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Introduction

Background

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

6.2 The proposed development within an application area of 18.3 hectares will consist of:

- An extension to the existing sand & gravel pit with extraction area of c. 9.8 hectares worked on a phased basis.
- Continued use of development granted planning permission under P. Ref. 24/6269 comprising the existing processing plant and related water management system; the existing concrete plant; ancillary buildings (site office (63 sq.m), 3 no. welfare portacabins (32 sq.m, 23.5 sq.m & 22.0 sqm), 4 no. storage buildings / containers (15 sq.m, 10 sq.m, 6 sq.m & 5 sq.m), 2 no. garages (76 sqm & 76 sq.m), ESB Substation (26 sq.m)); covered vehicle storage (220 sq.m); site access and all related ancillary facilities (wheelwash, fuel storage tank, weighbridge); and recycling of c. 15,000 tonnes of concrete per year for use in concrete production.
- Phased and final restoration to agricultural use.

6.3 Further details of the proposed development are provided in EIAR Chapter 2 – Project Description.

Scope of Work / EIA Scoping

6.4 This EIAR section is based on a desk study of the proposed development site / surrounding lands using published geological data, borehole logs, a geophysical site survey, site photographs, and site visits previously carried out by SLR.

Author

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

- Peter Glanville -SLR Technical Director (Hydrology & Hydrogeology) PGeo. EurGeol. and MCIWEM.

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Regulatory Background

EU Directives

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

- Environmental Impact Assessment Directive (2011/92/EU);
- Environmental Impact Assessment Directive (2014/52/EU);
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. 296 of 2018); and
- The management of waste from extractive industries (2006/21/EC).

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

Irish Legislation

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

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

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

Planning Policy and Development Control

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

6.11 The 2022-2028 county development plan, the current plan, sets out conservation objectives in relation to natural heritage and landscape, including geology, in the county.

6.12 Regarding Geological Heritage, Objective BE 15-2 of the development plan is to

- '*Recognise the value of protecting geological features of local and national interest*'.

6.13 The 2022-2028 development plan notes that an audit of the Geological Sites of Co. Cork is underway and that it is expected to be completed within the lifetime of the plan. The

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planning authority will seek to protect from inappropriate development the sites identified by the audit.

6.14 The development plan also recognises the importance of soil to the environment and to agriculture in the county.

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

6.16 The development plan contains the following objective in relation to the extractive industry:

- **EC 8-13**

  a) *Protect and safeguard the county's natural mineral resources from inappropriate development, by seeking to prevent incompatible land uses that could be located elsewhere, from being located in the vicinity of the resource, since the extraction of minerals and aggregates is resource based.*

  b) *Prepare a Minerals Strategy Plan to support a sustainable extractive industry during the lifetime of the plan.*

Guidelines

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

- Environmental Protection Agency (2022) Guidelines *on the Information to be Contained in Environmental Impact Assessment Reports*. Environmental Protection Agency, Johnstown Castle Estate, Co. Cork.
- DoEHLG (2010) Appropriate Assessment of Plans and Projects in Ireland - Guidance for Planning Authorities;
- Geological Survey of Ireland, Irish Concrete Federation (2008) Geological Heritage Guidelines for the Extractive Industry;
- Institute of Geologists of Ireland (2013) Guidelines for the preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements;
- National Roads Authority (2008) Environmental Impact Assessment of National Road Schemes - A Practical Guide;
- National Roads Authority (2008) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.
- National Roads Authority (2006) A Guide to Landscape Treatments for National Road Schemes in Ireland; and
- The Institute of Quarrying (2021), Good Practice Guide for Handling Soils in Mineral Workings.

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Receiving Environment

Study Area

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

6.19 The IGI guidelines state that the minimum distance of 2 km should be reviewed in the context of the geological environment as well as the scale of development and increased to reflect the sensitivity of the subsurface. The IGI guidelines also state that maps should be sourced to allow for the review of the geological and hydrogeological conditions that exist within a minimum of 2 km of the site boundary (from the outer limit of the planning and/or licence area) and presented at a scale of 1:25,000.

6.20 The baseline maps produced in this EIAR are at a scale of 1:25,000 and include an area up to c. 3.5 km from the lands under the control of the applicant, although the actual study area extends up to 2 km as stated above.

Baseline Study Methodology

6.21 The baseline study undertaken for Land, Soils and Geology, here involves a review of published literature and information, borehole information and the findings from a walkover survey of the proposed development site and the context of the site within the surrounding area.

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

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

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

Sources of Information

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

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

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- Existing site investigation data / reports.

6.25 A geophysical assessment of the site has previously been undertaken, see **Appendix 6-A**.

6.26 Three groundwater monitoring wells have been drilled at the site to provide information on the groundwater levels, refer to EIAR Chapter 7 - Water (Hydrology & Hydrogeology).

6.27 The exposures at the existing workings also provide information on the local soils and subsoils at the proposed development site.

Land

6.28 Within the EIA EU Directive (2014/52/EU) Land is recognised as a 'natural resource' and the Directive also refers to the importance of the sustainable use of soil and the need to address the unsustainable increase in settlement areas over time ('land take'). Therefore, the issues of land as both a natural resource and land take must be considered in an assessment.

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

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

6.30 Land can be considered to be a resource with a beneficial use to society, for example agricultural land use, extractive industry land use or urban residential land use; unnecessary land take may result in the loss of this resource which has the potential to have adverse social and economic consequences for society.

6.31 The land within the proposed extension area is currently used for agriculture.

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

Land Cover

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

6.34 The Corine land cover mapping reflects land use at the time of survey, in this case the latest available land cover data for Ireland is 2018. The land cover type in the proposed extension area and in the immediate vicinity of the site is classified as Agricultural Areas (Pastures), see Figure 6-1.

Soils Baseline

6.35 Soil is defined as the top layer of the earth's crust and is formed by mineral particles, organic matter, water, air and living organisms. Soil is an extremely complex, variable and

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living medium and its characteristics are a function of parent subsoil or bedrock materials, climate, relief and the actions of living organisms over time.

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

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

6.38 Soils have been removed from the area of the existing pit have been used at the site for use in the restoration process.

National Soils

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

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

6.41 The soil associations at the proposed development site are classified as the Ross Carberry Soil Series (ISIS Code 0900e) in the north and the Clashmore Soil Series in the south, refer to Figure 6-2.

6.42 The Ross Carberry association is described as coarse, loamy drift with siliceous stones, refer to the subsoil map on Figure 6-2. The soil combination is considered to be well draining.

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

6.44 The Clashmore soil association is described as coarse, loamy drift with siliceous stones. It is generally considered to be well draining.

6.45 The Clashmore soil association comprises Brown Earths, Luvisols, Lithosols and Gleys, related to fine soil textures on sandstone glacial till subsoils. The soils are naturally moderately draining and are considered to have good agricultural potential being friable deep soils with plentiful, well-developed roots, a high base saturation with good nutrient retention (Creamer et. al., 2018). The Brown Earths will generally be well draining.

6.46 There is River Alluvium (05RIV) mapped c. 500m southeast of the site. River Alluvium has similar features to gleys, with generally poor drainage. The soils in this association have poor soil drainage, weak structure and are very vulnerable to poaching when grazed.

6.47 Borehole drilling across the proposed development site has confirmed c. 0.3 metres of topsoil overlying a variable thickness of sand and gravel (up to c. 11 metres).

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Subsoils Baseline

Regional Subsoils

6.48 The Quaternary (Subsoil) deposits were deposited during the last 2 million years, and essentially comprise the unconsolidated materials overlying bedrock. The two predominant types of quaternary subsoils in Ireland are glacial till, deposited at the base of ice sheets, and sand & gravel deposits, associated with the melting of the ice sheets and are generally termed “glaciofluvial outwash sands and gravels”. Other extensive Quaternary subsoils in Ireland include peat, river alluvium and coastal process deposits. Most Quaternary subsoils in Ireland were deposited after the maximum of the last glaciation, the Midlandian, which occurred approximately 17,000 years ago.

6.49 The subsoils across Ireland have been mapped on a national basis by Teagasc as part of the EPA Soil and Subsoil Mapping Project for the Irish Forestry Soils (IFS) project. The subsoil mapping was undertaken at a national basis using existing Quaternary Geology maps, publications, remote sensing and field mapping and sampling.

6.50 Subsoils in the proposed development site have been mapped under the IFS project as sand and gravel derived from Devonian sandstones in the north of the site, and till derived from Devonian and Carboniferous sandstones and shales in the southern part of the site, see Figure 6-3.

6.51 Two Site Investigations have been undertaken at the site, a Trial Pit Survey in 2020 and a Borehole Survey in 2021. The details and findings of both surveys are outlined here.

Trial Pit Survey

6.52 A trial pit survey was undertaken on lands at Brinny Co. Cork on the 27th February 2020. The trial pits were undertaken by Keohane Readymix Ltd. (KRL) using a tracked excavator to undertake the trial pits. The trial pits were supervised by a representative from SLR who logged the trial pits and took bulk representative samples of material from selected trial pits for testing. the trial pit locations were informed by the results from the geophysical survey.

6.53 The trial pits were extended to the maximum depth of the excavator reach, or to the base of the sand & gravel material or where groundwater ingress occurred; whichever scenario was encountered first at the trial pit location.

6.54 The locations of the trial pits are shown in Figure 6-5 and the trial pit logs are shown in **Appendix 6-B**.

6.55 A total of seven representative bulk disturbed subsoil samples were taken from the trial pits and were tested at Mattest for their Particle Size Distribution, see **Appendix 6-C** and Figure 6-5 below. The grading classes are shown in **Table 6-1** below from BS 5930 description of soils.

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Diagram 6-1: Particle Size Distribution Results

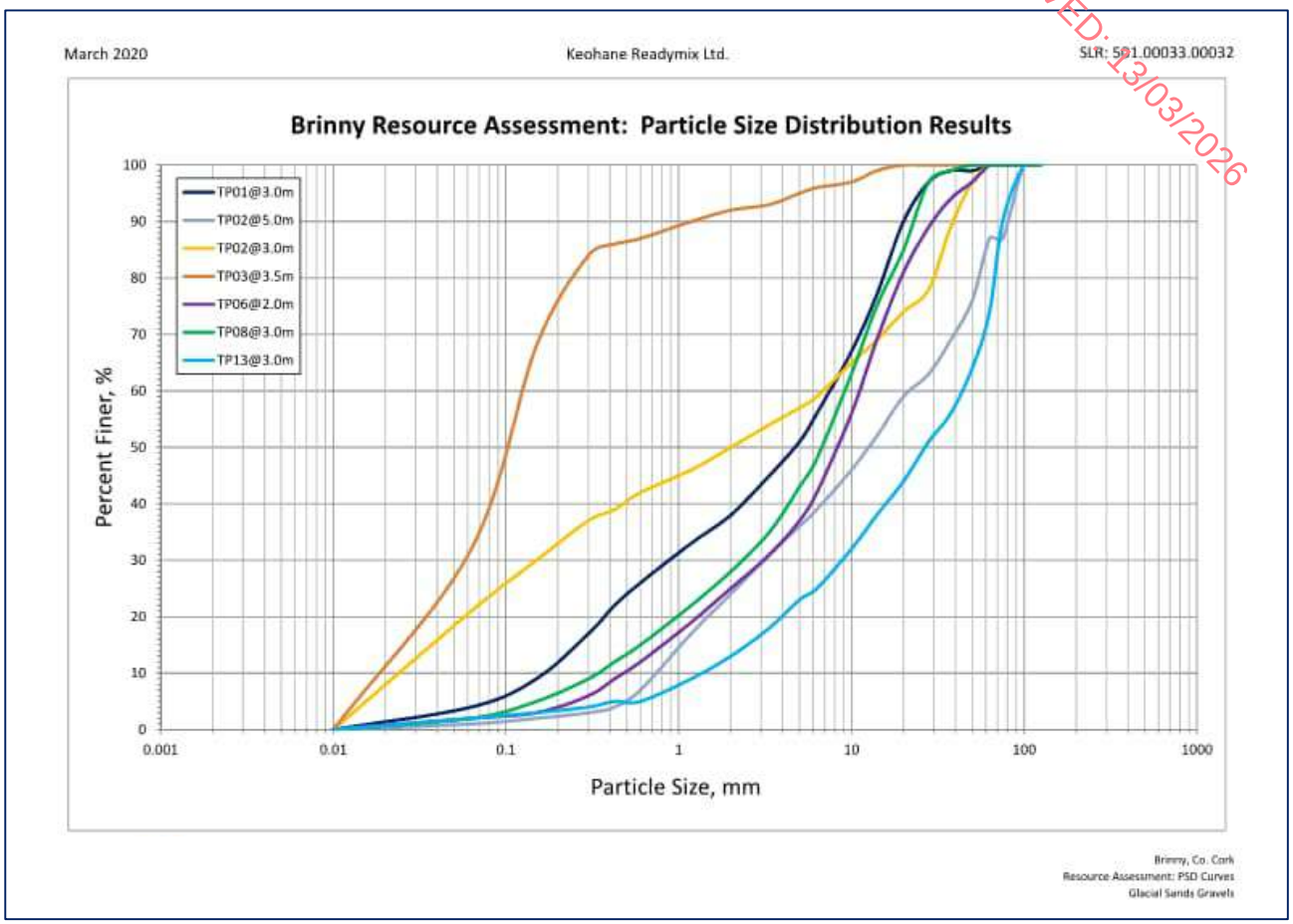

Table 6-1: Particle Size Grading Classes (BS.5930)

Grading Classes	Description
<0.06 mm	Silt
0.06 mm to 2 mm	Sand
0.2 mm to 60 mm	Gravel
60 mm to 200 mm	Cobbles

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6.56 Based on the Particle Size Distribution (PSD) Results the samples are described in **Table 6-2** below.

