & Utilities)
Population and Human Health										
Biodiversity										
Land, Soils and Geology										
Hydrology and Hydrogeology										
Air Quality and Climate										
Noise & Vibration										
Landscape & Visual Amenity										
Archaeology, Architectural and Cultural Heritage										
Material Assets										
Risk Management										

	No Interaction or intra relationship
	Interaction or intra relationship
	N/A

Table 14-2: Population and Human Health

Population and Human Health	
Summary	
Chapter 4 of this EIAR, *Population and Human Health,* details the potential direct and indirect impacts from the Historic extraction and infill activities (since 2012) on Population and Human Health; and sets out any required mitigation measures where appropriate. The population in the vicinity of the Site of the Unauthorised Development has been assessed in terms of demography, economic activity and employment, tourism and amenity, landscape and visual, human health and social health.	
Interactions	
Noise and Vibration	During the operational phase, the outward noise impact to the surrounding environment would have been limited to any additional traffic on surrounding roads and the operation of on-site machinery and equipment. The impact assessment of noise and vibration has concluded that additional noise associated with the operation of on-site machinery would have been intermittent and would not have created any major negative impacts beyond the Site boundary. Noise is fully assessed in Volume 2, chapter 9.
Air Quality and Climate	Interactions with air quality during operational phase, has had the potential to cause dust nuisance issues. However, the predicted impact is not significant with a neutral effect on human health. Air quality is discussed further in Volume 2, chapter 8.
Traffic	There is potential for interaction with Traffic during the operational phase of the historic development. The traffic assessment carried (as detailed in Chapter 12 of this rEIAR), concludes that there will be a slight increase in traffic volumes. However, this will not result in a negative impact on human health.
Hydrology and Hydrogeology	Hydrology has been fully assessed in Volume 2, Chapter 8 of this EIAR. No public health issues associated with the water (hydrology and hydrogeology) conditions at the Site have been identified for the Unauthorised Development.
Landscape and Visual	The visual assessment shows that the subject Site is well screened due to existing hedgerows, field boundaries, local topography, and the setback distance from the public road. There are no protected views within this area that could be affected by the operation of the Unauthorised Development. Overall, it is considered that the Unauthorised Development will have had an 'imperceptible' visual impact on nearby sensitive receptors. Therefore, it is not considered that the Unauthorised Development has caused any issues for the residential local population.

Conclusions
The Unauthorised Development has had the potential to provide employment opportunities and health improvements. Employment and income are among the most significant determinants of long-term health, influencing a range of factors including the quality of housing, education, diet, lifestyle, coping skills, access to services and social networks.

Table 14-3: Biodiversity

Biodiversity	
Summary	
Chapter 5 of this rEIAR/EIAR, *Biodiversity,* details the potential direct and indirect impacts from the Historic extraction on habitats, flora and fauna associated with Site of the Unauthorised Development. Potential impacts which may have resulted from the construction phase of the Historic Development include loss of grassland habitat within the extraction area. The chapter concluded that the possibility that the Unauthorised Development may not have had a likely significant effect on the River Barrow and Nore SAC (002161) may not be excluded and accordingly, a Remedial Natura Impact Statement has been prepared for the Unauthorised Development and is included under separate cover. There are no other known activities or proposed activities at or within close proximity to the site that would be likely to result in any significant cumulative impacts on the ecology of the local area at this current time. It is therefore considered that no significant cumulative ecological impacts would occur.	
Interactions	
Hydrology and Hydrogeology	An assessment of the potential impact of the Unauthorised Development on the hydrological and hydrogeological environment is included in Chapter 7 of this rEIAR. Procedures for dealing with silt laden runoff at the Site; potential spills/leakages of fuels/contaminants; and the protection of nearby watercourses are outlined in this chapter
Land & Soil	An assessment of the potential impact of the Historic Development on the existing land, soils and geological environment, with emphasis on the extraction and infilling of material; and the potential accidental release of contaminated materials to ground during operational phases of the Development, is included in Chapter 6 Land, Soil and Geology. Measures for the mitigation of these impacts are also set out in Chapter 6.
Conclusions	
It is deemed that historic extraction and infill activities would not have resulted in any significant environmental impacts given the habitat effected and the mitigation measures implemented during that period. Any potential Sand Martin habitat loss would have been compensated by new habitat creation in the existing quarry.	

Table 14-4: Land and Soils

Land and Soil	
Summary	
Chapter 6 of this rEIAR, *Land and Soil*, details the potential direct and indirect impacts from the Historic extraction and infill activities (since 2012) on the local land, soils, and geology; and sets out any required mitigation measures where appropriate. There has been an unavoidable loss of soil associated with the extraction and sale for use offsite of the sand and gravel quarried from the Site. There has been no identified impact to soil quality or degradation of soils associated with the unauthorised development.	
Interactions	
Population and Human Health	The potential for quarry workers to be exposed to silica dust can arise from the quarrying activities. Appropriate industry standard and health and safety legislative requirements have been implemented during the operational phase of the Unauthorised Development that were protective of site workers. It is noted that specific issues relating to Population and Human Health associated with the Unauthorised Development are set out in Chapter 4 of this rEIAR.
Hydrology and Hydrogeology	An assessment of the potential impact of the Unauthorised Development on the hydrological and hydrogeological environment is included in Chapter 7 of this rEIAR. Procedures for protection of water courses and the underlying bedrock aquifer are set out in Chapter 7 of this rEIAR.
Material Assets	In the event of spillage/ leaks from waste storage areas, this could negatively impact on the land and soil. Potential impacts on land and soils are addressed in Chapter 12 of this rEIAR.
Biodiversity	An assessment of the potential impacts of the Unauthorised Development on the Biodiversity of the Site, with emphasis on habitats, flora and fauna are included in Chapter 5 of this rEIAR
Landscape and Visual	An assessment of the potential impact of the Unauthorised Development on the landscape and visual environment is included in Chapter 10 of this rEIAR.
Air Quality and Climate	The potential impacts of the Unauthorised Development on air quality, particularly in terms of dust dispersion and deposition from extraction processes, have been considered in Chapter 8, *Air Quality and Climate,* of this rEIAR.
Conclusions	

The mitigation measures outlined in the respective Chapters outlined above will ensure that there will be no significant adverse impacts on the receiving land, soil and geology associated with the Operational Phase of the Unauthorised Development.

Table 14-5: Hydrology and Hydrogeology

Hydrology and Hydrogeology	
Summary	
Chapter 7 of this rEIAR, Hydrology and Hydrogeology, provides an assessment of the potential direct and indirect impacts from the Historic extraction and infill activities on hydrology, water and hydrogeology and sets out any required mitigation measures where appropriate. Following a review of the available information for the Unauthorised Development, it is considered that there are no significant residual impacts on hydrology and hydrogeology which have occurred, which are occurring, or which can be reasonably expected to occur as a result of the unauthorised quarry works. There have been no significant adverse residual impacts on the receiving hydrological and hydrogeological environment associated with the Unauthorised Development.	
Interactions	
Material Assets	Uncontrolled releases from the quarry during the Operational Phase could have negatively impact on the downstream Broadstown Stream or River Graney or New Ross groundwater body. Potential impacts on the surface water bodies and the underlying aquifer are addressed in Chapter 12.
Land and Soils	An assessment of the potential impact of the Unauthorised Development on the existing land, soils and geological environment are set out in Chapter 6 Land, Soil and Geology.
Population and Human Health	Appropriate industry standard and health and safety legislative requirements were implemented for the Unauthorised Development that were be protective of Site workers. It is noted that specific issues relating to Public Heath associated with the Unauthorised Development are set out in Chapter 4 of this rEIAR.
Biodiversity	An assessment of the potential impacts of the Development on the Biodiversity of the Site, with emphasis on habitats, flora and fauna which may have been impacted a result of the Unauthorised Development are included in Chapter 5 of this rEIAR. A hydrological connection has been identified between the Unauthorised Development Site and the Broadstown Stream which discharges to the River Barrow and River Nore SAC (002162). However, the rNIS report for this Application concluded that as the Unauthorised Development implemented the mitigation measures outlined in the EIS (EIS, 2004), there have not, are not and will not be any significant adverse effects on the River Barrow and River Nore SAC (002162).
Conclusions	
Overall, provided the mitigation measures outlined in the respective Chapters outlined above, there will be no significant adverse impacts on the receiving hydrological and hydrogeological environment associated with the Unauthorised Development.	

Table 14-6: Air Quality and Climate

Air Quality and Climate	
Summary	
Chapter 8 of this rEIAR, Air Quality and Climate, provides an assessment of the potential impacts from the Historic extraction and infill activities on ambient air quality and climate, and sets out appropriate mitigation measures where necessary. No considerable impact on climate is predicted to have occurred during the existing quarrying and infilling operations. There is the potential that combustion emissions from onsite machinery and traffic derived pollutants of CO_2 and N_2O were emitted during the operation phase of the Historic (Unauthorised) Quarry and Infill Operations. However, no significant increases in greenhouse gas emissions are expected to have taken place and therefore no considerable impact on climate.	
Interactions	
Population and Human Health	Interactions between Air Quality and Population and Human Health have been considered as the Operational Phase had the potential to cause health issues as a result of impacts on air quality from dust nuisances, including silica dust, and potential traffic derived pollutants. However, the mitigation measures employed at the Unauthorised Development ensured that all impacts are compliant with ambient air quality standards and human health have not been affected.
Traffic	Traffic derived pollutants which may affect Air Quality and Climate are deemed insignificant due to the marginal change in traffic volume and movement associated with the Unauthorised Development as outlined in Chapter 12, Section 2.1 *Traffic.*
Conclusions	
It is considered unlikely for significant air quality impacts to have occur as a result of increased traffic flow, and therefore an associated air quality check is not required. It is also noted that the development did not result in any significant change to current traffic movements and therefore no significant increases in greenhouse gas emissions are expected. Furthermore, the quantity and scale of machinery to be used at the Unauthorised Development is limited, and associated GHG contributions are likely to be marginal in terms of overall national GHG emission estimates, and therefore unlikely to have an adverse effect on climate.	

Table 14-7: Noise and Vibration

Noise and Vibration	
Summary	
Chapter 9 of this rEIAR, Noise and Vibration, provides a description and assessment of the likely impact of the historic activities from noise, and sets out appropriate mitigation measures where necessary. The noise-generating activities associated with the Unauthorised Development were as follows: • Extraction by excavators and transfer to wash/screening plant by dumper. • Washing and screening plant. • Generator. • Trucks entering and exiting the facility.	
Interactions	
Population and Human Health	The impact assessment of noise and vibration has concluded that additional noise associated with the operation of on-site machinery was intermittent and did not create any major negative impacts beyond the Site boundary. Mitigation and monitoring measures were incorporated to further reduce the potential for noise generation from the Unauthorised Development. It is noted that specific issues relating to Population and Human Health associated with the Development are set out in Chapter 4 of this rEIAR.
Traffic	The Unauthorised Development had no significant impact on overall traffic volumes and therefore traffic will not result in any significant increases of noise at sensitive receptors.
Conclusions	
No traffic routes were predicted to experience (or have experienced) increases of more than 25% in total traffic flows during the Operational Phase of historic development and therefore no detailed assessment is required as per the DMRB Guidelines. The impact of noise from operational traffic was unnoticeable and did not have a negative impact.	

Table 14-8: Landscape and Visual Assessment

Landscape and Visual Assessment	
Summary	
Chapter 10 of the rEIAR, Landscape and Visual Assessment, provides a description and assessment of the likely impact of the Unauthorised Development on the landscape and visual amenities of the area.	
Interactions	
	No relevant interactions.
Conclusions	
There will have been a ‘minor’ degree of impact on the landscape character of the development requiring substitute consent. It is considered that there will be a ‘neutral’ degree of impact on the landscape character of the Unauthorised Development, as all infrastructure was already in place It is concluded that the Historic Development had an ‘imperceptible’ visual impact on nearby sensitive receptors. No negative residual impacts in the context of landscape and visual impact are anticipated regarding this UNauthorised Development.	

Table 14-9: Archaeology and Cultural Heritage

Archaeology and Cultural Heritage	
Summary	
Chapter 11 of the rEIAR, Archaeology and Cultural Heritage, provides information on the known architectural, archaeological and cultural heritage sites in the study area in relation to Unauthorised Development. There are no records of any recorded monuments within the Site boundary of the Development. There are 15 No. recorded Monuments and Places within the 2km study area. These comprise 5 Enclosures (KD040-050----, CW001-001----, KD040-016----, WI026-013----, CW001-004----), 4 Ringfort – rath (CW001-002----, KD040-017----, KD038-050----, CW003-001----), 1 House – 17th century (KD040-037----), 1 Standing stone (KD040-040----), 1 Children's burial ground (KD038-049----), 1 Burnt Mound (CW001-003003-), 1 Church (CW001-003001-), 1 Graveyard (CW001-003002-). No negative residual impacts upon the archaeological or cultural heritage resource were identified.	
Interactions	
Landscape and Visual	It is not predicted that any changes in landscape or visual amenities will affect in any way the archaeology and cultural heritage of the area.
Conclusions	
There were negative residual impacts upon the archaeological or cultural heritage resource.	

Table 14-10: Material Assets - Traffic, Waste and Utilities

Material Assets - Traffic, Waste and Utilities	
Summary	
Chapter 12 of the rEIAR, Material Assets, provides an assessment of the potential impacts of the Unauthorised Development on Material Assets including traffic, built services and infrastructure.	
Interactions – Traffic	
Air Quality	The Unauthorised Development had no significant impact on overall traffic volumes and therefore traffic did not result in any significant impact on baseline air quality.
Noise	It has been concluded as part of the noise and vibration assessment that operational traffic did not result in adverse impacts on sensitive receptors in terms of noise.
Interactions – Waste & Utilities	
Land and Soils	In the event of spillage/ leaks from waste storage areas, this could have negatively impact on the land and soil. Potential impacts on land and soils are addressed in Chapter 6.
Hydrology and Hydrogeology	Uncontrolled releases from the quarry during the Operational Phase could have negatively impacted on the downstream Broadstown Stream or River Graney or New Ross groundwater body. Potential impacts on the surface water bodies and the underlying aquifer are addressed in Chapter 7.
Population and Human Health	In the event of uncontrolled releases of dust, noise or vibration, this could have negatively impacted on the surrounding human population and their overall health. Potential impacts on population and human health are addressed in Chapter 4. Additional potential impacts and interactions with the local population are addressed in detail in Chapters 8 (Air Quality), 9 (Noise and Vibrations) and 10 (Landscape and Visual Impact)
Conclusions	
No significant adverse residual impacts on Material Assets associated with the UNauthorised Development have been identified.	

14.4 References

EIAR Chapters 4 to 12 inclusive.

15 MITIGATION AND MONITORING MEASURES

15.1 Introduction

This rEIAR has assessed the impacts and resulting effects likely to occur as a result of the Unauthorised Development on the various aspects of the receiving environment.

The Unauthorised Development was operated in a manner that ensured that the potential impacts on the receiving environment were avoided where possible. In cases where impacts or potential impacts had been identified in the original EIS, mitigation measures had been proposed to reduce the significance of particular impacts. These mitigation recommendations are contained within each chapter exploring specific environmental aspects.

This chapter of the rEIAR collates and summarises the mitigation commitments made in Chapter 4 to Chapter 13.

15.2 Summary of Mitigation Measures

15.2.1 Population and Human Health

15.2.1.1 Mitigation

Proposed mitigation measures to ameliorate any adverse effects of the Development on human beings are described in detail in the remaining chapters of previously prepared EIS (*AWN Consulting Ltd, August 2004*) as follows:

- Dust and other emissions: Section 9.5
- Noise: Section 10.5
- Traffic: Section 8.7
- Visual Amenity & Landscape Heritage: Section 11.6
- Natural Heritage
    - Flora & Fauna: Section 7.5
    - Water: Section 6.7
    - Soils: Section 5.7
- Archaeological Heritage: Section 12.9

15.2.1.2 Monitoring

Monitoring to ensure there are no adverse effects on human beings are described in detail in the remaining chapters of previously prepared EIS as follows:

- A water quality monitoring programme, including groundwater and surface water monitoring will be developed to ensure that the implemented mitigation and restoration measures are effective in controlling emissions and that there is no negative impact on the receiving water (hydrological and hydrogeological) environment. Water in the sump will be monitored to ensure there are no negative impacts on groundwater (see Section 6.8)

15.2.2 Biodiversity

15.2.2.1 Mitigation

Several mitigation measures were implemented as part of the original EIS for the historic development to mitigate against significant impacts to habitats and fauna during both the construction and operation phase. The following paragraphs outline the mitigation measures implemented as part of the historic development. These measures implemented in full would have been sufficient to prevent significant impacts on habitats or fauna during the historic development including the unauthorised development.

15.2.2.1.1.1 Mitigation by Avoidance

The extraction and infill activities were contained within a clearly defined area of the site, largely concentrating on the hill located in the centre of the property. Machinery operated only within the allocated area and the access route to the site was confined to the existing track, in order to reduce to the largest extent possible, potential damage from vehicular disturbance.

Where preparation work was adjacent to hedgerows on site, a buffer zone of at least 5 metres from the drip line of mature trees was fenced off, to prevent damage to roots and branches.

This minimum distance also aimed to help in reducing dust build up on hedgerows. In addition, this 5m buffer would have limited disturbance to birds and mammals which may have been utilising the hedgerows adjacent to extraction and infill activities.

Although the unauthorised extraction and infill activities did not lead to the removal of any hedgerows or trees onsite, the original EIS states that any trimming or pruning works required along the access route, were to be carried out outside of the nesting period (March-August) in line with the Wildlife (Amendment) Act, 2000.This was to ensure that no avifauna is directly affected by the Historic development. This time period also coincides with the summer breeding season for bats and pruning and trimming works outside of this time would avoid any disturbance to bats which may have had summer maternity roosts within mature trees.

The original EIS also proposed measures to avoid significant impacts on aquatic habitats including the Broadstown stream to the south of the site. In particular, all surface water runoff runs into the pit or permeates into the ground. No surface water runoff was directed towards the nearby stream. In addition, topsoil that was stored on site was stored in mounds on a low-lying area away from the stream, so as to prevent solids entering the stream during periods of high rainfall.

15.2.2.1.1.2 Mitigation by Reduction

Measures were also taken to limit the working area during the preparation phase to reduce the impacts of the historic development on the adjacent habitats. On dry windy days dust preventative measures were implemented in order to prevent any dust blow to areas outside the delimited preparation areas. All fuels were contained within specially constructed bunds to ensure that all fuel spillages were fully contained and thus would not impact on any off-site habitats. The wastewater from the washing / rinsing plant was fed by gravity to two settlement lagoons laid out in series, in the west of the study area. These settlement ponds are designed to prevent any silt laden surface water run-off to adjacent habitats.

A significant amount of soil, sand and gravel was removed as a result of the extraction activities. All mounded soils or temporary aggregate were not placed within 5 metres of the drip line of any trees or hedgerows to be retained on site. In addition, all excavated topsoil was re-used for the reinstatement of the area once excavation was complete. Phase I was progressively restored using the topsoil stripped from Phase Two (once work on Phase Two had commenced) and so on until the final phase was completed. Silts extracted from the settlement lagoons were also used in the restoration process.

15.2.2.1.1.3 Mitigation by Remedy

Remedial measures included reseeding the areas of lost grassland habitat once pit operations were stopped and the area was infilled.

15.2.2.2 Monitoring

No monitoring is proposed.

15.2.3 Land and Soils

15.2.3.1 Mitigation

15.2.3.1.1 Construction Phase

There was no Construction Phase for the Unauthorised Development, therefore avoidance, remedial and mitigation measures are not required.

15.2.3.1.2 Operational Phase

The impact to land and land stability has been already mitigated in the central portion of the Site with the restoration using surplus stripped topsoil and overburden to ensure that the lands have been returned to suitable agricultural lands.

There has been an unavoidable loss of soil associated with the extraction and sale for use offsite of the sand and gravel quarried from the Site. There has been no identified impact to soil quality or degradation of soils associated with the unauthorised development.

Overall, no significant impacts identified at the Unauthorised Development Site that would warrant remedial or mitigation measures and therefore avoidance, remedial and mitigation measures are not required.

15.2.3.2 Monitoring

There are no monitoring requirements for the Construction Phase or Operational Phase of the Unauthorised Development.

15.2.4 Hydrology

15.2.4.1 Mitigation

15.2.4.1.1 Construction Phase

There was no Construction Phase for the unauthorised development and therefore no requirement for mitigation measures.

15.2.4.1.2 Operational Phase

Overall, there were no significant impacts to the receiving hydrological and hydrogeological environment which have occurred, which are occurring, or which can be reasonably expected to occur as a result of the Unauthorised Development. Onsite operations have ceased and there is no requirement for mitigation measures.

15.2.4.2 Monitoring

15.2.4.2.1 Construction Phase

There are no monitoring requirements for the Construction Phase of the Unauthorised Development

15.2.4.2.2 Operational Phase

There are no monitoring requirements for the Operational Phase of the Unauthorised Development.

15.2.5 Air Quality

15.2.5.1 Mitigation

No remedial and mitigation measures are required.

15.2.6 Climate

15.2.6.1 Mitigation

No remedial and mitigation measures are required.

15.2.7 Monitoring

No remedial monitoring measures are required.