Table 6-2: Particle Size Distribution Description

Trial Pit	PSD Description (Lab)
TP01 - Sample at 3m depth	slightly silty sandy GRAVEL
TP02 - Sample at 3m depth	very silty SAND & GRAVEL
TP02 - Sample at 5m depth	sandy GRAVEL with cobbles
TP03 - Sample at 3.5m depth	very silty SAND with some gravel
TP06 - Sample at 2m depth	slightly silty SAND & GRAVEL
TP08 - Sample at 3m depth	slightly silty SAND & GRAVEL
TP13 at 3m depth	slightly silty sandy GRAVEL with cobbles

6.57 The PSD results indicate that silt is typically <5% in the samples tested except for TP02 at 5m depth and TP03 at 3.5m depth where silt was 20% and 30% of the sample respectively.

Borehole Survey

6.58 The three boreholes drilled at the site intersected sand and gravel to depths of c. 4-11m below ground level (see Table 6-3 below). The borehole locations are shown on Figure 6-4 and borehole logs are included in Appendix 6-D.

Table 6-3: Borehole Summary

Borehole	Easting (ITM)	Northing (ITM)	Ground Level at BH (mAOD)	Depth to top of sand and gravel (m)	Depth to base of sand and gravel (m)	Final stratum	Total Borehole Depth (mbgl)
BH 1	550643	559876	31.18	0.3	10.9	Shale (bedrock)	11.5
BH 2	550446	559491	26.55	0.3	4.0	Silt	11.0
BH 3	550751	559354	26.00	0.25	4.2	Sandy, silty clay	8.0

Bedrock Geology Baseline

Regional Setting

6.59 Regionally, the proposed site lies in a syncline within the upper Devonian and lower Carboniferous Cork Group, refer to the geology map shown on Figure 6-4.

Local Detail

6.60 Geological Survey of Ireland (GSI) 1:100,000 mapping shows the proposed development site is underlain by four units of the Cork Group, see Figure 6-4.

6.61 The Narrow Cove Member is mapped as being underlying the northwest corner of the proposed site. It is described as a bedded sandstone and mudstone. The total thickness of the unit is reported as c. 300m.

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6.62 The Pigs Cove Member sits above the Narrow Cove Member and is described as a sand-lensed mudstone. It is characterised by a lack of sandstone beds. The Pigs Cove Member varies in thickness, and in this area is believed to be c. 50-100m thick.

6.63 The Courtmacsherry Formation lies above the Pigs Cover Member; it is a calcareous mudstone with limestone. In this area, it has significant limestone content. The formation is c. 340m thick at its type area, but in this area, it is believed to be c. 60-120m thick.

6.64 The Lispatrick Formation overlies the Courtmacsherry Formation, and it is described as a pyritic cherty mudstone with dolomite. The formation is c. 40-70m thick in the area.

6.65 Bedrock is buried beneath of soil, sand and gravel, with limited exposures near the site. No outcrops are recorded within the proposed development site but there is a small outcrop c.400m to the north of the proposed site, and some riverbed exposures c. 600m south of the site.

6.66 Borehole BR1 intersected 0.6m of weathered shale at a depth of 10.9m below ground level.

Structure

6.67 The proposed site overlies the northern limb of a west-southwest trending syncline. The syncline is sinistrally offset by a north-northeast trending fault with a horizontal displacement of c. 200m. The eastern side of the fault is downthrown by an unknown amount.

Karstification

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

Geological Profile

6.69 Based on the information from the review of published geological information, site inspections, the geophysical assessment and the installation of the groundwater wells the geological profile at the site comprises:

- Topsoil / subsoil;
- Sand and gravel;
- Silt; and
- Bedrock.

Geological Heritage Baseline

6.70 An audit of County Geological Sites in Co. Cork is currently underway so there is no dataset of audited sites.

6.71 The Geological Survey of Ireland (GSI) Irish Geological Heritage (IGH) Programme of unaudited sites was consulted and reviewed (www.gsi.ie) to establish if any geological heritage issues were present in relation to the proposed site. No geological heritage sites were identified in the vicinity of the proposed development.

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Sensitive Receptors

6.72 In terms of land, soils and geology baseline considered here, the sensitive receptors identified from this baseline are land for agricultural land use and agricultural soils at the proposed development site.

Impact Assessment

Evaluation Methodology

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

Evaluation of Impacts

6.74 This assessment therefore will focus on the potential impact of the proposed quarry development at the site.

6.75 The proposed development comprises sand extraction will result in the direct loss of agricultural land within the extraction area. On cessation of the extraction activities the site will be restored to agricultural land use, refer to EIAR Figure 2.4.

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

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

Attribute	Status / Occurrence	Importance
Land	The land in the existing development is used for sand & gravel extraction. The land at the proposed extension is currently used for agriculture. The land is moderately to well drained.	The pit is of high importance at a local scale for its contribution to the economy. Agricultural land has a value in terms of its ability to support agriculture and it is considered to be of high importance at a local scale.
Soils	The soils at the site are well draining. The Ross Carbery soil association has an extensive distribution across the county. The Clashmore soil sssociation has a relatively wide distribution in mid-Cork.	The soils are considered to be of moderate importance at a local scale as they are relatively well-draining. These soils are suitable for agriculture but may need liming or nutrient addition.
Subsoils	The subsoils are tills and gravels derived from Devonian and Carboniferous rocks and are widespread in the county. The subsoils do not have any particular status.	The subsoils at the site are considered to be of moderate importance at a local scale as they facilitate the development of well-draining soils, and of sand and gravel deposits.

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Attribute	Status / Occurrence	Importance
Geology	The bedrock at the site does not have any designated status.	In terms of the proposed development, the bedrock geology is of low economic importance at the local scale. It has the potential to be used in the construction materials sector but is buried by the overlying sand deposits.
Geological Heritage	There are no geological heritage sites in the vicinity of the proposed development.	None.

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

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

Attribute	Impact of Proposal on Land, Soil and Geology	Magnitude of Potential Impact (with No Mitigation)
Land	Development of land for the purposes of extraction.	Low impact due to temporary loss of resource locally within the extraction area.
Topsoil	Stripping of soil, temporary storage and use in progressive and final restoration works.	Low to moderate impact as soil type is relatively common and soil quality is moderate.
Subsoils	Stripping of soil, temporary storage and use in progressive and final restoration works.	Low impact as subsoil type is common and overlying soil quality is moderate.
Geology	No impact as bedrock is already significantly buried.	No impact.
Geological Heritage	No impact.	No impact.

Indirect Impacts

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

Unplanned Events

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

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

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

Human Health

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

Cumulative Impacts

6.83 There is an existing pharmaceutical plant operated by MSD c. 0.5km to the east of the proposed development site. No cumulative impacts have been identified on land, soils or geology in relation to this development.

Interaction with Other Impacts

6.84 The interaction between soils / geology and water is addressed in EIAR Chapter 7 Water (Hydrology & Hydrogeology).

'Do-nothing Scenario'

6.85 Under the 'do nothing scenario' the land within the extension area will remain in agricultural use and the existing site will be operated and restored under planning permission ref. 24/06269.

Mitigation Measures

6.86 Mitigation measures are outlined below for the proposed development.

Site Preparation (Construction) Stage

Soils

6.87 The scheme will involve soil stripping across the excavation areas. Soils will be managed on site in line with best practice guidance as set out in The Institute of Quarrying guidelines[1].

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

6.89 During the site construction stage, the topsoil will be stripped off and will be stockpiled on site, ready for use in restoration works. The soils will be stripped and stored in accordance with best practice guidance[1].

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

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

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

6.92 Soil stripping is to be undertaken by the excavator standing on the surface of the topsoil and digging the topsoil to its maximum depth and loading it into dump trucks. The dump trucks draw alongside the exposed soil profile, standing and travelling only on the basal layer, see Diagram 6-2 and Diagram 6-3 below from the Institute of Quarrying Good Practice Guide.

Diagram 6-2: Soil Stripping Using Modified Layer by Layer Practice

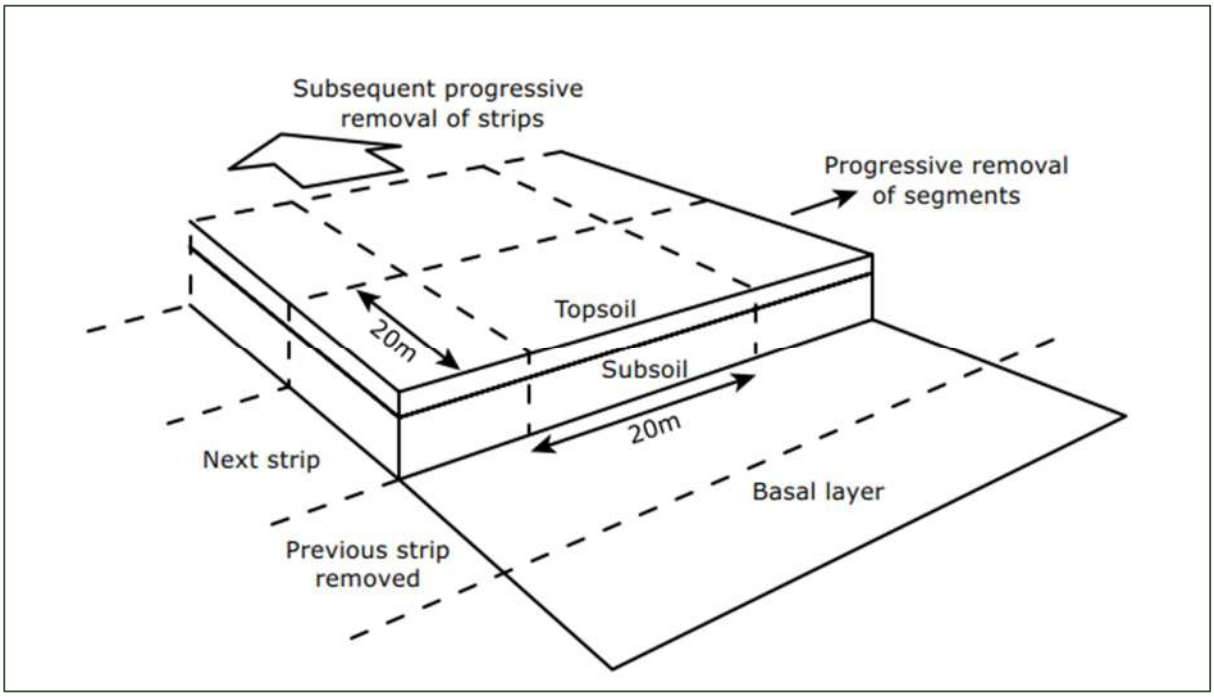

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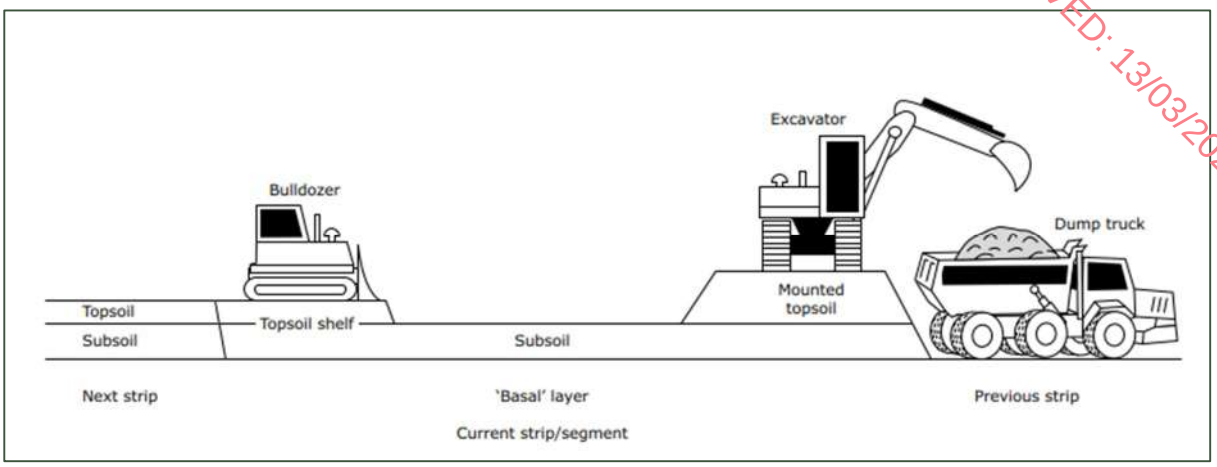
Diagram 6-3: Topsoil Stripping Using Modified Layer by Layer Practice



6.93 Topsoil storage in screening berms will not exceed 3 m in height in order to protect the structure of the soils for use in restoration. Any subsoils, if present, will be stored at a maximum height of 5 m.