15.2.8 Noise & Vibrations

15.2.8.1 Mitigation

In order to control likely noise impacts caused by the proposed external operations, mitigation measures as set below were adopted as much as possible during the site operations:

- Selection of plant with low inherent potential for generating noise.
- Siting of plant as far away from sensitive receptors as permitted by site constraints.
- Avoidance unnecessary revving of engines and switch off plant items when not required.
- Plant, machinery and vehicles were adequately maintained and serviced.
- Proper balancing of plant items with rotating parts occurred.
- Internal routes were well maintained and avoid steep gradients.
- Drop heights for materials were minimised where possible.
- Alternative reversing alarm systems on plant machinery used where possible.
- Limited the hours during which site activities likely to create high levels of noise are permitted.

15.2.8.2 Monitoring

No remedial monitoring measures are required.

15.2.9 Landscape & Visual

15.2.9.1 Mitigation

As the landscape and visual impacts of the Unauthorised Development did not cause any significant long-term negative impacts on the surrounding landscape or visual amenities, no avoidance, remedial or mitigation measures are required for the Unauthorised Development.

15.2.9.2 Monitoring

No specific monitoring measures are required in relation to landscape and visual assessment.

15.2.10 Archaeology and Cultural Heritage

15.2.10.1 Mitigation

Since no known archaeological, architectural or cultural heritage remains were found during the desk top survey as well as the walkover survey, there are no further mitigation measures required for this development.

15.2.10.2 Monitoring

No specific monitoring measures are required in relation to archaeology and cultural heritage.

15.2.11 Materials Assets

15.2.11.1 Mitigation

No remedial and mitigation measures are required.

15.2.11.2 Monitoring

No monitoring was carried out for the Historic Development.

15.2.12 Traffic

15.2.12.1 Mitigation

15.2.12.1.1 Construction Phase

There was no avoidance, remedial or mitigation measures proposed for the construction phase.

15.2.12.1.2 Operational Phase

Two mitigation measures are proposed, additional road markings and signage on the site access arm of the junction are proposed, with “STOP” markings and a stop line to be provided (RRM 017 and M114), and a stop sign shall also be provided (RUS 027) as per Sections 6 and 7 of the Traffic Signs Manual, 2019. These enhancements are proposed at the junction in order to maintain its safety characteristics, despite the moderate increase in traffic anticipated at the junction. The second measure is to cut back the hedge in the northbound direction to improve visibility splay.

15.2.12.2 Monitoring

There are no monitoring measures proposed.

15.2.13 Risk

15.2.13.1 Mitigation

No mitigation measures are considered necessary.

15.2.13.2 Monitoring

No monitoring is considered necessary.

Appendix A

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW3**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
		Ground Level				Headworks
0		Dark brown, slightly silty CLAY with frequent rootlets. Dry.				
		Light grey/ light brown, silty SAND. Dry.				
1						
		Dark brown, slightly gravelly, slightly silty SAND. Dry.				
2		Dark brown SAND and GRAVEL. Dry.				
3						
		Brown, slightly silty GRAVEL. Damp.				
4						
5		Brown, slightly silty, slightly clayey GRAVEL. Damp.				
		Brown, slightly clayey GRAVEL. Wet.		Minor seepage 5.2mbGL		
6		Brown, slightly gravelly, slightly clayey SILT. Dry.				
		Light brown, slightly gravelly SAND. Dry.				
7						
		Light brown, slightly sandy SILT. Moist to wet.		Minor seepage 7.3mbGL		
8						
		Light brown, slightly gravelly, silty CLAY. Dry.				
9						

Bentonite 0-12.5mbGL

Plain PVC pipe 0-13mbGL

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 5.2mbGL	
Method: Air rotary drill	**Elevation:** 115.053mOD	**Water Level :** 113.252mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684643.5	**Logged by:** FJ	**Sheet:** 1 of 2
Drill Date: 14/10/2021	**Northing:** 684779.7	**Checked by:**	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW3**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
10		Brown, slightly silty CLAY. Dry.				
		Brown, slightly gravelly, slightly silty CLAY. Dry.				
11						
12						
		Light brown, slightly sandy, slightly clayey SILT. Dry.				
13		Light brown, slightly silty, slightly gravelly SAND. Damp.				
		Brown, slightly silty SAND. Moist.				
		Brown, slightly silty SAND and GRAVEL.		Water strike 13.6mbGL		
14						
15		Brown, slightly gravelly, slightly silty SAND. Wet.				
		Brown CLAY. Moist.				
16		Brown, slightly clayey SAND. Moist.				
		White Granite Bedrock.				
17						
18		End of hole: 18mbGL				
19						

Gravel 12.5-18mbGL

Slotted PVC pipe 13-16mbGL

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 5.2mbGL	
Method: Air rotary drill	**Elevation:** 115.053mOD	**Water Level :** 113.252mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684643.5	**Logged by:** FJ	**Sheet:** 2 of 2
Drill Date: 14/10/2021	**Northing:** 684779.7	**Checked by:**	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW4**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
		Ground Level				Headworks
0		Dark brown, slightly gravelly CLAY with frequent rootlets. Dry.				
		Light brown, slightly gravelly SAND. Dry.				
1						
		Light brown, gravelly SAND. Dry.				
2						
		Brown, slightly silty, slightly gravelly SAND. Wet.		Minor seepage 2.5mbGL		
		Brown, slightly silty SAND. Damp.				
3						
		Brown, gravelly SAND. Damp.				
4						
		Grey/ brown, slightly silty SAND and GRAVEL. Wet.		Water strike 4.7mbGL		
5						
6		Brown/ grey, gravelly SAND. Wet..				
		Brown, gravelly SAND. Moist.				
7						
		Brown, silty, slightly gravelly SAND. Moist to wet.				
8		Brown, slightly silty SAND and GRAVEL. Wet.				
9						

Bentonite 0-5.5mbGL
Plain PVC pipe 0-6.5mbGL
Gravel 5.5-9.5mbGL
Slotted PVC pipe 6.5-9.5mbGL
Bentonite 9.5-11.5mbGL

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 2.5mbGL	
Method: Air rotary drill	**Elevation:** 114.372mOD	**Water Level :** 112.209mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684524.6	**Logged by:** FJ	**Sheet:** 1 of 2
Drill Date: 19/10/2021	**Northing:** 684838.3	**Checked by:**	

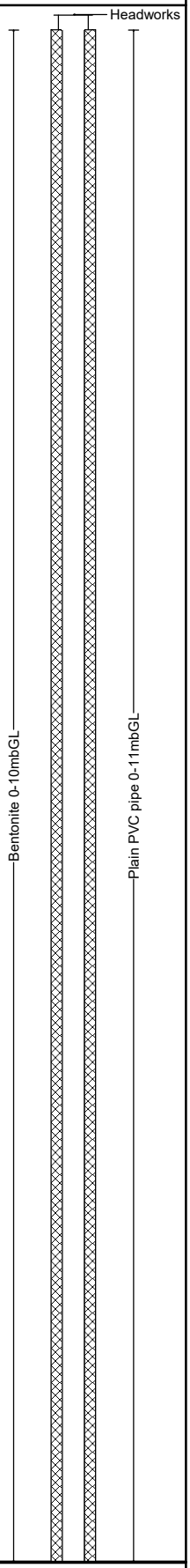
Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW4**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
10						
11		Brown, gravelly SAND. Damp to Moist.				
		End of hole: 11.5mbGL				
12						
13						
14						
15						
16						
17						
18						
19						

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 2.5mbGL	
Method: Air rotary drill	**Elevation:** 114.372mOD	**Water Level :** 112.209mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684524.6	**Logged by:** FJ	**Sheet:** 2 of 2
Drill Date: 19/10/2021	**Northing:** 684838.3	**Checked by:**	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW5**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
		Ground Level				
0		Dark brown, silty CLAY with frequent rootlets. Dry to damp.				
		Brown, slightly gravelly, sandy CLAY. Moist to Wet.		Minor seepage 0.2mbGL		
1						
2		Brown, slightly gravelly SAND. Dry.				
3		Brown, gravelly SILT. Dry.				
4		Brown, gravelly SAND. Dry.				
		Brown, sandy GRAVEL. Dry.				
5						
6		Grey, slightly sandy GRAVEL. Damp.				
7						
8						
9						



Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 10.5mbGL	
Method: Air rotary drill	**Elevation:** 120.064mOD	**Water Level :** 113.318mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684843	**Logged by:** FJ	**Sheet:** 1 of 2
Drill Date: 19/10/2021	**Northing:** 685016.6	**Checked by:**	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW5**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
10				Water strike 10.5mbGL		Gravel 10-14mbGL; Slotted PVC pipe 11-14mbGL; Bentonite 14-15mbGL
		Brown, slightly clayey SAND and GRAVEL. Wet.				
11						
12						
		Brown, gravelly SAND. Wet.				
13						
		Granite boulder layer. Dry.				
		Brown, slightly gravelly SAND. Wet.				
14						
15		End of hole: 15mbGL				
16						
17						
18						
19						

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 10.5mbGL	
Method: Air rotary drill	**Elevation:** 120.064mOD	**Water Level :** 113.318mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684843	**Logged by:** FJ	**Sheet:** 2 of 2
Drill Date: 19/10/2021	**Northing:** 685016.6	**Checked by:**	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW6**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
		Ground Level				Headworks
0		Dark brown, gravelly CLAY with frequent rootlets. Wet to Moist.				
		Dark brown, gravelly, slightly sandy CLAY. Moist.				
1		Brown, SAND and GRAVEL. Damp.				
2		Brown, slightly sandy GRAVEL. Damp.				
3		Brown, gravelly SAND. Dry.				
		Brown, slightly gravelly SAND. Dry.				
4		Brown SAND and GRAVEL. Dry.				
5		Grey/ brown, slightly gravelly SAND. Dry.				
6		Brown, SAND and GRAVEL. Dry.				
7		Brown, fine-grained SAND. Dry.				
8						
9						

Bentonite 0-9mbGL

Gravel 9-14mbGL

Plain PVC pipe 0-10.5mbGL

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 10.5mbGL	
Method: Air rotary drill	**Elevation:** 122.533mOD	**Water Level :** 111.409mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684227.6	**Logged by:** FJ	**Sheet:** 1 of 2
Drill Date: 21/10/2021	**Northing:** 684942.9	**Checked by:**	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW6**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
10		Brown, slightly clayey SILT. Moist to Wet.		Water strike 10.1mbGL		Gravel 9-14mbGL; Slotted PVC pipe 10.5-13.5mbGL
11		Brown, clayey SILT. Wet.				
12						
13						
14		End of hole: 14mbGL				
15						
16						
17						
18						
19						

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 10.5mbGL	
Method: Air rotary drill	**Elevation:** 122.533mOD	**Water Level :** 111.409mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684227.6	**Logged by:** FJ	**Sheet:** 2 of 2
Drill Date: 21/10/2021	**Northing:** 684942.9	**Checked by:**	

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP01

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		MADE GROUND. Brown, silty, gravelly, fine to medium grained SAND with frequent rootlets. Dry to moist.			0.0ppm (0.2mbGL)
		MADE GROUND. Light brown to orange, gravelly, medium to coarse grained SAND with some assorted cobbles of limestone. Moist.			0.0ppm (0.3-0.6mbGL)
1		MADE GROUND. Light brown, sandy, gravelly SILT with rare lenses of sandy gravel. Moist.			0.0ppm (1.7-2.1mbGL)
2		End of hole: 2.5mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.5m
Date:

Reference Point:
Elevation: 120.229mOD
Easting: 684708.3
Northing: 684892.4

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by:

Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP02

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		MADE GROUND. Brown, silty, gravelly, medium to coarse grained SAND with frequent rootlets and trace medium cobbles of limestone. Dry to moist.			0.0ppm (0.2mbGL)
		MADE GROUND. Light brown, slightly gravelly, sandy SILT with trace assorted cobbles of limestone. Moist.			0.0ppm (0.4-0.8mbGL)
1					
2		MADE GROUND. Light grey, slightly gravelly, silty, fine grained SAND with trace inclusion of metal wire at 2.5mbGL. Moist.			0.0ppm (2.4-2.6mbGL)
		MADE GROUND. Light brown, slightly gravelly, sandy SILT with trace assorted cobbles of limestone. Moist.			0.0ppm (2.6-2.8mbGL)
		End of hole: 2.8mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.8m
Date:

Reference Point:
Elevation: 118.091mOD
Easting: 684736.2
Northing: 684987.4

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by:
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP03

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		MADE GROUND. Brown, silty, gravelly, medium to coarse grained SAND with frequent rootlets and trace medium cobbles of limestone. Dry to moist.			
		MADE GROUND. Brown, slightly sandy, slightly gravelly SILT. Dry.			0.0ppm (0.4-0.8mbGL)
1		MADE GROUND. Brown, slightly sandy gravelly SILT with occasional assorted cobbles of limestone. Dry.			
		MADE GROUND. Grey, sandy GRAVEL. Moist.			0.0ppm (1.4-1.7mbGL)
2		MADE GROUND. Grey to brown, slightly gravelly sandy SILT. Moist.			
		Grey, silty, coarse grained SAND. Water ingress at 2.4mbGL.		Water ingress 2.4mbGL	0.0ppm (2.4-2.6mbGL)
		End of hole: 2.6mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.6m
Date:

Reference Point:
Elevation: 114.967mOD
Easting: 684609.6
Northing: 684990.2

Water Strike: 2.4mbGL
Water Level: N/A
Logged by: GC
Checked by:
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP04

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		MADE GROUND. Brown, silty, gravelly, medium to coarse grained SAND with frequent rootlets and trace medium cobbles of limestone. Dry to moist.			0.0ppm (0.0-0.4mbGL)
1		MADE GROUND. Light brown, slightly sandy, gravelly SILT with trace assorted cobbles of limestone. Dry to moist.			0.0ppm (1.0-1.5mbGL)
2		MADE GROUND. Grey to brown, silty, gravelly fine to medium grained SAND with pockets of grey, gravelly silt. Moist.			0.0ppm (2.0-2.1mbGL)
		Grey, gravelly medium to coarse grained SAND. Slight water ingress at 2.35mbGL.		Water ingress 2.35mbGL	
3		End of hole: 2.5mbGL			
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.5m
Date:

Reference Point:
Elevation: 115.166mOD
Easting: 684623.3
Northing: 684907.4

Water Strike: 2.35mbGL
Water Level: N/A
Logged by: GC
Checked by:
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP05

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty fine to medium grained SAND with frequent rootlets. Moist.			
		Light brown to orange, slightly silty, gravelly medium grained SAND. Dry to moist.			0.0ppm (0.7-0.8mbGL)
1					
		Grey, slightly silty, slightly gravelly fine to medium grained SAND with occasional pockets of grey sandy silt and veins of gravelly coarse grained sand. Dry to moist.			0.0ppm (1.1-1.5mbGL)
2					
		End of hole: 2.6mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.6m
Date:

Reference Point:
Elevation: 122.016mOD
Easting: 684779.8
Northing: 684875.3

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by:
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP06

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty fine to medium grained SAND with frequent rootlets. Moist.			
		Brown, gravelly coarse grained SAND with occasional cobbles of limestone and granite. Dry to moist.			0.0ppm (0.3-0.7mbGL)
1		Grey, sandy GRAVEL with frequent assorted cobbles of limestone and granite. Moist.			0.0ppm (1.8-2.0mbGL)
2		End of hole: 2.0mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2m
Date:

Reference Point:
Elevation: 119.212mOD
Easting: 684843.8
Northing: 684849.2

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by:
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP07

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty fine to medium grained SAND with frequent rootlets. Moist.			
		Brown, gravelly medium grained SAND. Moist.			
1		Grey, sandy GRAVEL with assorted cobbles of limestone and granite. Moist.			0.0ppm (1.4-1.8mbGL)
		End of hole: 1.8mbGL			
2					
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 1.8m
Date:

Reference Point:
Elevation: 120.68mOD
Easting: 684891.5
Northing: 684839.6

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by:
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP08

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty fine to medium grained SAND with frequent rootlets. Moist.			
		Brown, slightly gravelly, silty medium grained SAND. Dry to moist.			
		Grey, sandy GRAVEL with assorted cobbles of limestone and granite. Moist.			
1					0.0ppm (0.8-1.1mbGL)
		Grey, sandy GRAVEL with occasional cobbles of limestone and granite.			
		Grey, gravelly fine to coarse grained SAND with few cobbles of limestone and gravel. Dry to moist.			
2					0.0ppm (1.9-2.3mbGL)
		Grey, sandy GRAVEL. Moist.			
		End of hole: 2.5mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.5m
Date:

Reference Point:
Elevation: 121.418mOD
Easting: 684966.2
Northing: 684797.1

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by:
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP09

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty fine to medium grained SAND with frequent rootlets. Moist.			0.0ppm (0.1-0.3mbGL)
		Brown to orange, silty, gravelly medium grained SAND. Dry to moist.			
1		Grey, gravelly coarse grained SAND with some assorted cobbles of limestone and granite. Dry to moist.			0.0ppm (0.6-1.1mbGL)
		Grey, sandy GRAVEL with few cobbles of limestone and granite. Dry to moist.			0.0ppm (1.6-1.9mbGL)
2		End of hole: 2.2mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.2m
Date:

Reference Point:
Elevation: 120.41mOD
Easting: 684717.7
Northing: 684836

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by:
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP10

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty fine to medium grained SAND with frequent rootlets. Moist.			
		Brown to orange, slightly gravelly, silty fine grained SAND. Dry to moist.			0.0ppm (0.3-0.6mbGL)
1		Grey, gravelly medium grained SAND with some pockets of fine grained sand. Dry.			0.0ppm (0.0-1.4mbGL)
2		Brown, gravelly medium grained SAND with pockets of sandy gravel. Dry to moist.			
		End of hole: 2.2mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.2m
Date:

Reference Point:
Elevation: 121.808mOD
Easting: 684815.3
Northing: 684982.2

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by:
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP11

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty fine to medium grained SAND with frequent rootlets. Moist.			
		Brown, slightly gravelly, silty fine grained SAND. Dry to moist.			0.0ppm (0.4-0.9mbGL)
1		Grey, sandy GRAVEL with assorted cobbles of limestone and granite. Moist.			
2					
		End of hole: 2.2mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.2m
Date:

Reference Point:
Elevation: 123.541mOD
Easting: 684978
Northing: 684913.6

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by:
Sheet: 1 of 1

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW3**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
		Ground Level				Headworks
0		Dark brown, slightly silty CLAY with frequent rootlets. Dry.				
		Light grey/ light brown, silty SAND. Dry.				
1						
		Dark brown, slightly gravelly, slightly silty SAND. Dry.				
2		Dark brown SAND and GRAVEL. Dry.				
3						
		Brown, slightly silty GRAVEL. Damp.				
4						
5		Brown, slightly silty, slightly clayey GRAVEL. Damp.				
		Brown, slightly clayey GRAVEL. Wet.		Minor seepage 5.2mbGL		
6		Brown, slightly gravelly, slightly clayey SILT. Dry.				
		Light brown, slightly gravelly SAND. Dry.				
7						
		Light brown, slightly sandy SILT. Moist to wet.		Minor seepage 7.3mbGL		
8						
		Light brown, slightly gravelly, silty CLAY. Dry.				
9						

Bentonite 0-12.5mbGL

Plain PVC pipe 0-13mbGL

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 5.2mbGL	
Method: Air rotary drill	**Elevation:** 115.053mOD	**Water Level :** 113.252mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684643.5	**Logged by:** FJ	**Sheet:** 1 of 2
Drill Date: 14/10/2021	**Northing:** 684779.7	**Checked by:**	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW3**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
10		Brown, slightly silty CLAY. Dry.				
		Brown, slightly gravelly, slightly silty CLAY. Dry.				
11						
12						
		Light brown, slightly sandy, slightly clayey SILT. Dry.				
13		Light brown, slightly silty, slightly gravelly SAND. Damp.				
		Brown, slightly silty SAND. Moist.				
		Brown, slightly silty SAND and GRAVEL.		Water strike 13.6mbGL		
14						
15		Brown, slightly gravelly, slightly silty SAND. Wet.				
		Brown CLAY. Moist.				
16		Brown, slightly clayey SAND. Moist.				
		White Granite Bedrock.				
17						
18		End of hole: 18mbGL				
19						

Gravel 12.5-18mbGL

Slotted PVC pipe 13-16mbGL

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 5.2mbGL	
Method: Air rotary drill	**Elevation:** 115.053mOD	**Water Level :** 113.252mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684643.5	**Logged by:** FJ	**Sheet:** 2 of 2
Drill Date: 14/10/2021	**Northing:** 684779.7	**Checked by:**	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW4**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
		Ground Level				Headworks
0		Dark brown, slightly gravelly CLAY with frequent rootlets. Dry.				
		Light brown, slightly gravelly SAND. Dry.				
1						
		Light brown, gravelly SAND. Dry.				
2		Brown, slightly silty, slightly gravelly SAND. Wet.		Minor seepage 2.5mbGL		
		Brown, slightly silty SAND. Damp.				
3		Brown, gravelly SAND. Damp.				
4						
		Grey/ brown, slightly silty SAND and GRAVEL. Wet.		Water strike 4.7mbGL		
5						
6		~~Brown/ grey~~, gravelly SAND. Wet..				
		Brown, gravelly SAND. Moist.				
7						
		Brown, ~~silty, slightly gravelly~~ SAND. Moist to wet.				
8		Brown, slightly silty SAND and GRAVEL. Wet.				
9						