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

Subsoils

6.95 Sand and gravel subsoil will be extracted, processed and used to support the local and regional construction industry. Any subsoils not suitable for use in construction will be used as screening berms and subsequently restoration in returning the land to agricultural use.

Geology

6.96 There will be no effect on the geology during construction.

Geological Heritage

6.97 There will be no effect on geological heritage during construction.

Operational Stage

6.98 During the operational stage the Sand & Gravel materials will be excavated and processed at the site.

6.99 Operations at the pit will adhere to the Health and Safety Authority Safe Quarry Guidelines (2020) in relation to the Safety Health and Welfare at Work (Quarries) Regulations (2008, as amended) and this will limit the potential for unplanned events such as instability of pit faces or instability in adjacent lands.

6.100 The pit floor will remain a minimum of 1 m above the identified groundwater table level to ensure that the restored soils at the site will remain free draining.

6.101 No mitigation measures are required for geology or geological heritage.

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6.102 No other specific mitigation measures are required at the site in terms of land, soil and geology at this stage.

Restoration Stage

6.103 The lands within the proposed development will be restored to agricultural use on a phased basis, as detailed in EIAR Chapter 2 and Figure 2-4. The final restored pit slopes are designed to ensure long-term stability.

6.104 No mitigation measures are required for geology or geological heritage.

Residual Impact Assessment

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

Land

6.106 With the restoration of the proposed development back to agricultural land use, it is considered that the long-term impact of the proposed development on land will be negligible and not significant.

6.107 The design of the extraction scheme (boundary set-back distance and final pit slopes) together with the operation of the quarry will be in line with the Health and Safety Authority Safe Quarry Guidelines in relation to the Safety Health and Welfare at Work (Quarries) Regulations 2008. This will eliminate the potential for unplanned events such as instability of quarry face or instability in adjacent lands. Therefore, it is considered that the residual impact of the proposed extraction development on land stability will be negligible and not significant.

Soil

6.108 The residual impact on the soil and topsoil will be low to negligible with the phased extraction and appropriate management of the soils for reuse in restoration. The residual impact on soil is considered Not Significant.

Subsoil (Sand & Gravel)

6.109 The residual impact on the extracted Sand & Gravel material will be permanent.

Monitoring

6.110 The restoration works will be managed and monitored during the two-year proposed final restoration period to ensure that the restored land use is successful and to confirm that the restored final pit faces are stable.

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Cork County Development Plan 2022 - 2028.

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Figures

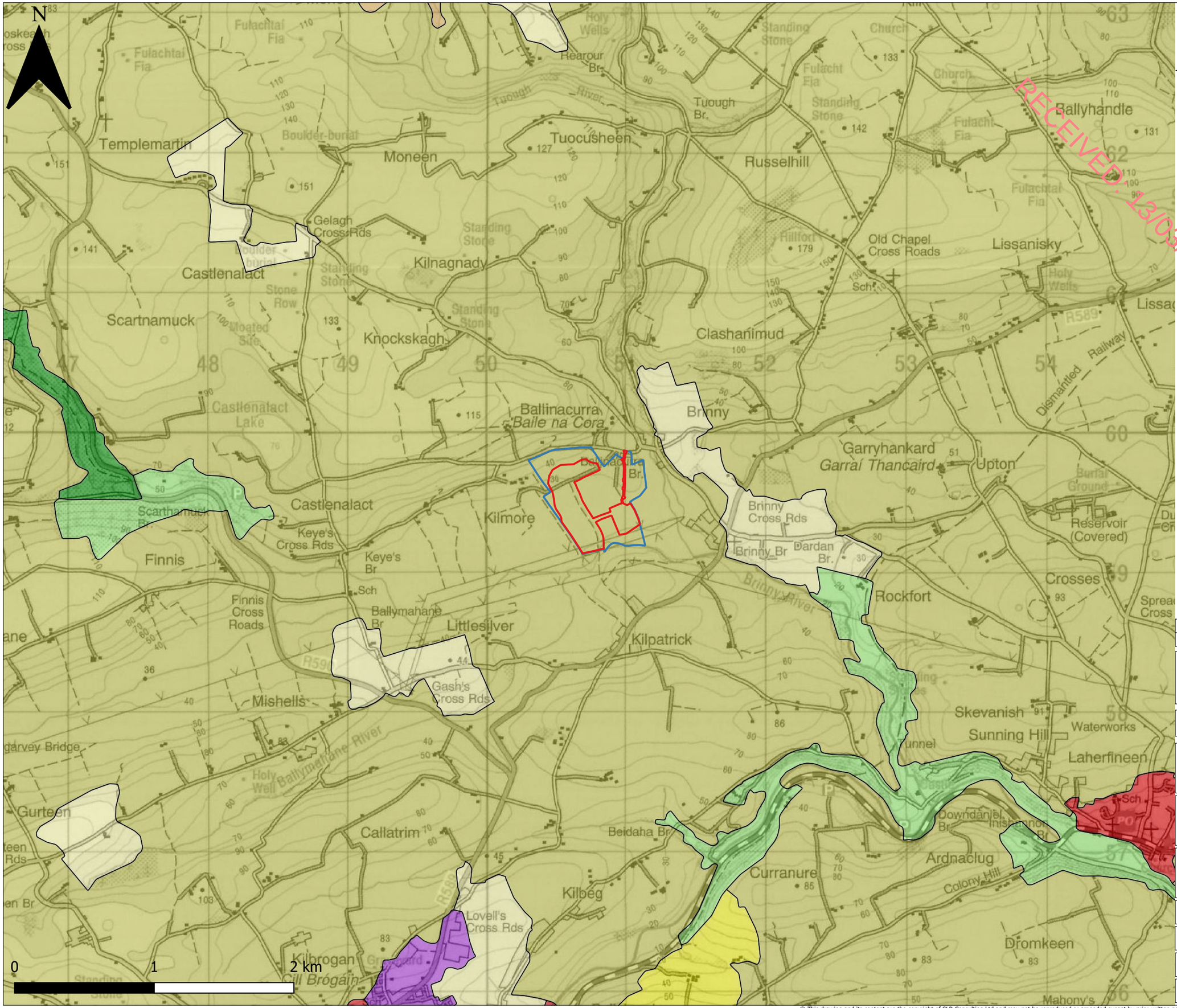
Figure 6-1: CORINE Land Cover Map

Figure 6-2: Regional Soils Map

Figure 6-3: Regional Subsoils Map

Figure 6-4: Bedrock Geology Map

Figure 6-5: Trial Pit & Borehole Locations



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2. Corine Land Cover © Environmental Protection Agency
3. Base Mapping OSi Discovery Series Sheet 86

LEGEND:

WFD Ground Waterbody:

- Complex cultivation patterns
- Coniferous forest
- Discontinuous urban fabric
- Industrial or commercial units
- Land principally occupied by agriculture, with significant areas of natural vegetation
- Mixed forest
- Non-irrigated arable land
- Pastures

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1		12/2025	ND	PG	XX

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KEOHANE READYMIX LIMITED

Project
SAND & GRAVEL PIT, KILMORE, BRINNY, CO. CORK

Drawing Title
CORINE LAND COVER MAP

Scale	SLR Project No.
1:25,000 @ A3	501.065499.00001

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FIGURE 6-1

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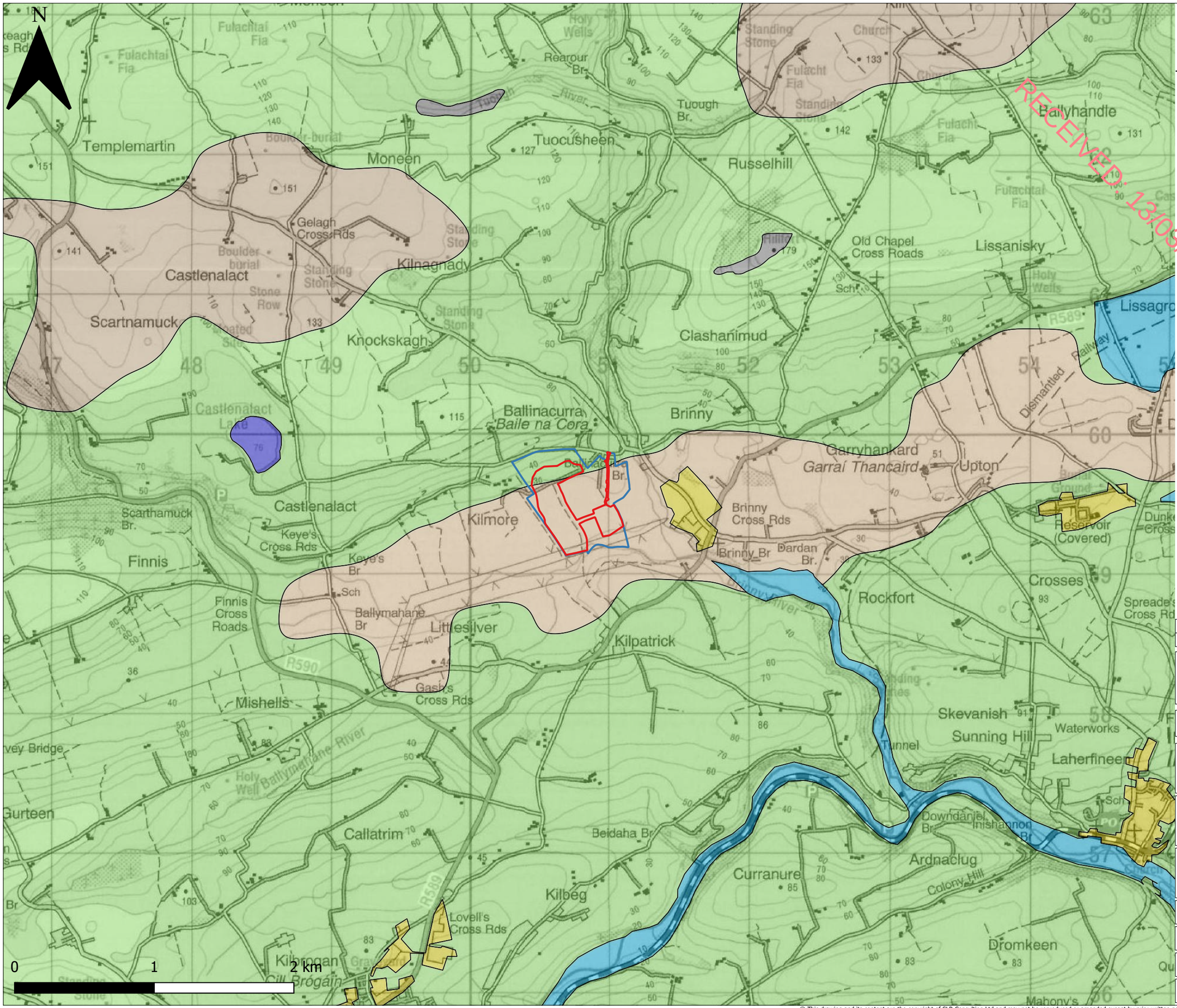

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2. Soil data 250k © Teagasc
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LEGEND:

- Planning Application Area
- Applicant's Land Interest

Soil Association:

- Broomhill
- Clashmore
- River
- Rock
- Ross Carbery
- Urban
- Water body

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Drawing Title
SOIL ASSOCIATION MAP