Bentonite 0-5.5mbGL

Plain PVC pipe 0-6.5mbGL

Gravel 5.5-9.5mbGL

Slotted PVC pipe 6.5-9.5mbGL

Bentonite 9.5-11.5mbGL

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 2.5mbGL	
Method: Air rotary drill	**Elevation:** 114.372mOD	**Water Level :** 112.209mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684524.6	**Logged by:** FJ	**Sheet:** 1 of 2
Drill Date: 19/10/2021	**Northing:** 684838.3	**Checked by:**	

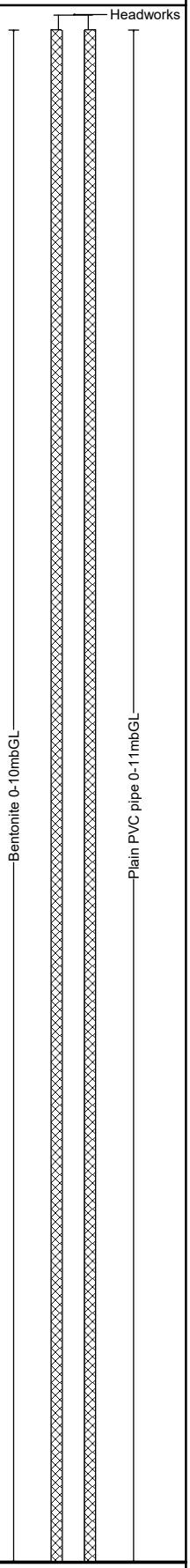
Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW4**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
10						
11		Brown, gravelly SAND. Damp to Moist.				
		End of hole: 11.5mbGL				
12						
13						
14						
15						
16						
17						
18						
19						

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 2.5mbGL	
Method: Air rotary drill	**Elevation:** 114.372mOD	**Water Level :** 112.209mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684524.6	**Logged by:** FJ	**Sheet:** 2 of 2
Drill Date: 19/10/2021	**Northing:** 684838.3	**Checked by:**	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW5**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
		Ground Level				
0		Dark brown, silty CLAY with frequent rootlets. Dry to damp.				
		Brown, slightly gravelly, sandy CLAY. Moist to Wet.		Minor seepage 0.2mbGL		
1						
2		Brown, slightly gravelly SAND. Dry.				
3		Brown, gravelly SILT. Dry.				
4		Brown, gravelly SAND. Dry.				
5		Brown, sandy GRAVEL. Dry.				
6		Grey, slightly sandy GRAVEL. Damp.				
7						
8						
9						



Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 10.5mbGL	
Method: Air rotary drill	**Elevation:** 120.064mOD	**Water Level :** 113.318mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684843	**Logged by:** FJ	**Sheet:** 1 of 2
Drill Date: 19/10/2021	**Northing:** 685016.6	**Checked by:**	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW5**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
10						
		Brown, slightly clayey SAND and GRAVEL. Wet.		Water strike 10.5mbGL		
11						
12						Gravel 10-14mbGL
		Brown, gravelly SAND. Wet.				
13						
		Granite boulder layer. Dry.				
		Brown, slightly gravelly SAND. Wet.				
14						Bentonite 14-15mbGL
15		End of hole: 15mbGL				Slotted PVC pipe 11-14mbGL
16						
17						
18						
19						

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 10.5mbGL	
Method: Air rotary drill	**Elevation:** 120.064mOD	**Water Level :** 113.318mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684843	**Logged by:** FJ	**Sheet:** 2 of 2
Drill Date: 19/10/2021	**Northing:** 685016.6	**Checked by:**	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW6**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
		Ground Level				Headworks
0		Dark brown, gravelly CLAY with frequent rootlets. Wet to Moist.				
		Dark brown, gravelly, slightly sandy CLAY. Moist.				
1		Brown, SAND and GRAVEL. Damp.				
2		Brown, slightly sandy GRAVEL. Damp.				
3		Brown, gravelly SAND. Dry.				
		Brown, slightly gravelly SAND. Dry.				
4		Brown SAND and GRAVEL. Dry.				
5		Grey/ brown, slightly gravelly SAND. Dry.				
6		Brown, SAND and GRAVEL. Dry.				
7		Brown, ~~fine-grained~~ SAND. Dry.				
8						
9						

Bentonite 0-9mbGL

Gravel 9-14mbGL

Plain PVC pipe 0-10.5mbGL

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 10.5mbGL	
Method: Air rotary drill	**Elevation:** 122.533mOD	**Water Level :** 111.409mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684227.6	**Logged by:** FJ	**Sheet:** 1 of 2
Drill Date: 21/10/2021	**Northing:** 684942.9	**Checked by:**	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW6**
Project: EIAR	**Client: Mark Phelan**	**Site: Maplestown, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
10		Brown, slightly clayey SILT. Moist to Wet.		Water strike 10.1mbGL		Gravel 9-14mbGL; Slotted PVC pipe 10.5-13.5mbGL
11		Brown, clayey SILT. Wet.				
12						
13						
14		End of hole: 14mbGL				
15						
16						
17						
18						
19						

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 10.5mbGL	
Method: Air rotary drill	**Elevation:** 122.533mOD	**Water Level :** 111.409mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684227.6	**Logged by:** FJ	**Sheet:** 2 of 2
Drill Date: 21/10/2021	**Northing:** 684942.9	**Checked by:**	

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP01

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		MADE GROUND. Brown, silty, gravelly, fine to medium grained SAND with frequent rootlets. Dry to moist.			0.0ppm (0.2mbGL)
		MADE GROUND. Light brown to orange, gravelly, medium to coarse grained SAND with some assorted cobbles of limestone. Moist.			0.0ppm (0.3-0.6mbGL)
1		MADE GROUND. Light brown, sandy, gravelly SILT with rare lenses of sandy gravel. Moist.			0.0ppm (1.7-2.1mbGL)
2		End of hole: 2.5mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.5m
Date:

Reference Point:
Elevation: 120.229mOD
Easting: 684708.3
Northing: 684892.4

Water Strike: None
Water Level: N/A

Logged by: GC
Checked by:

Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP02

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		MADE GROUND. Brown, silty, gravelly, ~~medium to coarse grained~~ SAND with frequent rootlets and trace medium cobbles of limestone. Dry to moist.			0.0ppm (0.2mbGL)
		MADE GROUND. Light brown, slightly gravelly, sandy SILT with trace assorted cobbles of limestone. Moist.			0.0ppm (0.4-0.8mbGL)
1					
2		MADE GROUND. Light grey, slightly gravelly, silty, ~~fine grained~~ SAND with trace inclusion of metal wire at 2.5mbGL. Moist.			0.0ppm (2.4-2.6mbGL)
		MADE GROUND. Light brown, slightly gravelly, sandy SILT with trace assorted cobbles of limestone. Moist.			0.0ppm (2.6-2.8mbGL)
		End of hole: 2.8mbGL			
3					
4					

Contractor: Mark Phelan
Method: ~~Tracked excavator~~
Pit Dimensions: 1m x 5m x 2.8m
Date:

Reference Point:
Elevation: 118.091mOD
Easting: 684736.2
Northing: 684987.4

Water Strike: None
Water Level: N/A

Logged by: GC
Checked by:

Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP03

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		MADE GROUND. Brown, silty, gravelly, ~~medium to coarse grained~~ SAND with frequent rootlets and trace medium cobbles of limestone. Dry to moist.			
		MADE GROUND. Brown, slightly sandy, slightly gravelly SILT. Dry.			0.0ppm (0.4-0.8mbGL)
1		MADE GROUND. Brown, slightly sandy gravelly SILT with occasional assorted cobbles of limestone. Dry.			
		MADE GROUND. Grey, sandy GRAVEL. Moist.			0.0ppm (1.4-1.7mbGL)
2		MADE GROUND. Grey to brown, slightly gravelly sandy SILT. Moist.			
		Grey, silty, ~~coarse grained~~ SAND. ~~Water ingress at 2.4mbGL.~~		Water ingress 2.4mbGL	0.0ppm (2.4-2.6mbGL)
		End of hole: 2.6mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.6m
Date:

Reference Point:
Elevation: 114.967mOD
Easting: 684609.6
Northing: 684990.2

Water Strike: 2.4mbGL
Water Level: N/A
Logged by: GC
Checked by:
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP04

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		MADE GROUND. Brown, silty, gravelly, ~~medium to coarse grained~~ SAND with frequent rootlets and trace medium cobbles of limestone. Dry to moist.			0.0ppm (0.0-0.4mbGL)
1		MADE GROUND. Light brown, slightly sandy, gravelly SILT with trace assorted cobbles of limestone. Dry to moist.			0.0ppm (1.0-1.5mbGL)
2		MADE GROUND. Grey to brown, silty, gravelly ~~fine to medium grained~~ SAND with pockets of grey, gravelly silt. Moist.			0.0ppm (2.0-2.1mbGL)
		Grey, gravelly ~~medium to coarse grained~~ SAND. ~~Slight water ingress at 2.35mbGL.~~		Water ingress 2.35mbGL	
3		End of hole: 2.5mbGL			
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.5m
Date:

Reference Point:
Elevation: 115.166mOD
Easting: 684623.3
Northing: 684907.4

Water Strike: 2.35mbGL
Water Level: N/A
Logged by: GC
Checked by:
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP05

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty ~~fine to medium grained~~ SAND with frequent rootlets. Moist.			
		Light brown to orange, slightly silty, gravelly ~~medium grained~~ SAND. Dry to moist.			0.0ppm (0.7-0.8mbGL)
1		Grey, slightly silty, slightly gravelly ~~fine to medium grained~~ SAND with occasional pockets of grey sandy silt and veins of gravelly ~~coarse grained~~ sand. Dry to moist.			0.0ppm (1.1-1.5mbGL)
2					
		End of hole: 2.6mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.6m
Date:

Reference Point:
Elevation: 122.016mOD
Easting: 684779.8
Northing: 684875.3

Water Strike: None
Water Level: N/A

Logged by: GC
Checked by:

Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP06

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty ~~fine to medium grained~~ SAND with frequent rootlets. Moist.			
		Brown, gravelly ~~coarse grained~~ SAND with occasional cobbles of limestone and granite. Dry to moist.			0.0ppm (0.3-0.7mbGL)
1		Grey, sandy GRAVEL with frequent assorted cobbles of limestone and granite. Moist.			0.0ppm (1.8-2.0mbGL)
2		End of hole: 2.0mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2m
Date:

Reference Point:
Elevation: 119.212mOD
Easting: 684843.8
Northing: 684849.2

Water Strike: None
Water Level: N/A

Logged by: GC
Checked by:

Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP07

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty fine to medium grained SAND with frequent rootlets. Moist.			
		Brown, gravelly medium grained SAND. Moist.			
		Grey, sandy GRAVEL with assorted cobbles of limestone and granite. Moist.			
1					0.0ppm (1.4-1.8mbGL)
		End of hole: 1.8mbGL			
2					
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 1.8m
Date:

Reference Point:
Elevation: 120.68mOD
Easting: 684891.5
Northing: 684839.6

Water Strike: None
Water Level: N/A

Logged by: GC
Checked by:

Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP08

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty fine to medium grained SAND with frequent rootlets. Moist.			
		Brown, slightly gravelly, silty medium grained SAND. Dry to moist.			
		Grey, sandy GRAVEL with assorted cobbles of limestone and granite. Moist.			
1					0.0ppm (0.8-1.1mbGL)
		Grey, sandy GRAVEL with occasional cobbles of limestone and granite.			
		Grey, gravelly fine to coarse grained SAND with few cobbles of limestone and gravel. Dry to moist.			
2					0.0ppm (1.9-2.3mbGL)
		Grey, sandy GRAVEL. Moist.			
		End of hole: 2.5mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.5m
Date:

Reference Point:
Elevation: 121.418mOD
Easting: 684966.2
Northing: 684797.1

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by:
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP09

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty fine to medium grained SAND with frequent rootlets. Moist.			0.0ppm (0.1-0.3mbGL)
		Brown to orange, silty, gravelly medium grained SAND. Dry to moist.			
1		Grey, gravelly coarse grained SAND with some assorted cobbles of limestone and granite. Dry to moist.			0.0ppm (0.6-1.1mbGL)
		Grey, sandy GRAVEL with few cobbles of limestone and granite. Dry to moist.			0.0ppm (1.6-1.9mbGL)
2		End of hole: 2.2mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.2m
Date:

Reference Point:
Elevation: 120.41mOD
Easting: 684717.7
Northing: 684836

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by:

Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP10

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty fine to medium grained SAND with frequent rootlets. Moist.			
		Brown to orange, slightly gravelly, silty fine grained SAND. Dry to moist.			0.0ppm (0.3-0.6mbGL)
1		Grey, gravelly medium grained SAND with some pockets of fine grained sand. Dry.			0.0ppm (0.0-1.4mbGL)
2		Brown, gravelly medium grained SAND with pockets of sandy gravel. Dry to moist.			
		End of hole: 2.2mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.2m
Date:

Reference Point:
Elevation: 121.808mOD
Easting: 684815.3
Northing: 684982.2

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by:
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP11

Project: EIAR | **Client:** Mark Phelan | **Site Location:** Maplestown, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty fine to medium grained SAND with frequent rootlets. Moist.			
		Brown, slightly gravelly, silty fine grained SAND. Dry to moist.			0.0ppm (0.4-0.9mbGL)
1		Grey, sandy GRAVEL with assorted cobbles of limestone and granite. Moist.			
2		End of hole: 2.2mbGL			
3					
4					

Contractor: Mark Phelan
Method: Tracked excavator
Pit Dimensions: 1m x 5m x 2.2m
Date:

Reference Point:
Elevation: 123.541mOD
Easting: 684978
Northing: 684913.6

Water Strike: None
Water Level: N/A

Logged by: GC
Checked by:

Sheet: 1 of 1

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW5**
Project: EIAR	**Client: Mr. Mark Phelan**	**Site: Maplestown, Rathvilly, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
		Ground Level				
0		Dark brown, silty CLAY with frequent rootlets. Dry to damp.		Minor seepage 0.2mbGL		
1		Brown, slightly gravelly, sandy CLAY. Moist to Wet.				
2		Brown, slightly gravelly SAND. Dry.				
3		Brown, gravelly SILT. Dry.				
4		Brown, gravelly SAND. Dry.				
5		Brown, sandy GRAVEL. Dry.				
6		Grey, slightly sandy GRAVEL. Damp.		Water level 113.318 mOD (21/10/2021)		Headworks; Bentonite 0-10mbGL; Plain PVC pipe 0-11mbGL
7						
8						
9						

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 0.2mbGL; and 10.5mbGL	
Method: Air rotary drill	**Elevation:** 120.064mOD	**Water Level :** 113.318mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684843.0	**Logged by:** FJ	**Sheet:** 1 of 2
Drill Date: 19/10/2021	**Northing:** 685016.6	**Checked by:** GC	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW5**
Project: EIAR	**Client: Mr. Mark Phelan**	**Site: Maplestown, Rathvilly, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
10						
		Brown, slightly clayey SAND and GRAVEL. Wet.		Water strike 10.5mbGL		
11						
12						
		Brown, gravelly SAND. Wet.				
13			Granite boulder encountered between 13.4 and 13.6mbGL.			
		Brown, slightly gravelly SAND. Wet.				
14						
15		End of hole: 15mbGL				
16						
17						
18						
19						

Gravel 10-14mbGL

Bentonite 14-15mbGL

Slotted PVC pipe 11-14mbGL

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 0.2mbGL; and 10.5mbGL	
Method: Air rotary drill	**Elevation:** 120.064mOD	**Water Level :** 113.318mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684843.0	**Logged by:** FJ	**Sheet:** 2 of 2
Drill Date: 19/10/2021	**Northing:** 685016.6	**Checked by:** GC	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW6**
Project: EIAR	**Client: Mr. Mark Phelan**	**Site: Maplestown, Rathvilly, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
		Ground Level				Headworks
0		Dark brown, gravelly CLAY with frequent rootlets. Wet to Moist.				
		Dark brown, slightly sandy, gravelly CLAY. Moist.				
1		Brown, SAND and GRAVEL. Damp.				
2						
		Brown, slightly sandy GRAVEL. Damp.				
3		Brown, gravelly SAND. Dry.				
		Brown, slightly gravelly SAND. Dry.				
4		Brown, SAND and GRAVEL. Dry.				
5		Grey to brown, slightly gravelly SAND. Dry.				
6						
		Brown, SAND and GRAVEL. Dry.				
7						
		Brown, SAND. Dry.				
8						
9						Bentonite 0-9mbGL Plain PVC pipe 0-10.5mbGL Gravel 9-14mbGL

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 10.1mbGL	
Method: Air rotary drill	**Elevation:** 122.533mOD	**Water Level :** 111.409mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684227.6	**Logged by:** FJ	**Sheet:** 1 of 2
Drill Date: 21/10/2021	**Northing:** 684942.9	**Checked by:** GC	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW6**
Project: EIAR	**Client: Mr. Mark Phelan**	**Site: Maplestown, Rathvilly, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
10		Brown, slightly clayey SILT. Moist to Wet.		Water strike 10.1mbGL		Gravel 9-14mbGL; Slotted PVC pipe 10.5-13.5mbGL
11		Brown, clayey SILT. Wet.				
12				Water level 111.409 mOD (21/10/2021)		
13						
14		End of hole: 14mbGL				
15						
16						
17						
18						
19						

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 10.1mbGL	
Method: Air rotary drill	**Elevation:** 122.533mOD	**Water Level :** 111.409mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684227.6	**Logged by:** FJ	**Sheet:** 2 of 2
Drill Date: 21/10/2021	**Northing:** 684942.9	**Checked by:** GC	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW4**
Project: EIAR	**Client: Mr. Mark Phelan**	**Site: Maplestown, Rathvilly, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
		Ground Level				Headworks
0		Dark brown, slightly gravelly CLAY with frequent rootlets. Dry.				
		Light brown, slightly gravelly, fine grained SAND. Dry.				
1						
				Water level 112.209 mOD (21/10/2021)		
		Light brown, gravelly SAND. Dry.				
2						
				Minor seepage 2.5mbGL		
		Brown, slightly silty, slightly gravelly SAND. Wet.				
		Brown, slightly silty SAND. Damp.				
3						
		Brown, gravelly SAND. Damp.				
4						
		Grey to brown, slightly silty SAND and GRAVEL. Wet.		Water strike 4.7mbGL		
5						
6		Brown to grey, gravelly SAND. Wet.				
		Brown, gravelly SAND. Moist.				
7						
		Brown, slightly gravelly, silty SAND. Moist to wet.				
8		Brown, slightly silty SAND and GRAVEL. Wet.				
9						

Bentonite 0-5.5mbGL
Plain PVC pipe 0-6.5mbGL
Gravel 5.5-9.5mbGL
Slotted PVC pipe 6.5-9.5mbGL
Bentonite 9.5-11.5mbGL

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 2.5mbGL; and 4.7mbGL	
Method: Air rotary drill	**Elevation:** 114.372mOD	**Water Level :** 112.209mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684524.6	**Logged by:** FJ	**Sheet:** 1 of 2
Drill Date: 19/10/2021	**Northing:** 684838.3	**Checked by:** GC	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW4**
Project: EIAR	**Client: Mr. Mark Phelan**	**Site: Maplestown, Rathvilly, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
10						
11		Brown, gravelly SAND. Damp to Moist.				Bentonite 9.5- 11.5mbGL
		End of hole: 11.5mbGL				
12						
13						
14						
15						
16						
17						
18						
19						

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 2.5mbGL; and 4.7mbGL	
Method: Air rotary drill	**Elevation:** 114.372mOD	**Water Level :** 112.209mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684524.6	**Logged by:** FJ	**Sheet:** 2 of 2
Drill Date: 19/10/2021	**Northing:** 684838.3	**Checked by:** GC	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW3**
Project: EIAR	**Client: Mr. Mark Phelan**	**Site: Maplestown, Rathvilly, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
		Ground Level				Headworks
0		Dark brown, slightly silty CLAY with frequent rootlets. Dry.				
		Light grey to light brown, silty, SAND. Dry.				
1						
		Dark brown, slightly gravelly, slightly silty SAND. Dry.				
2		Dark brown SAND and GRAVEL. Dry.		Water level 133.252 mOD (21/10/2021)		
3						
		Brown, slightly silty GRAVEL. Damp.				
4						
5		Brown, slightly silty, slightly clayey GRAVEL. Damp.				
		Brown, slightly clayey GRAVEL. Wet.		Minor seepage 5.2mbGL		
6		Brown, slightly gravelly, slightly clayey SILT. Dry.				
		Light brown, slightly gravelly SAND. Dry.				
7						
		Light brown, slightly sandy SILT. Moist to wet.		Minor seepage 7.3mbGL		
8						
		Light brown, slightly gravelly, silty CLAY. Dry.				
9						

Bentonite 0-12.5mbGL

Plain PVC pipe 0-13mbGL

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 5.2mbGL; 7.3mbGL; and 13.6mbGL	
Method: Air rotary drill	**Elevation:** 115.053mOD	**Water Level :** 113.252mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684643.5	**Logged by:** FJ	**Sheet:** 1 of 2
Drill Date: 14/10/2021	**Northing:** 684779.7	**Checked by:** GC	