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FIGURE 6-2

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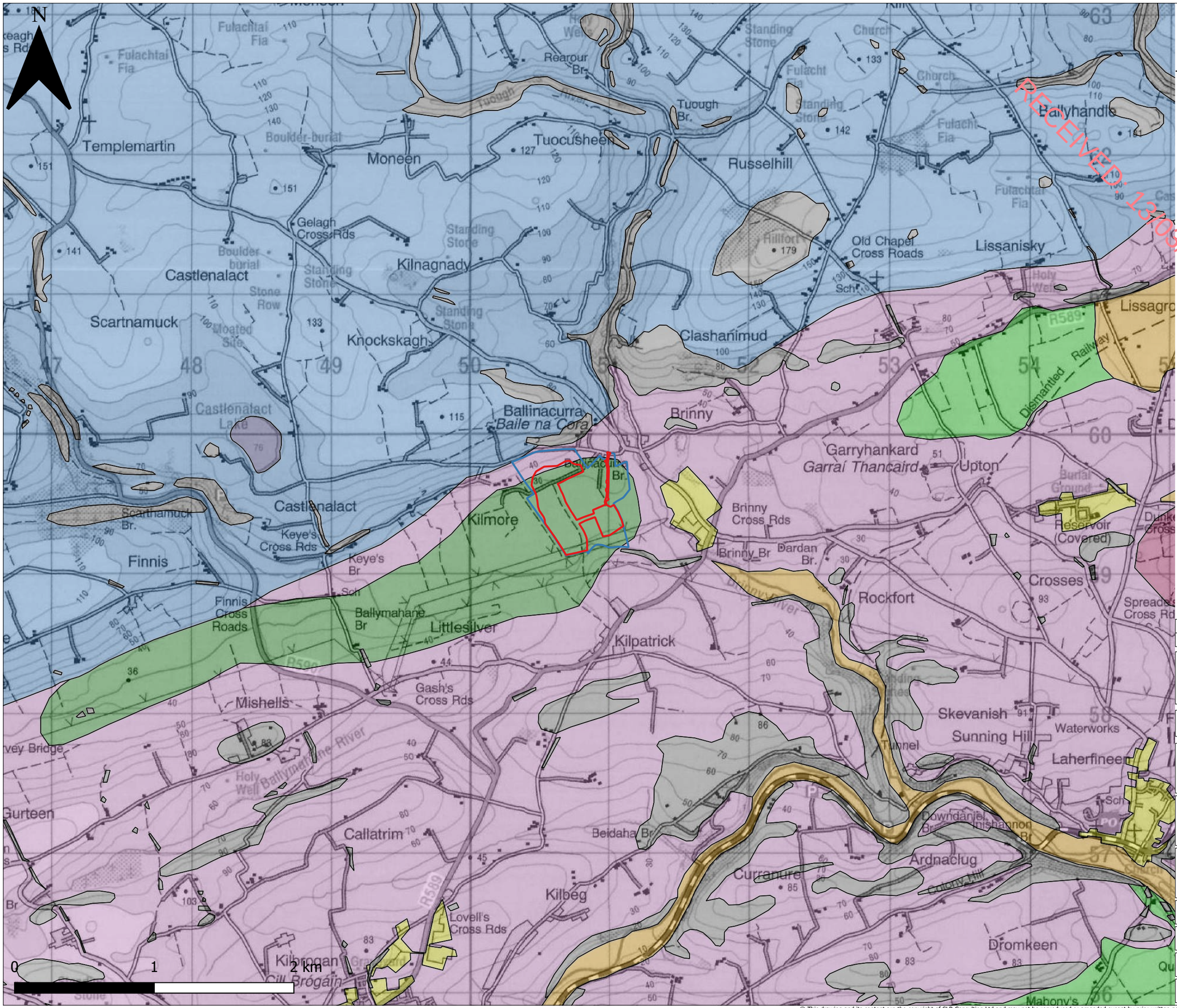

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LEGEND:

- Planning Application Area
- Applicant's Land Interest

Subsoils:

- A - Alluvium undifferentiated gravelly
- GDCSs - Sandstone sands and gravels Devonian Carboniferous
- GDSs - Sandstone sands and gravels Devonian
- Made - Made ground
- Rck - Bedrock at surface
- TDCSsS - Sandstone and shales till Devonian/ Carboniferous
- TDSs - Sandstone till Devonian
- TNSSs - Shales and sandstones till (Namurian)
- Water

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Drawing Title
SUBSOIL MAP

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Date 03/26	Date 03/26	Date 03/26	Date 03/26

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FIGURE 6-3

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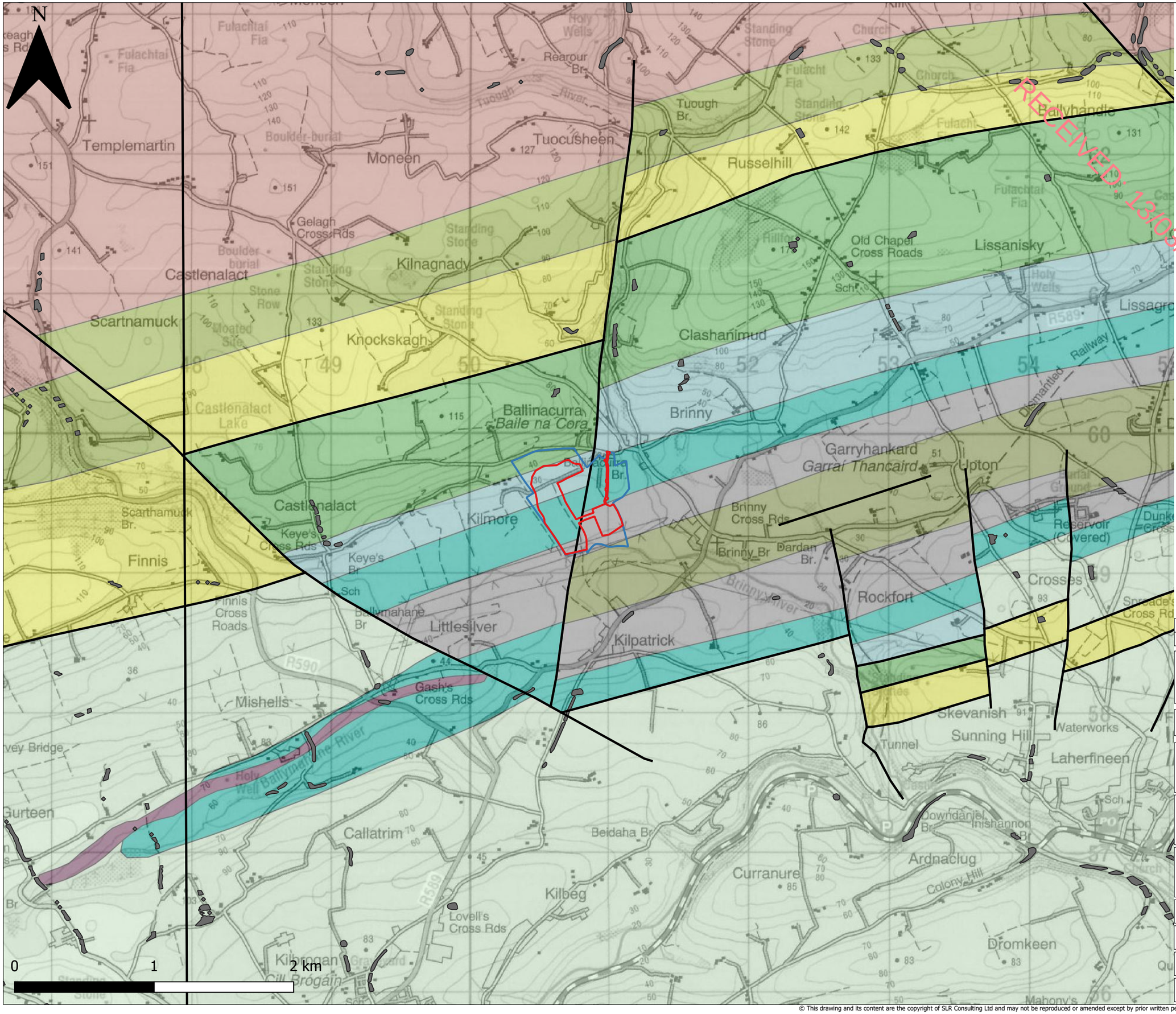

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LEGEND:

- Planning Application Area
- Applicant's Land Interest
- Geological Fault

Bedrock Geology:

- Ballytrasna Formation
- Courtmacsherry Formation
- Dolerite and Gabbro
- Gyleen Formation
- Kinsale Formation
- Lispatrick Formation
- Narrow Cove Member
- Old Head Sandstone Formation
- Pigs Cove Member
- White Strand Formation

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Project
SAND & GRAVEL PIT, KILMORE, BRINNY, CO. CORK

Drawing Title
BEDROCK GEOLOGY MAP

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Drawing Number
FIGURE 6-4

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Notes:

1. Extract from Ordnance Survey 6 INCH Map **No. CK096.**

Legend:

- APPLICANTS LAND INTEREST (c. 43.2 Ha)
- APPLICATION AREA (c. 18.3 Ha)
- EXISTING WAYLEAVE
- RESIDENTIAL LOCATION
- CONTOURS
- TRIAL PIT LOCATION
- GROUNDWATER MONITORING BOREHOLE LOCATION

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Project: KILMORE TOWNLANDS, BRINNY, CO. CORK

Drawing Title: TRIAL PIT & BOREHOLE LOCATIONS

Scale	SLR Project No.
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Designed	Drawn	Checked	Authorised
EW	EW	TP	TP
Date 03/26	Date 03/26	Date 03/26	Date 03/26

Drawing Number: **FIGURE 6-5** Rev. **0**

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\\dir.local\eu\Offices\IE\Dublin\SLR DATA\SLR Projects\0033 Keohane Readymix Ltd\065499 KRL Brinny Reapplication 2026\EIAR Feb 2026\6 LS&G\065499.0.FIG 6-5 Trial Pit & Borehole Locations.dwg

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Appendix 6-A Geophysical Survey Report

SLR

AGP19198_01

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Report on the Kilmore Sand & Gravel Geophysical Investigation at Brinny, Co. Cork for Keohane Readymix

5TH November 2019

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THE FINDINGS OF THIS REPORT ARE THE RESULT OF A GEOPHYSICAL SURVEY USING NON-INVASIVE SURVEY TECHNIQUES CARRIED OUT AT THE GROUND SURFACE. INTERPRETATIONS CONTAINED IN THIS REPORT ARE DERIVED FROM A KNOWLEDGE OF THE GROUND CONDITIONS, THE GEOPHYSICAL RESPONSES OF GROUND MATERIALS AND THE EXPERIENCE OF THE AUTHOR. APEX GEOPHYSICS LTD. HAS PREPARED THIS REPORT IN LINE WITH BEST CURRENT PRACTICE AND WITH ALL REASONABLE SKILL, CARE AND DILIGENCE IN CONSIDERATION OF THE LIMITS IMPOSED BY THE SURVEY TECHNIQUES USED AND THE RESOURCES DEVOTED TO IT BY AGREEMENT WITH THE CLIENT. THE INTERPRETATIVE BASIS OF THE CONCLUSIONS CONTAINED IN THIS REPORT SHOULD BE TAKEN INTO ACCOUNT IN ANY FUTURE USE OF THIS REPORT.

PROJECT NUMBER	AGP19198 KILMORE SAND & GRAVEL		
AUTHOR	**CHECKED**	**REPORT STATUS**	**DATE**
EURGEOL DR. YVONNE O'CONNELL PH.D., M.SC. (GEOPHYSICS), PGEO	TONY LOMBARD M.SC (GEOPHYSICS)	V.01	5TH NOVEMBER 2019

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1. EXECUTIVE SUMMARY

APEX Geophysics Limited was requested by Keohane Readymix to carry out a geophysical investigation at a site c. 1 km west of the village of Brinny in Co. Cork. The purpose of the geophysical investigation is to provide an estimate of the sand and gravel resource across the site and the depth to and type of bedrock. There is an existing sand & gravel pit located to the east of the proposed survey area. The survey area is approx. 25.4 ha in extent.

The objectives of the survey were to estimate the thickness and extent of sand & gravel deposits, provide a resource estimate calculation and determine depth to and type of bedrock.

The geophysical investigation was carried out on the 16th and 17th October 2019 and consisted of reconnaissance EM ground conductivity mapping, 2D Electrical Resistivity Tomography and Seismic Refraction profiling.

The geophysical results have outlined **'clean' SAND/GRAVEL** and **silty SAND/GRAVEL** covering 14.5 ha across much of the east, and northwest of the surveyed area with (uneconomical) clayey SAND/GRAVEL across the west, south and northeast of the surveyed area.

A volume of 583,886 cu.m (1.05 million tonnes) of **'clean' SAND/GARVEL** and a volume of 358,075 cu.m (0.64 million tonnes) of **silty SAND/GRAVEL** is estimated in two zones across the survey area. The **silty SAND/GRAVEL** material may have economic potential but the fines content, which, based on previous experience, is likely to be between 5% and 15% and may be a limiting factor.

MUDSTONE bedrock has been interpreted at an average depth of 10 m below ground level.