Enviroguide Consulting, 3D Core C, Block 71, The Plaza, Park West Business Park, Dublin	**BOREHOLE LOG**	**Borehole No: MW3**
Project: EIAR	**Client: Mr. Mark Phelan**	**Site: Maplestown, Rathvilly, Co. Carlow**

Depth (mbGL)	Legend	Description	Comments	Water	Sample (mbGL)	Well Installation Details
10		Brown, slightly silty CLAY. Dry.				
		Brown, slightly gravelly, slightly silty CLAY. Dry.				
11						
12						
		Light brown, slightly sandy, slightly clayey SILT. Dry.				
13		Light brown, slightly silty, slightly gravelly SAND. Damp.				
		Brown, slightly silty SAND. Moist.				
		Brown, slightly silty SAND and GRAVEL.		Water strike 13.6mbGL		
14						
15		Brown, slightly gravelly, slightly silty SAND. Wet.				
		Brown CLAY. Moist.				
16		Brown, slightly clayey SAND. Moist.				
		White Granite Bedrock.				
17						
18		End of hole: 18mbGL				
19						

Gravel 12.5-18mbGL

Slotted PVC pipe 13-16mbGL

Contractor: Gerry Comerford Drilling Ltd.	**Reference Point:** Ground Level	**Water Strike:** 5.2mbGL; 7.3mbGL; and 13.6mbGL	
Method: Air rotary drill	**Elevation:** 115.053mOD	**Water Level :** 113.252mOD (21/10/2021)	
Borehole Diameter: 150mm	**Easting:** 684643.5	**Logged by:** FJ	**Sheet:** 2 of 2
Drill Date: 14/10/2021	**Northing:** 684779.7	**Checked by:** GC	

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP01

Project: EIAR | **Client:** Mr. Mark Phelan | **Site Location:** Maplestown, Rathvilly, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		MADE GROUND. Brown, slightly silty, gravelly, SAND with frequent rootlets. Dry to moist.			0.0ppm (0.2mbGL)
		MADE GROUND. Light brown to orange, gravelly, SAND with some assorted cobbles of limestone. Moist.			0.0ppm (0.3-0.6mbGL)
1		MADE GROUND. Light brown, slightly sandy, gravelly SILT with rare lenses of sandy gravel. Moist.			0.0ppm (1.7-2.1mbGL)
2		End of hole: 2.5mbGL			
3					
4					

Contractor: Mr. Mark Phelan
Method: Backhoe loader
Pit Dimensions: 1m x 5m x 2.5m
Date: 14/10/2021

Reference Point: Ground level
Elevation: 120.229mOD
Easting: 684708.3
Northing: 684892.4

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by: CC
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP02

Project: EIAR | **Client:** Mr. Mark Phelan | **Site Location:** Maplestown, Rathvilly, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		MADE GROUND. Brown, slightly silty, gravelly, SAND with frequent rootlets and trace medium cobbles of limestone. Dry to moist.			0.0ppm (0.2mbGL)
		MADE GROUND. Light brown, slightly gravelly, sandy SILT with trace assorted cobbles of limestone. Moist.			0.0ppm (0.4-0.8mbGL)
1					
2		MADE GROUND. Light grey, slightly gravelly, silty, SAND with trace inclusion of metal wire at 2.5mbGL. Moist.			0.0ppm (2.4-2.6mbGL)
		MADE GROUND. Light brown, slightly gravelly, sandy SILT with trace assorted cobbles of limestone. Moist.			0.0ppm (2.6-2.8mbGL)
		End of hole: 2.8mbGL			
3					
4					

Contractor: Mr. Mark Phelan
Method: Backhoe loader
Pit Dimensions: 1m x 5m x 2.8m
Date: 14/10/2021

Reference Point: Ground level
Elevation: 118.091mOD
Easting: 684736.2
Northing: 684987.4

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by: CC
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP03

Project: EIAR | **Client:** Mr. Mark Phelan | **Site Location:** Maplestown, Rathvilly, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		MADE GROUND. Brown, slightly silty, gravelly, SAND with frequent rootlets and trace medium cobbles of limestone. Dry to moist.			
		MADE GROUND. Brown, slightly sandy, slightly gravelly SILT. Dry.			0.0ppm (0.4-0.8mbGL)
1		MADE GROUND. Brown, slightly sandy, gravelly SILT with occasional assorted cobbles of limestone. Dry.			
		MADE GROUND. Grey, sandy GRAVEL. Moist.			0.0ppm (1.4-1.7mbGL)
2		MADE GROUND. Grey to brown, slightly gravelly sandy SILT. Moist.			
		Grey, silty, SAND.		Water ingress 2.4mbGL	0.0ppm (2.4-2.6mbGL)
		End of hole: 2.6mbGL			
3					
4					

Contractor: Mr. Mark Phelan
Method: Backhoe loader
Pit Dimensions: 1m x 5m x 2.6m
Date: 14/10/2021

Reference Point: Ground level
Elevation: 114.967mOD
Easting: 684609.6
Northing: 684990.2

Water Strike: 2.4mbGL
Water Level: N/A
Logged by: GC
Checked by: CC
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP04

Project: EIAR | **Client:** Mr. Mark Phelan | **Site Location:** Maplestown, Rathvilly, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		MADE GROUND. Brown, slightly silty, gravelly SAND with frequent rootlets and trace medium cobbles of limestone. Dry to moist.			0.0ppm (0.0-0.4mbGL)
1		MADE GROUND. Light brown, slightly sandy, gravelly SILT with trace assorted cobbles of limestone. Dry to moist.			0.0ppm (1.0-1.5mbGL)
2		MADE GROUND. Grey to brown, slightly silty, gravelly SAND with occasional pockets of grey, gravelly silt. Moist.			0.0ppm (2.0-2.1mbGL)
		Grey, gravelly SAND.		Water ingress 2.35mbGL	
3		End of hole: 2.5mbGL			
4					

Contractor: Mr. Mark Phelan
Method: Backhoe loader
Pit Dimensions: 1m x 5m x 2.5m
Date: 14/10/2021

Reference Point: Ground level
Elevation: 115.166mOD
Easting: 684623.3
Northing: 684907.4

Water Strike: 2.35mbGL
Water Level: N/A
Logged by: GC
Checked by: CC
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP05

Project: EIAR | **Client:** Mr. Mark Phelan | **Site Location:** Maplestown, Rathvilly, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
0		Ground Level			
		Brown, slightly gravelly, silty SAND with frequent rootlets. Moist.			
		Light brown to orange, slightly silty, gravelly SAND. Dry to moist.			0.0ppm (0.7-0.8mbGL)
1					
		Grey, slightly silty, slightly gravelly SAND with occasional pockets of grey sandy silt and veins of gravelly sand. Dry to moist.			0.0ppm (1.1-1.5mbGL)
2					
		End of hole: 2.6mbGL			
3					
4					

Contractor: Mr. Mark Phelan
Method: Backhoe loader
Pit Dimensions: 1m x 5m x 2.6m
Date: 14/10/2021

Reference Point: Ground level
Elevation: 122.016mOD
Easting: 684779.8
Northing: 684875.3

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by: CC
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP06

Project: EIAR | **Client:** Mr. Mark Phelan | **Site Location:** Maplestown, Rathvilly, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty SAND with frequent rootlets. Moist.			
		Brown, gravelly SAND with occasional cobbles of limestone and granite. Dry to moist.			0.0ppm (0.3-0.7mbGL)
1		Grey, sandy GRAVEL with frequent assorted cobbles of limestone and granite. Moist.			0.0ppm (1.8-2.0mbGL)
2		End of hole: 2.0mbGL			
3					
4					

Contractor: Mr. Mark Phelan
Method: Backhoe loader
Pit Dimensions: 1m x 5m x 2m
Date: 14/10/2021

Reference Point: Ground level
Elevation: 119.212mOD
Easting: 684843.8
Northing: 684849.2

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by: CC
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP07

Project: EIAR | **Client:** Mr. Mark Phelan | **Site Location:** Maplestown, Rathvilly, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty SAND with frequent rootlets. Moist.			
		Brown, gravelly SAND. Moist.			
		Grey, sandy GRAVEL with assorted cobbles of limestone and granite. Moist.			
1					0.0ppm (1.4-1.8mbGL)
		End of hole: 1.8mbGL			
2					
3					
4					

Contractor: Mr. Mark Phelan
Method: Backhoe loader
Pit Dimensions: 1m x 5m x 1.8m
Date: 14/10/2021

Reference Point: Ground level
Elevation: 120.68mOD
Easting: 684891.5
Northing: 684839.6

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by: CC
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP08

Project: EIAR | **Client:** Mr. Mark Phelan | **Site Location:** Maplestown, Rathvilly, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty SAND with frequent rootlets. Dry to moist.			
1		Grey, sandy GRAVEL with assorted cobbles of limestone and granite. Moist.			0.0ppm (0.8-1.1mbGL)
2		Grey, gravelly SAND with few cobbles of limestone and gravel. Dry to moist.			0.0ppm (1.9-2.3mbGL)
		Grey, sandy GRAVEL. Moist.			
		End of hole: 2.5mbGL			
3					
4					

Contractor: Mr. Mark Phelan
Method: Backhoe loader
Pit Dimensions: 1m x 5m x 2.5m
Date: 14/10/2021

Reference Point: Ground level
Elevation: 121.418mOD
Easting: 684966.2
Northing: 684797.1

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by: CC
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP09

Project: EIAR | **Client:** Mr. Mark Phelan | **Site Location:** Maplestown, Rathvilly, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
0		Ground Level			
		Brown, slightly gravelly, silty SAND with frequent rootlets. Moist.			0.0ppm (0.1-0.3mbGL)
		Brown to orange, slightly silty, gravelly SAND. Dry to moist.			
1		Grey, gravelly SAND with some assorted cobbles of limestone and granite. Dry to moist.			0.0ppm (0.6-1.1mbGL)
		Grey, sandy GRAVEL with few cobbles of limestone and granite. Dry to moist.			0.0ppm (1.6-1.9mbGL)
2		End of hole: 2.2mbGL			
3					
4					

Contractor: Mr. Mark Phelan
Method: Backhoe loader
Pit Dimensions: 1m x 5m x 2.2m
Date: 14/10/2021

Reference Point: Ground level
Elevation: 120.41mOD
Easting: 684717.7
Northing: 684836

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by: CC
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP10

Project: EIAR | **Client:** Mr. Mark Phelan | **Site Location:** Maplestown, Rathvilly, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty SAND with frequent rootlets. Moist.			
		Brown to orange, slightly gravelly, silty SAND. Dry to moist.			0.0ppm (0.3-0.6mbGL)
1		Grey, gravelly SAND with some pockets of fine grained sand. Dry.			0.0ppm (0.0-1.4mbGL)
2		Brown, gravelly SAND with pockets of sandy gravel. Dry to moist.			
		End of hole: 2.2mbGL			
3					
4					