To confirm the findings of the geophysical report the following trial pits are recommended:

No.	ITM Easting	ITM Northing	Target
PTP1	550343	559836	to assess 'clean' sand / gravel in Zone A2
PTP2	550484	559857	to assess absence of sand / gravel
PTP3	550706	559827	to assess 'clean' sand / gravel in Zone A1
PTP4	550491	559764	to assess 'clean' sand / gravel in Zone A1
PTP5	550545	559655	to assess 'clean' sand / gravel in Zone A1
PTP6	550355	559464	to assess absence of sand / gravel
PTP7	550581	559507	to assess 'clean' sand / gravel in Zone B1
PTP8	550494	559300	to assess 'clean' sand / gravel in Zone A1
PTP9	550638	559320	to assess 'clean' sand / gravel in Zone A1

Samples should be taken from the trial pits for Particle Size Distribution (PSD) analysis and for physical, mechanical and laboratory tests. (If the pits show good quality material down to 4m then two pits should be continued as macro pits with the sides battered back to a safe angle to allow digging in of the excavator).

The geophysical report should be reviewed after the completion of any direct investigation.

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2. INTRODUCTION

APEX Geophysics Limited was requested by Keohane Readymix to carry out a geophysical investigation at a site near Brinny, Co. Cork. The purpose of the geophysical investigation is to provide an estimate of the sand and gravel resource across the site and the depth to and type of bedrock.

2.1 Survey Objectives

The objectives of the survey were to provide the following information:

- Estimate the thickness and extent of sand & gravel deposits,
- Provide a resource estimate calculation,
- Depth to and type of bedrock.

2.2 Site Background

The survey area is situated c. 1 km west of the village of Brinny in Co. Cork and comprises of open agricultural land with the regional road R700 to the west. There is an existing sand & gravel pit located to the east of the proposed survey area. The survey area is approx. 25.4 ha in extent. Topography across the site ranges from 22 MSL in the south rising to 39 MSL in the north of the survey area.

Fig 2.1: Site location (survey area marked in red).

2.2.1 Soils

The Geological Survey of Ireland (GSI) subsoils map for the area (Figure 2.2) indicates that the site is underlain by gravels derived from Devonian sandstones with till derived from Devonian and Carboniferous sandstones

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and shales surrounding the site. Areas of subcrop / outcrop are also indicated to the north and southeast of the site.

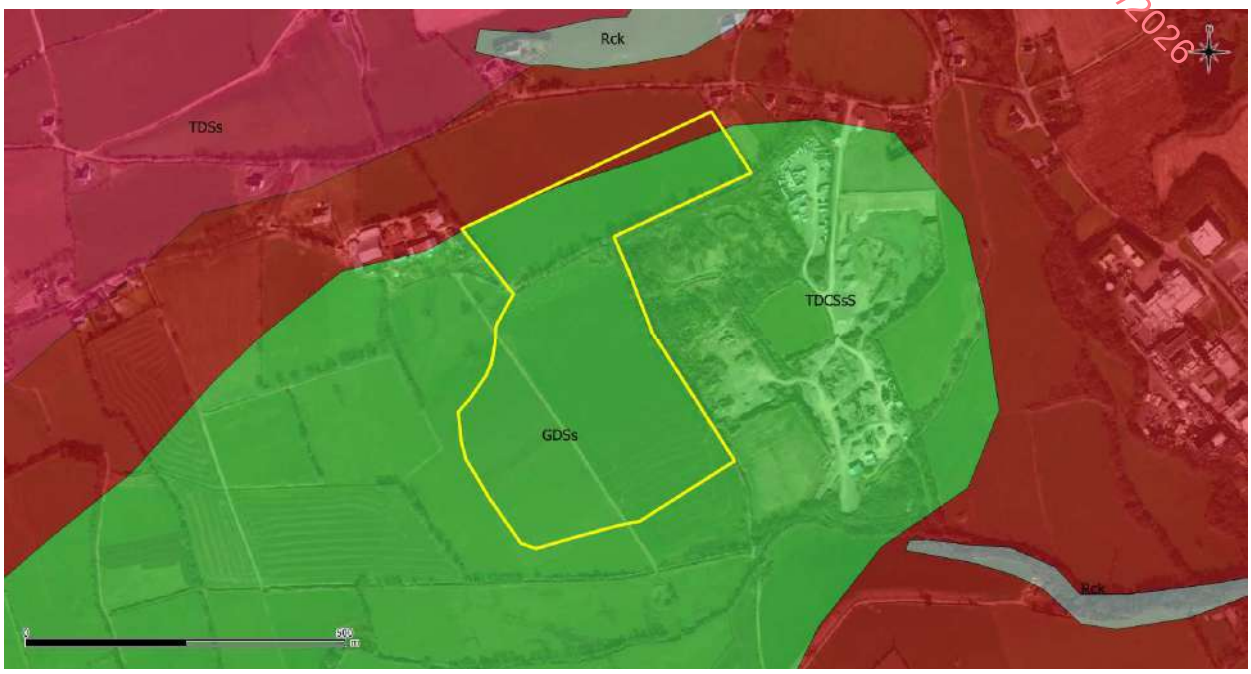

Fig 2.2: GSI subsoils map of the site (survey area marked in yellow). GDSs (green) = gravels, TDCSsS (red) = sandstone & shale till, TDSs (pink) = sandstone till, Rck (grey) = subcrop/outcrop.

2.2.2 Geology

The GSI 1:100,000 Bedrock Geology map for the area (Figure 2.3) indicates that the site is underlain by Pigs Cove Member sand-lensed mudstone and Courtmacsherry Formation calcareous mudstone with limestone. North of the site the Narrow Cove Member comprises sandstone and mudstone while south of the site the Lispatrick Formation comprises pyritic cherty mudstone with dolomite. A NNE-SSW fault is mapped to the east.

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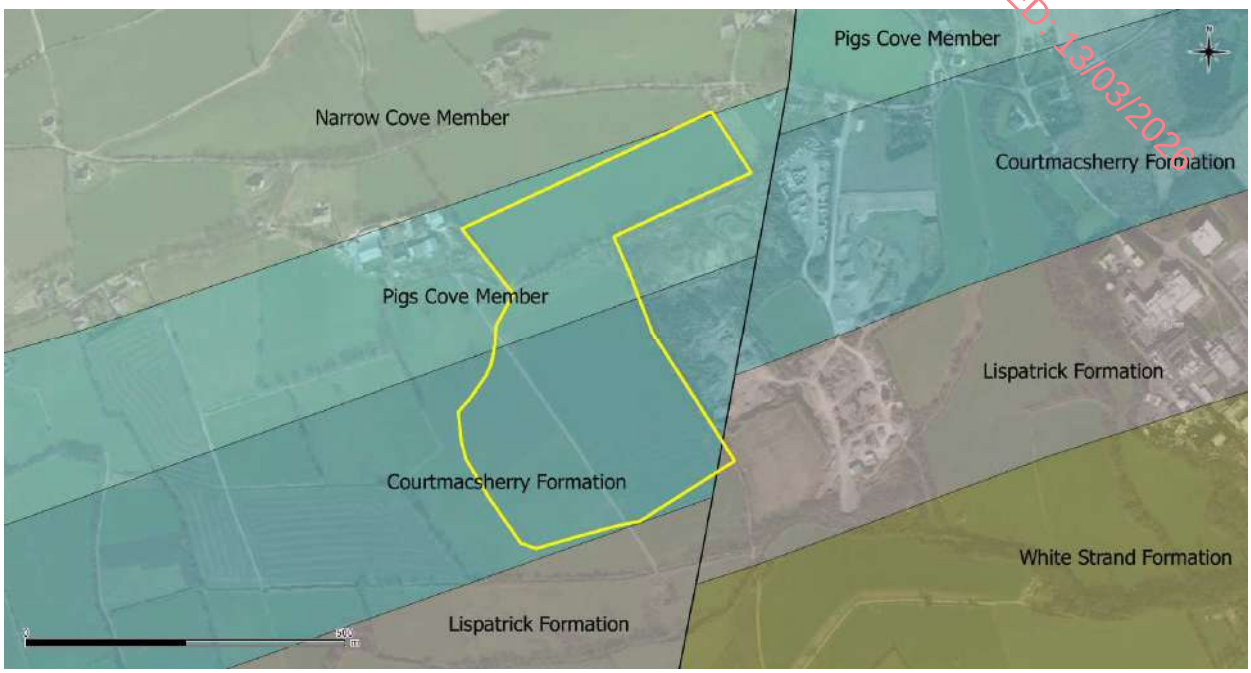

Fig 2.3: The GSI bedrock map (survey area marked in yellow).

2.2.3 Groundwater Aquifer and Vulnerability

The GSI database indicates the site is situated within a 'Locally important gravel aquifer' (Figure 2.4). Bedrock lithologies in the survey area are classified as a 'Locally Important Aquifer – Bedrock which is Moderately Productive only in Local Zones' (Figure 2.5).

Fig 2.4: Groundwater aquifers map of the site (survey area marked in yellow).

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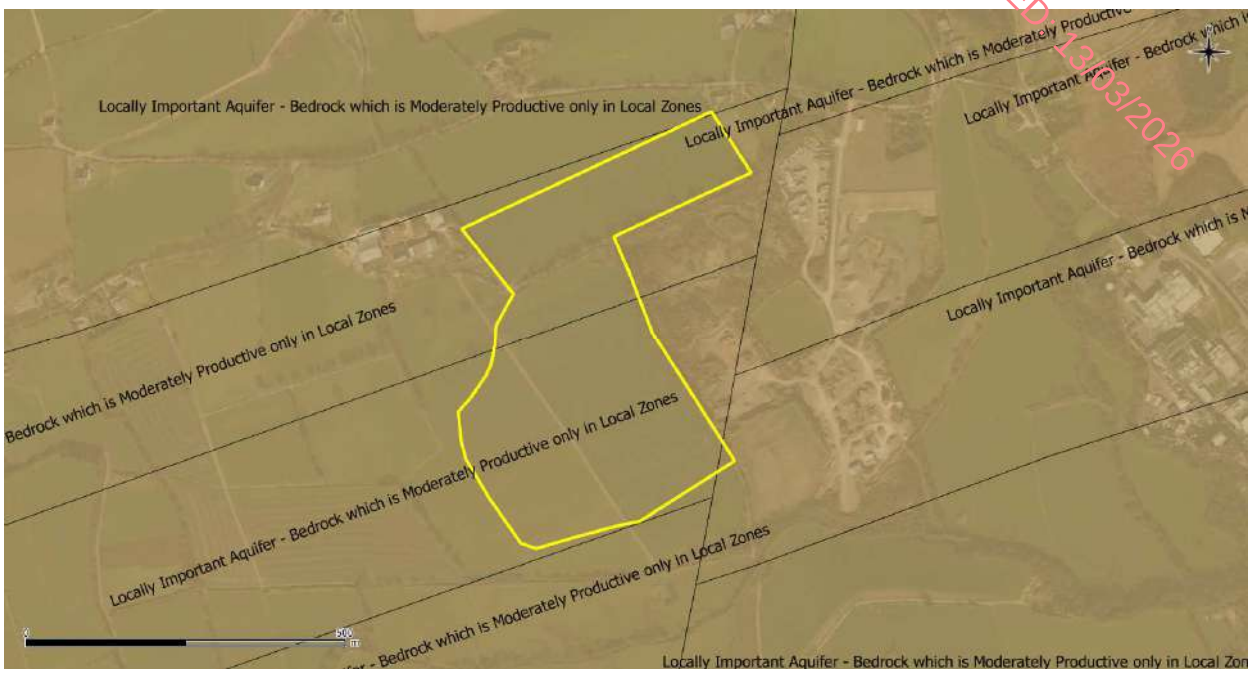

Fig 2.5: Groundwater aquifers map of the site (survey area marked in yellow).

The GSI groundwater vulnerability is classified as 'medium' to 'high' across the site (Figure 2.6).

Fig 2.6: Groundwater vulnerability map of the site (survey area marked in yellow). M = medium vulnerability, H = High, E = Extreme and X = Extreme-rock at or near surface.

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2.2.4 Historical Sheet

The 6" Geological Sheet (Figure 2.7) indicates slates and grits outcropping c. 700 m northeast of the site. No geological observations have been made across the site.

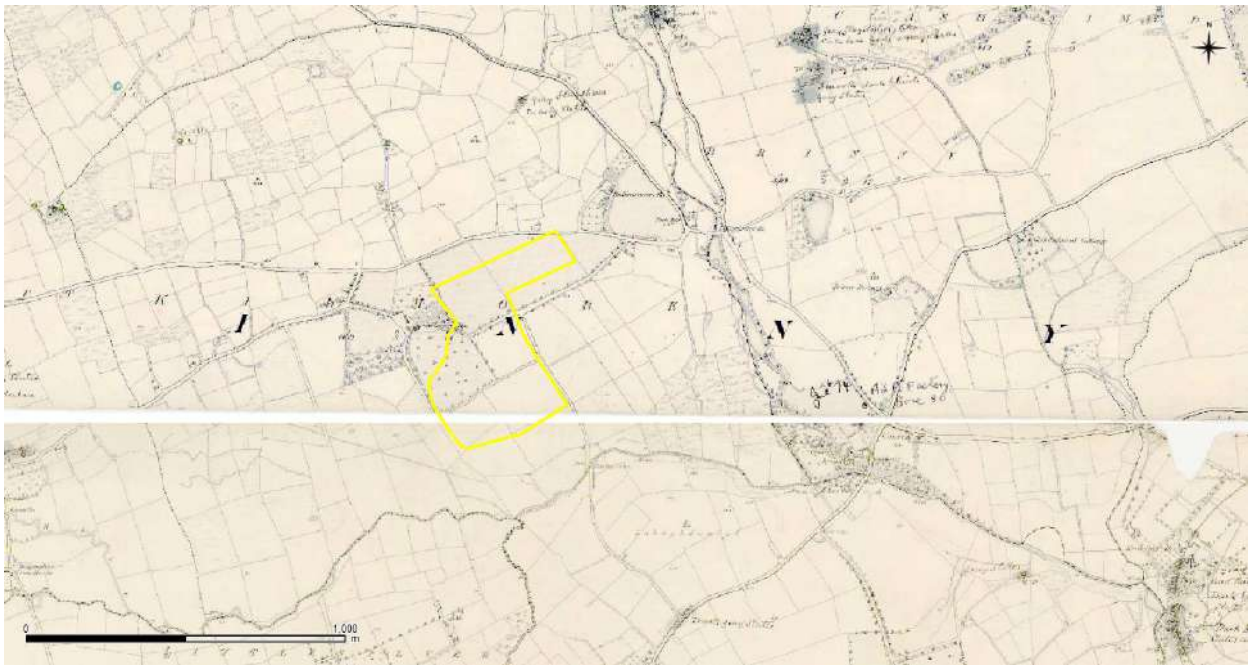

Fig.2.7. GSI 6" Sheet of the survey area (outcrop = hatched area northeast of site).

2.3 Survey Rationale

The investigation consisted of reconnaissance EM ground conductivity mapping, 2D Electrical Resistivity Tomography (ERT) and Seismic Refraction profiling.

EM ground conductivity mapping operates on the principle of inducing currents in conductive substrata and measuring the resultant secondary electro-magnetic field. The strength of this secondary EM field is calibrated to give apparent ground conductivity in milliSiemens/metre (mS/m). This technique will provide information on the shallow (0-6m below ground level) variation of the superficial deposits and outline the shallow bedrock.

ERT images the resistivity of the materials in the subsurface along a profile to produce a cross-section showing the variation in resistivity with depth. Each cross-section will be interpreted to determine the material type along the profile at increasing depth, based on the typical resistivities returned for Irish ground materials.

Seismic Refraction profiling measures the velocity of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher seismic velocities while soft, loose or fractured materials have lower velocities. Readings are taken using geophones connected via multi-core cable to a seismograph. This method should allow us to profile the depth to the top of the bedrock, along profiles across the site.

As with all geophysical methods the results are based on indirect readings of the subsurface properties. The effectiveness of the proposed approach will be affected by variations in the ground properties. By combining a number of techniques it is possible to provide a higher quality interpretation and reduce any ambiguities which

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may otherwise exist. Further information on the detailed methodology of each geophysical method employed in this investigation is given in **APPENDIX A: DETAILED GEOPHYSICAL METHODOLOGY**.

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3. RESULTS

The survey was carried out on the 16th and 17th October 2019 and involved the collection of EM Ground Conductivity data, 8 no. ERT profiles and 4 no. seismic refraction profiles. The geophysical survey locations are indicated on Drawing AGP19198_01 (**APPENDIX B**).

3.1 EM Ground Conductivity Mapping

The EM ground conductivity results (Drawing AGP19198_02, Appendix B) are indicative of the bulk conductivity of the ground materials from 0-6.0m bgl. The recorded conductivity values were predominantly in the range 1.5 to 12.5 mS/m and have been generally interpreted in conjunction with the ERT and seismic data as follows:

Conductivity (mS/m)	Interpretation
1- 4	Primarily 'clean' SAND/GRAVEL with some clayey/silty SAND/GRAVEL over rock
4 - 5	Primarily silty SAND/GRAVEL over rock
>5	Primarily clayey SAND/GRAVEL over rock

3.2 ERT

The resistivity values have been interpreted on the following basis:

Resistivity (Ohm-m)	Interpretation
250 - 500	Clayey SAND/GRAVEL
500 - 1000	Silty SAND/GRAVEL
1000 - 5000	SAND/GRAVEL
50-350	MUDSTONE Bedrock

Note: resistivity values do not distinguish between sand and gravel.

3.3 Seismic Refraction Profiling

The seismic refraction data has been interpreted on the following basis:

Layer	Seismic Velocity (m/s)	Average Seismic Velocity (m/s)	Interpretation
1	205-375	255	Topsoil & loose clayey/silty/clean SAND/GRAVEL
2	436-1258	895	Medium dense- dense clayey/silty/clean SAND/GRAVEL
3	2158-3988	2690	Slightly Weathered – Fresh ROCK

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3.4 SAND & GRAVEL ZONE

Electrical resistivity values for Irish sand and gravel deposits are generally within the following ranges:

Material	*Fines Content %	Resistivity (Ohm-m)	Economic Potential
'Clean' SAND/GRAVEL	< 5	> 1000	Yes
Silty SAND/GRAVEL	5 - 15	500-1000	may have, subject to screening/washing.
Clayey SAND/GRAVEL	> 15%	250-500	unlikely, due to fines content

**(Fines refer to the clay and silt content of the sand/gravel material. The higher the fines content the poorer the material and use is restricted and screening/or washing required. These estimates should be confirmed by subsequent sampling and testing).*

A total area of 25.4 ha was surveyed. The geophysical results have outlined **'clean' SAND/GRAVEL** and **silty SAND/GRAVEL** covering 14.5 ha across much of the east, and northwest of the surveyed area (see summary interpretation map shown on Drawing AGP19198_03) with clayey SAND/GRAVEL across the west, south and northeast of the surveyed area.

The **'clean' SAND/GARVEL** is up to 13 m thick with an estimated average thickness of 9.5 m in Zone A1 and 5.5 m in A2 (an allowance has been made for 0.5 m of topsoil and/or overburden) and the **silty SAND/GRAVEL** is up to 14 m thick with an estimated average thickness of 9.5 m Zone B1 and an estimated 5.5 m in B2 (again an allowance has been made for 0.5 m of topsoil and/or overburden).

The **silty SAND/GRAVEL** material may have economic potential but the fines content, which, based on previous experience, is likely to be between 5% and 15% and may be a limiting factor.

	Zone	Area (m^2)	Area (ha)	Average thickness (m)	Volume (cu. m.)	Tonnage (at 1.6t/cu.m overburden, at1.8t/cu.m SAND/GRAVEL) (tonnes)
Overburden	A1	85,420	8.5	0.5	42,710	68,336
	A2	4,115	0.4	0.5	2,058	3,292
	B1	51,530	5.2	0.5	25,765	41,224
	B2	4,000	0.4	0.5	2,000	3,200
Estimated Total Overburden					**72,533**	**116,052**
'Clean' SAND/GRAVEL	A1	85,420	8.5	**6.65	568,043	1,022,477
	A2	4,115	0.4	**3.85	15,843	28,517
Silty SAND/GRAVEL	B1	51,530	5.2	**6.65	342,675	616,814
	B2	4,000	0.4	**3.85	15,400	27,720
Total SAND/GRAVEL					**941,960**	**1,695,528**

***The estimated thicknesses on the ERT profiles have been multiplied by a calibration factor of 0.7, (this is due to the overestimation of the thickness of high resistivity materials, which is an artifact of resistivity data processing software).*

This is a gross estimate based on interpreted geophysical data, average heights from the topographic data acquired as part of the geophysical investigation and should be refined after direct investigation and detailed design).

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No allowance has been made for waste or standoffs from boundaries. This is likely to reduce the net resource amount by 10-20%.

The data indicate slightly weathered to fresh MUDSTONE bedrock. Depth to bedrock across the site varies from 1.5 – 16.0 m below ground level (bgl) but is estimated to be on average 10 m bgl.

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4. RECOMENDATIONS

To confirm the findings of the geophysical report the following trial pits are recommended:

No.	ITM Easting	ITM Northing	Target
PTP1	550343	559836	to assess 'clean' sand / gravel in Zone A2
PTP2	550484	559857	to assess absence of sand / gravel
PTP3	550706	559827	to assess 'clean' sand / gravel in Zone A1
PTP4	550491	559764	to assess 'clean' sand / gravel in Zone A1
PTP5	550545	559655	to assess 'clean' sand / gravel in Zone A1
PTP6	550355	559464	to assess absence of sand / gravel
PTP7	550581	559507	to assess 'clean' sand / gravel in Zone B1
PTP8	550494	559300	to assess 'clean' sand / gravel in Zone A1
PTP9	550638	559320	to assess 'clean' sand / gravel in Zone A1

Samples should be taken from the trial pits for Particle Size Distribution (PSD) analysis and for physical, mechanical and laboratory tests. (If the pits show good quality material down to 4m then two pits should be continued as macro pits with the sides battered back to a safe angle to allow digging in of the excavator).

The geophysical report should be reviewed after the completion of any direct investigation.

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APPENDIX A: DETAILED GEOPHYSICAL METHODOLOGY

A combination of geophysical techniques was used to provide a high quality interpretation and reduce any ambiguities, which may otherwise exist.

EM Ground Conductivity Mapping

Principles

This is an electromagnetic technique used to investigate lateral variations in overburden material and to assist with the indication of the depth to bedrock. This method operates on the principle of inducing currents in conductive substrata and measuring the resultant secondary electro-magnetic field. The strength of this secondary EM field is calibrated to give apparent ground conductivity in milliSiemens/metre (mS/m). Readings over material such as organic waste and peat give high conductivity values while readings over dry materials with low clay mineral content such as gravels, limestone or quartzite give low readings. The EM31 survey technique determines the apparent conductivity of the ground material from 0-6m bgl depending on the dipole mode used.

Data collection

The EM equipment used was a GF CMD-4 conductivity meter equipped with data logger. This instrument features a real time graphic display of the previous 20 measurement points to monitor data quality and results. Conductivity and in-phase values were recorded across the site. Local conditions and variations were recorded.

Data processing

The conductivity and in-phase field readings were downloaded, contoured and plotted using the SURFER 12 program (Golden Software, 2015). Data which was affected by metallic objects was removed. Assignation of material types and possible anomaly sources was carried out, with cross-reference to other data.

Electrical Resistivity Tomography (ERT)

Electrical Resistivity Tomography was carried out to provide information on lateral variations in the overburden material as well as on the underlying bedrock.

Principles

This surveying technique makes use of the Wenner resistivity array. The 2D-resistivity profiling method records a large number of resistivity readings in order to map lateral and vertical changes in material types. This method involves the use of electrodes connected to a resistivity meter, using computer software to control the process of data collection and storage.

Data Collection

Profiles were recorded using a Tigre resistivity meter, imaging software, two 32 takeout multicore cables and up to 64 stainless steel electrodes. Saline solution was used at the electrode/ground interface in order to gain a good electrical contact required for the technique to work effectively. The recorded data were processed and viewed immediately after surveying.

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Data Processing
The field readings were stored in computer files and inverted using the RES2DINV package (Geotomo Software, 2006) with up to 5 iterations of the measured data carried out for each profile to obtain a 2D-depth model of the resistivities.

The inverted 2D resistivity models and corresponding interpreted geology are displayed on the accompanying drawings alongside the processed seismic sections. Profiles have been contoured using the same contour intervals and colour codes. Distance is indicated along the horizontal axis of the profiles.

Seismic Refraction Profiling

Principles
This method measures the velocity of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher seismic velocities while soft, loose or fractured materials have lower velocities.

Seismic profiling measures the p-wave velocity (Vp) of refracted seismic waves through the overburden and rock material and allows an assessment of the thickness and quality of the materials present to be made. Stiffer and stronger materials usually have higher Vp velocities while soft, loose or fractured materials have lower Vp velocities. Readings are taken using geophones connected via multi-core cable to a seismograph.

Data Collection
A Geode high resolution 24 channel digital seismograph, 24 10HZ vertical geophones and a 10 kg hammer were used to provide first break information, with a 24 take-out cable (3m spacing). Equipment was carried was operated by a two-person crew.

Readings are taken using geophones connected via multi-core cable to a seismograph. The depth of resolution of soil/bedrock boundaries is determined by the length of the seismic spread, typically the depth of resolution is about one third the length of the profile, (eg. 69m profile ~23m depth, 33m profile ~ 11m depth).

Shots from seven different positions were taken (2 x off-end, 2 x end, 3 x middle) to ensure optimum coverage of all refractors.

Data Processing
First break picking in digital format was carried out using the SeisImager/2D PICKWIN software program from Geometrics to construct p-wave (Vp) traveltime plots for each spread. The processing and interpretation uses the ray-tracing and tomographic inversion methods, to acquire depths to boundaries and the P-wave velocities of these layers, using the SeisImager/2D PLOTREFA program.