Contractor: Mr. Mark Phelan
Method: Backhoe loader
Pit Dimensions: 1m x 5m x 2.2m
Date: 14/10/2021

Reference Point: Ground level
Elevation: 121.808mOD
Easting: 684815.3
Northing: 684982.2

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by: CC
Sheet: 1 of 1

Enviroguide Consulting,
3D Core C, Block 71,
The Plaza,
Park West Business Park,
Dublin
D12F9TN
www.enviroguide.ie

TRIAL PIT LOG

Trial Pit No: TP11

Project: EIAR | **Client:** Mr. Mark Phelan | **Site Location:** Maplestown, Rathvilly, Co. Carlow

Depth (m)	Legend	Description	Comments	Water	Sample Depth
		Ground Level			
0		Brown, slightly gravelly, silty SAND with frequent rootlets. Dry to moist.			
					0.0ppm (0.4-0.9mbGL)
1		Grey, sandy GRAVEL with assorted cobbles of limestone and granite. Moist.			
2					
		End of hole: 2.2mbGL			
3					
4					

Contractor: Mr. Mark Phelan
Method: Backhoe loader
Pit Dimensions: 1m x 5m x 2.2m
Date: 14/10/2021

Reference Point: Ground level
Elevation: 123.541mOD
Easting: 684978
Northing: 684913.6

Water Strike: None
Water Level: N/A
Logged by: GC
Checked by: CC
Sheet: 1 of 1

Appendix B

Enviroguide Consulting
Table 2: Groundwater Analysis
Client: Mr. Mark Phelan
Project: Environmental Impact Assessment Report for Proposed Development
Location: Maplestown, Rathvilly, Co. Carlow

Parameters	**Units**	**LOD**	**Groundwater Regulations 2010 (S.I. No. 9 of 2010 and as amended) (GTV)**	*European Communities Envionmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272/2009 and as amended) (EQS)*		European Union (Drinking water) Regulations 2014 (SI. No. 122/2015 and as amended) (PV)	**Sample ID**	MW1	MW3
							Sample Type	Groundwater	Groundwater
							Sampled Date	18/10/2021	18/10/2021
							Laboratory Ref No.	21/16428	21/16428
				AA-EQS	*MAC-EQS*		**Observations**		
				Inland surface waters (ug/l)	*Inland surface waters (ug/l)*				
Laboratory Measured									
Conductivity	us/cm	--	800-1875	--	--	2500			
pH	pH units	--	--	Soft Water 4.5< pH < 9.0 or Hard Water 6.0< pH < 9.0		6.5 - 9.5			
Turbidity	NTU	--	--	--	--	--			
Temperature	ºC	--	--	Not greater than a 1.5°C rise in ambient temperature outside the mixing zone		--			
Dissolved Oxygen	%	--	--	95%ile >80% saturation <120% saturation		--			
Oxidation-Reduction Potential	mV	--	--	--	--	--			
Colour	mg/l Pt-Co	--	--	--	--	--			
Dissolved Metals									
Dissolved Arsenic	ug/l	<2.5	7.5	25	--	--		<2.5	3
Dissolved Barium	ug/l	<3	--	--	--	--		21	21
Dissolved Beryllium	ug/l	<0.5	--	--	--	--		<0.5	<0.5
Dissolved Boron	ug/l	<12	750	--	--	--		<12	<12
Dissolved Cadmium	ug/l	<0.5	3.75	0.09 (Class 3)*	0.6 (Class 3)*	--		<0.5	<0.5
Total Dissolved Chromium	ug/l	<1.5	37.5	3.4**	--	--		<1.5	<1.5
Dissolved Chromium III	ug/l	<6	--	4.7	32	--		<6	<6
Hexavalent Chromium	ug/l	<6	7.5	3.4	--	--		<6	<6
Dissolved Copper	ug/l	<7	1500	5 or 30~	--	--		<7	<7
Dissolved Lead	ug/l	<5	7.5	1.2	14	--		<5	<5
Dissolved Mercury	ug/l	<1	0.75	--	0.07	--		<1	<1
Dissolved Nickel	ug/l	<2	15	4	34	--		<2	<2
Dissolved Selenium	ug/l	<3	--	--	--	--		<3	<3
Dissolved Vanadium	ug/l	<1.5	--	--	--	--		<1.5	<1.5
Dissolved Zinc	ug/l	<3	75	8 or 50 or 100~	--	--		<3	<3
Total Metals									
Total Arsenic	ug/l	<2.5	--	--	--	10		**95.7**	**419.5**
Total Barium	ug/l	<3	--	--	--	--		407	319
Total Beryllium	ug/l	<0.5	--	--	--	--		8.5	13.5
Total Boron	ug/l	<12	--	--	--	1000		<12	<12
Total Cadmium	ug/l	<0.5	--	--	--	5		<0.5	<0.5
Total Chromium	ug/l	<1.5	--	--	--	50		**124.8**	**104.6**
Total Copper	ug/l	<7	--	--	--	2000		107	113
Total Lead	ug/l	<5	--	--	--	10		<5	<5
Total Mercury	ug/l	<1	--	--	--	1		<1	<1
Total Nickel	ug/l	<2	--	--	--	20		**111**	**108**
Total Selenium	ug/l	<3	--	--	--	--		<3	<3
Total Vanadium	ug/l	<1.5	--	--	--	--		189.7	145
Total Zinc	ug/l	<3	--	--	--	--		419	391
MTBE	ug/l	<5	10	--	--	--		<5	<5
Benzene	ug/l	<5	0.75	10	50	1.1		<5	<5
Toluene	ug/l	<5	525	10	--	--		<5	<5
Ethylbenzene	ug/l	<5	--	--	--	--		<5	<5
m/p-Xylene	ug/l	<5	--	10	--	--		<5	<5

o-Xylene	ug/l	<5	--	10	--	--		<5	<5
Total Petroleum Hydrocarbons Criteria Working Group (TPHCWG)									
Aliphatics									
>C5-C6	ug/l	<10	--	--	--	--		<10	<10
>C6-C8	ug/l	<10	--	--	--	--		<10	<10
>C8-C10	ug/l	<10	--	--	--	--		<10	<10
>C10-C12	ug/l	<5	--	--	--	--		<5	<5
>C12-C16	ug/l	<10	--	--	--	--		<10	<10
>C16-C21	ug/l	<10	--	--	--	--		<10	<10
>C21-C35	ug/l	<10	--	--	--	--		<10	<10
Total aliphatics C5-35	ug/l	<10	--	--	--	--		<10	<10
Aromatics									
>C5-EC7	ug/l	<10	--	--	--	--		<10	<10
>EC7-EC8	ug/l	<10	--	--	--	--		<10	<10
>EC8-EC10	ug/l	<10	--	--	--	--		<10	<10
>EC10-EC12	ug/l	<5	--	--	--	--		<5	<5
>EC12-EC16	ug/l	<10	--	--	--	--		<10	<10
>EC16-EC21	ug/l	<10	--	--	--	--		<10	<10
>EC21-EC35	ug/l	<10	--	--	--	--		<10	<10
Total aromatics C5-35	ug/l	<10	--	--	--	--		<10	<10
Total aliphatics and aromatics(C5-35)	ug/l	<10	7.5	--	--	--		<10	<10
Indicators and Inorganics									
Total Ammonia as N	mg/l	<0.03	--	High status <= 0.04 (mean)or <=0.090 (95%ile) or Good status <= 0.065 (mean) or <= 0.14 (95%ile)		--		*0.11*	<0.03
Ammonium as N (calculated)	mg/l	<0.03	0.065-0.175	--	--	0.3		**0.14**	<0.03
Ammoniacla Nitrogen as NH3	mg/l	<0.03	--	--	--	--		0.13	<0.03

Groundwater Exceedances
Cells in **BOLD** exceed Groundwater Regulations 2010 (S.I. No. 9 of 2010 and as amended) (GTV)
Cells in *ITALICS* exceed European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272/2009 and as amended) (EQS)
Cells UNDERLINED exceed European Union (Drinking water) Regs 2014 (SI. No. 122/2015 and as amended) (PV)

Enviroguide Consulting
Table 1: EPA 2020, Soil Recovert Facility Maximum Concentrations/ Soil Trigger Level Screening
Client: Mr. Mark Phelan
Project: Environmental Impact Assessment Report for Proposed Development
Location: Maplestown, Rathvilly, Co. Carlow

		EPA, 2020 SRF Soil Trigger Level Values							**Sample ID**	TP2	TP3	TP4
									Sample Type	2.40-2.60	0.40-0.80	1.00-1.50
		Domain / Limit							**Sampled Date**	44483	44483	44483
									Element Job No.	21/16389	21/16389	21/16389
Parameters	**Units**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Comments**	Meets All Geochcmical Domains 1 to 7	Meets All Geochcmical Domains 1 to 7	Meets All Geochcmical Domains 1 to 7
Arsenic	mg/kg	15.60	24.90	38.10	32.30	41.50	85.80	30.90		10	13	9.7
Cadmium	mg/kg	1.50	3.28	1.60	0.97	1.42	2.38	0.54		0.4	0.6	0.5
Chromium	mg/kg	51.50	50.30	47.50	51.70	73.20	54.00	57.60		51.7	51.4	53.8
Copper	mg/kg	51.20	63.50	56.90	80.40	77.60	40.00	83.10		11	15	12
Lead	mg/kg	48.30	86.10	81.30	91.40	109.00	108.00	61.10		10	15	11
Mercury	mg/kg	0.25	0.36	0.46	0.29	0.30	0.53	0.26		<0.1	<0.1	<0.1
Nickel	mg/kg	47.80	61.90	54.40	50.30	65.70	28.20	35.70		16	21.8	17.8
Zinc	mg/kg	137.00	197.00	237.00	155.00	224.00	168.00	122.00		50	65	53
TOC	mg/kg	3.00	3.00	3.00	3.00	3.00	3.00	3.00		0.08	0.23	0.18
Total BTEX	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05		<0.025	<0.025	<0.025
Mineral Oil	mg/kg	50.00	50.00	50.00	50.00	50.00	50.00	50.00		<30	<30	<30
Total PAHs	mg/kg	1.00	1.00	1.00	1.00	1.00	1.00	1.00		<0.6	<0.6	<0.6
Total PCBs	mg/kg	0.05	0.05	0.05	0.05	0.05	0.05	0.05		<0.035	<0.035	<0.035
Asbestos	mg/kg	NAD	NAD	NAD	NAD	NAD	NAD	NAD		NAD	NAD	NAD

Notes:
Cells highlighted in **RED TEXT** exceed the maximum SRF Soil Trigger Level for all domains.
Cells UNDERLINED exceed the respective SRF Soil Trigger Level but does not exceed 1.5 times the SRF and therefore complies with that specific domain limit.
Cells in **BOLD** exceed the respective SRF Soil Trigger Level for that specific domain
NAD : No Asbestos Detected