SeisImager/2D interprets seismic refraction data as a laterally varying layered earth structure. The program includes three methods for data analysis, time-term inversion, the reciprocal method and tomography.

The tomography method creates an initial velocity model, then traces rays through the model, comparing the calculated and measured traveltimes. The model is then modified and the process repeated to minimise the difference between the calculated and measured times. The data was processed using this method and was then converted to a layer model for display and interpretation.

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Approximate errors for Vp velocities are estimated to be +/- 10%. Errors for the calculated layer thicknesses are of the order of +/-20%. Possible errors due to the "hidden layer" and "velocity inversion" effects may also occur (Soske, 1959).

Spatial Relocation

All the geophysical investigation locations were acquired using Trimble Geo 7X high-accuracy GNSS handheld GPS system using the settings listed below. This system allows collection of GPS data with c.20mm accuracy.

Projection:	Irish Transverse Mercator
Datum:	Ordnance
Coordinate units:	Meters
Altitude units:	Meters
Survey altitude reference:	MSL
Geoid model:	Republic of Ireland

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APPENDIX B: DRAWINGS

The information derived from the geophysical investigation is presented in the following drawings:

AGP19198_01	Geophysical Investigation Locations	1:4000	@ A4
AGP19198_02	EM Conductivity Contours (mS/m)	1:4000	@ A4
AGP19198_03	Summary Interpretation Map	1:4000	@ A4
AGP19198_R1	Results and Interpretation – ERT R1 & S1	1:2000	@ A4
AGP19198_R2	Results and Interpretation – ERT R2 & S2	1:2000	@ A4
AGP19198_R3	Results and Interpretation – ERT R3	1:1000	@ A4
AGP19198_R4	Results and Interpretation – ERT R4	1:1000	@ A4
AGP19198_R5	Results and Interpretation – ERT R5	1:1000	@ A4
AGP19198_R6	Results and Interpretation – ERT R6 & S3	1:1000	@ A4
AGP19198_R7	Results and Interpretation – ERT R7 &S4	1:2000	@ A4
AGP19198_R8	Results and Interpretation – ERT R8	1:1000	@ A4

FIGURE 1: GEOPHYSICAL INVESTIGATION LOCATIONS

SCALE 1:4000

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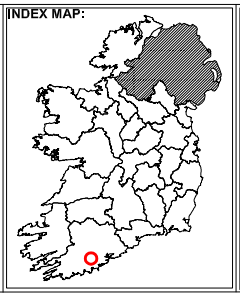
INDEX MAP:



LEGEND:

- Site
- + EM conductivity reading
- R1 2D resistivity profile
- S1 Seismic refraction profile

The information displayed here is to be used in conjunction with Report AGP19198_01 Report on the Kilmore Sand & Gravel Geophysical Investigation at Brinny, Co. Cork for Keohane Readymix, APEX Geophysics Ltd. 5th November 2019

PROJECT:	KILMORE SAND & GRAVEL GEOPHYSICAL SURVEY
CLIENT.:	KEOHANE READYMIX
DRAWING NO:	AGP19198_01
SCALE:	AS INDICATED @ A4
DATE:	05-11-2019

Version:	Date:	Drawn By:	Checked:
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FIGURE 1: EM CONDUCTIVITY CONTOURS (mS/m)

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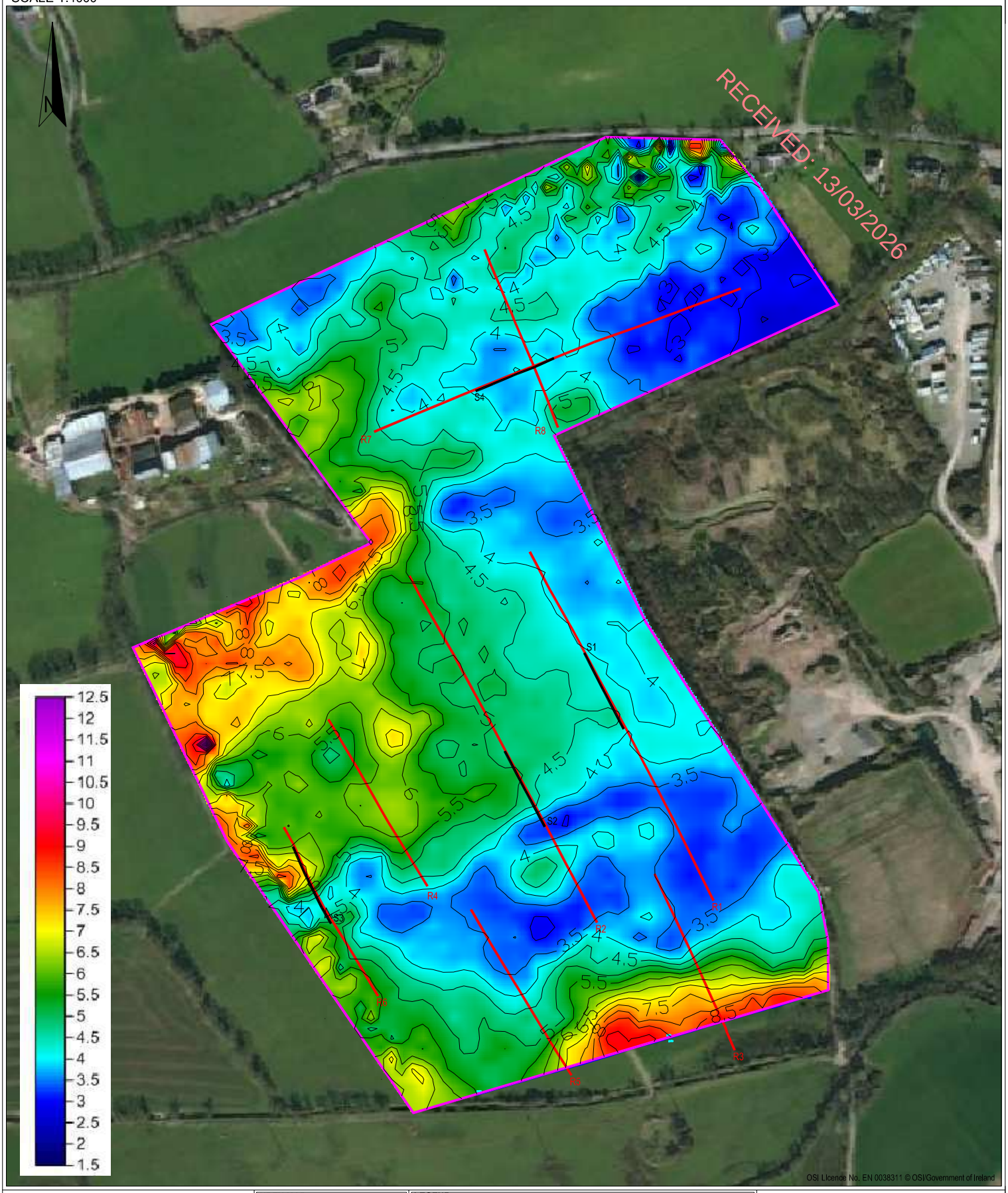

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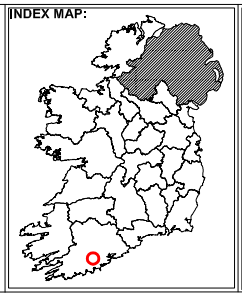
INDEX MAP:



LEGEND:

- Site
- + EM conductivity reading
- R1 2D resistivity profile
- S1 Seismic refraction profile

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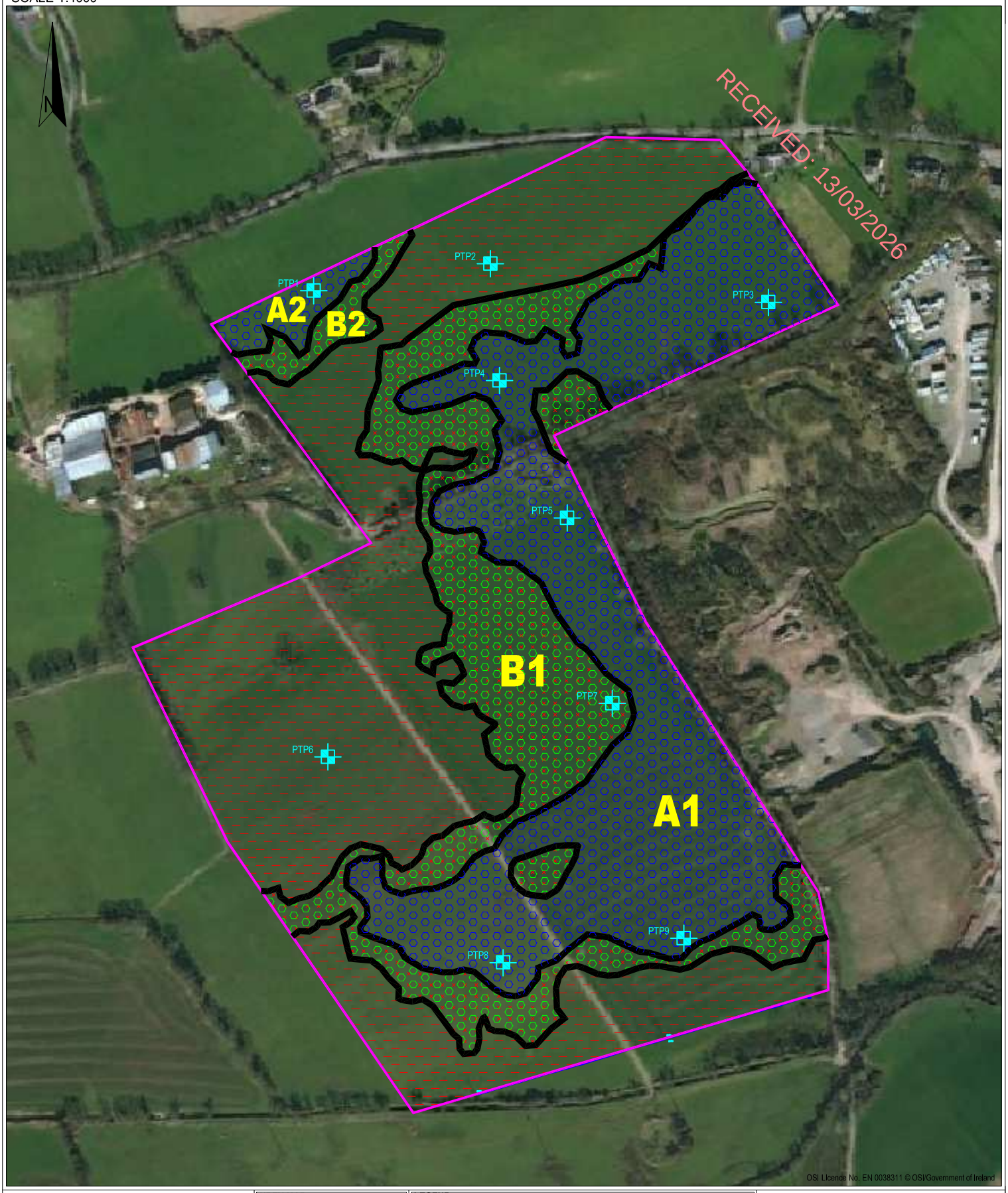
FIGURE 1: SUMMARY INTERPRETATION MAP

SCALE 1:4000



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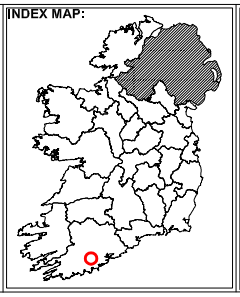
INDEX MAP:



LEGEND:

- Sandy gravelly CLAY
- silty SAND/GRAVEL
- SAND/GRAVEL
- PTP1 Proposed trial pit

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FIGURE 1: RESULTS & INTERPRETATION - ERT R1 & S1

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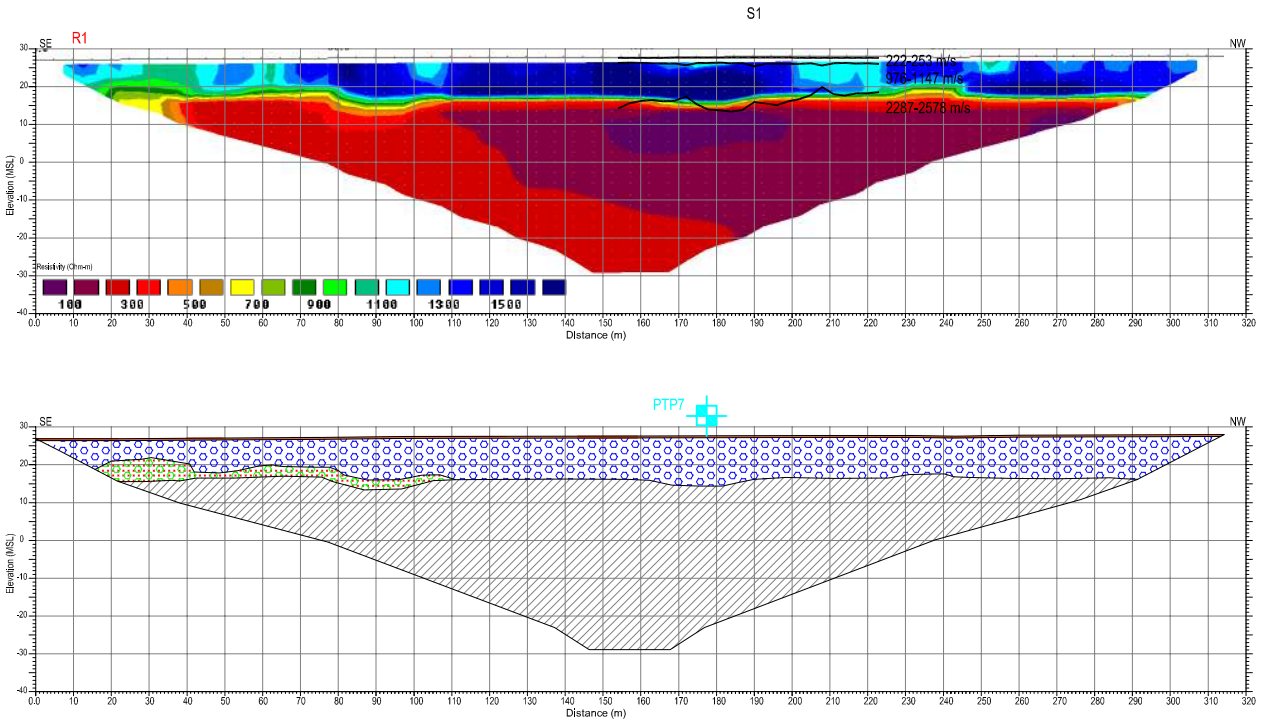

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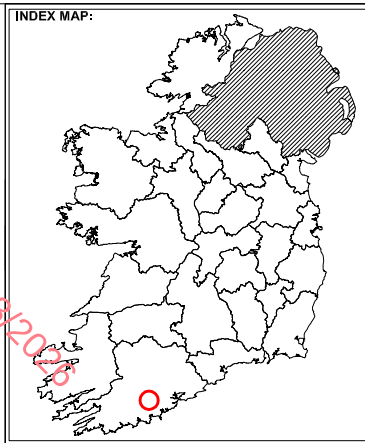

LEGEND:

- Topsoil/Overburden
- clayey SAND/GRAVEL
- silty SAND/GRAVEL
- SAND/GRAVEL
- MUDSTONE
- PTP1 Proposed trial pit

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SCALE:	AS INDICATED @ A4
DATE:	05-11-2019

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FIGURE 1: RESULTS & INTERPRETATION - ERT R2 & S2

SCALE 1:2000

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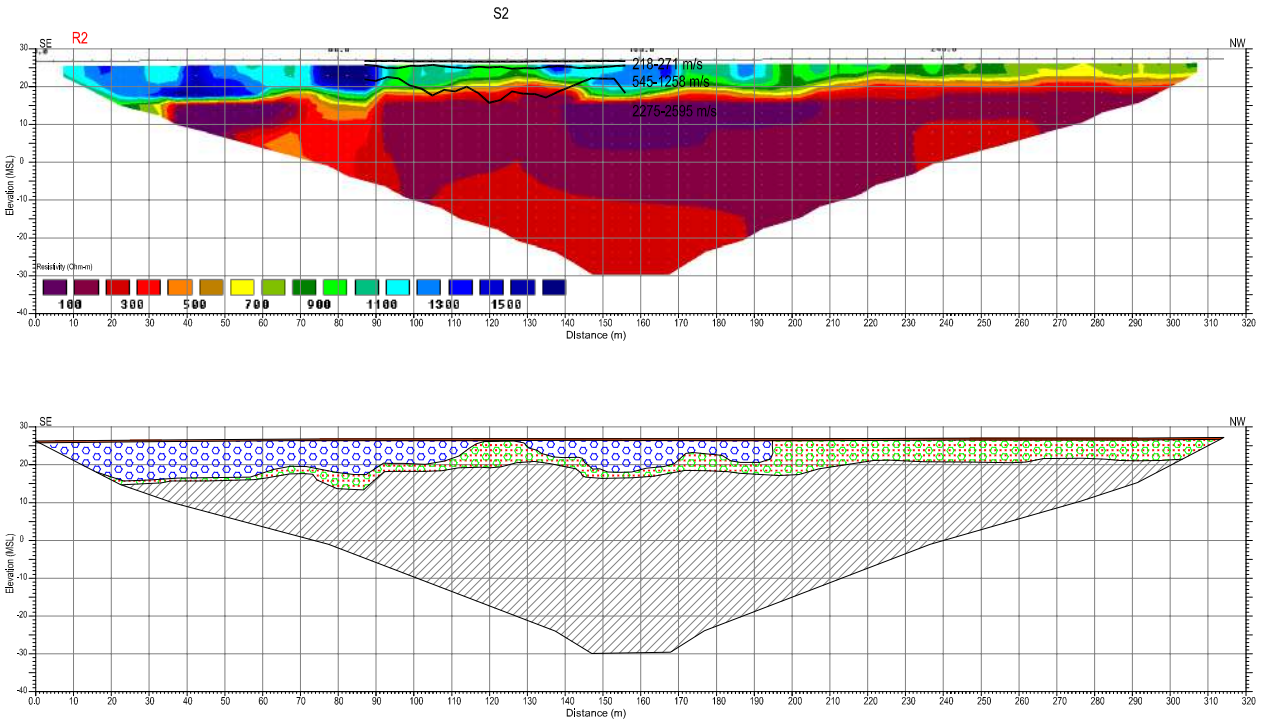

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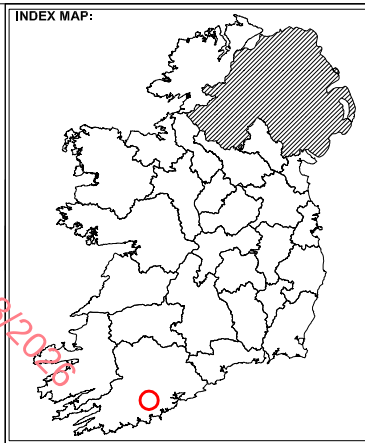

LEGEND:

- Topsoil/Overburden
- clayey SAND/GRAVEL
- silty SAND/GRAVEL
- SAND/GRAVEL
- MUDSTONE
- PTP1 Proposed trial pit

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DATE:	05-11-2019

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FIGURE 1: RESULTS & INTERPRETATION - ERT R3

SCALE 1:1000

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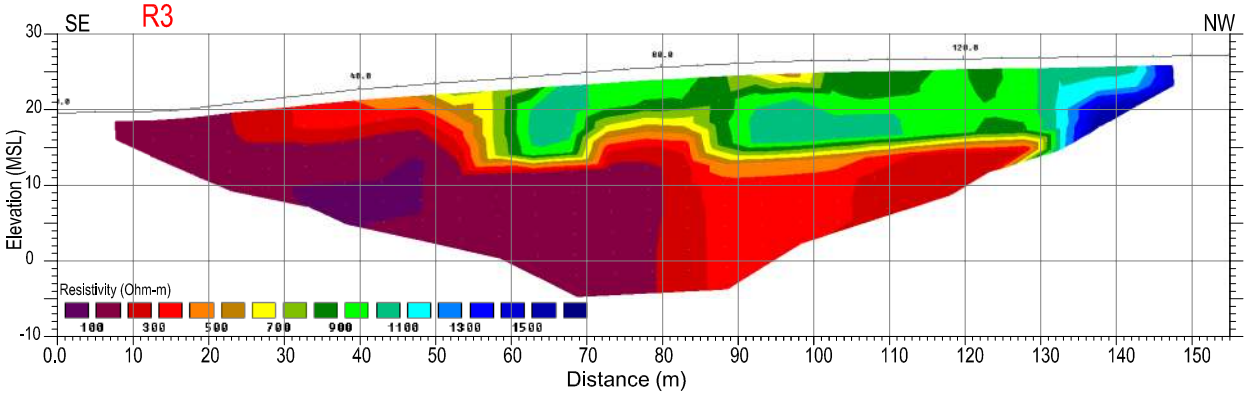

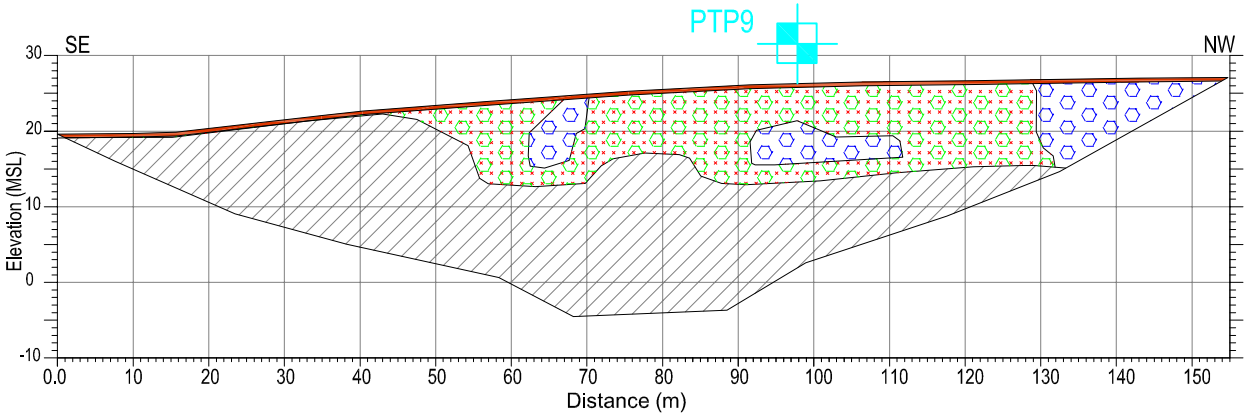

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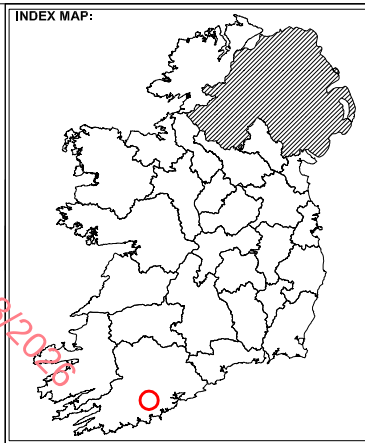

LEGEND:

- Topsoil/Overburden
- clayey SAND/GRAVEL
- silty SAND/GRAVEL
- SAND/GRAVEL
- MUDSTONE
- PTP1 Proposed trial pit

The information displayed here is to be used in conjunction with Report AGP19198_01 Report on the Kilmore Sand & Gravel Geophysical Investigation at Brinny, Co. Cork for Keohane Readymix, APEX Geophysics Ltd. 5th November 2019

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SCALE:	AS INDICATED @ A4
DATE:	05-11-2019

Version:	Date:	Drawn By:	Checked:
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FIGURE 1: RESULTS & INTERPRETATION - ERT R4

SCALE 1:1000

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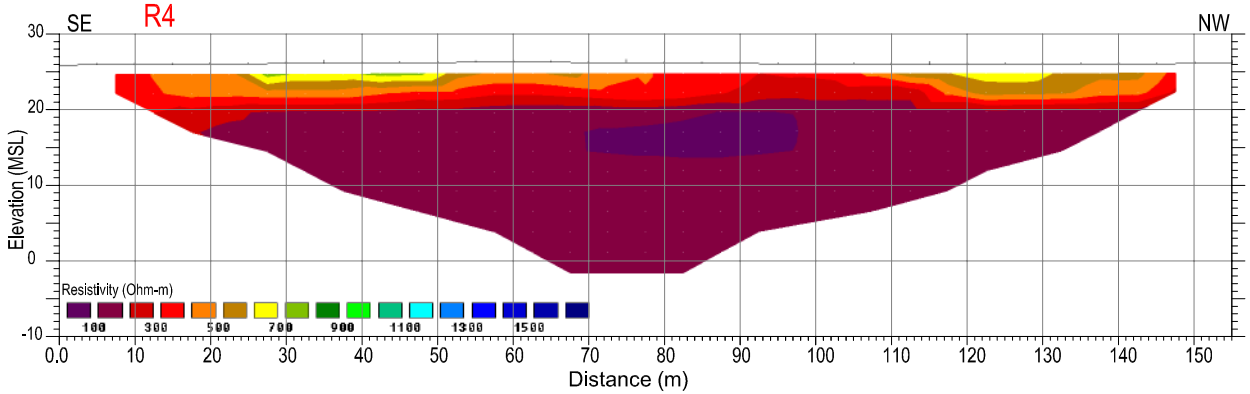

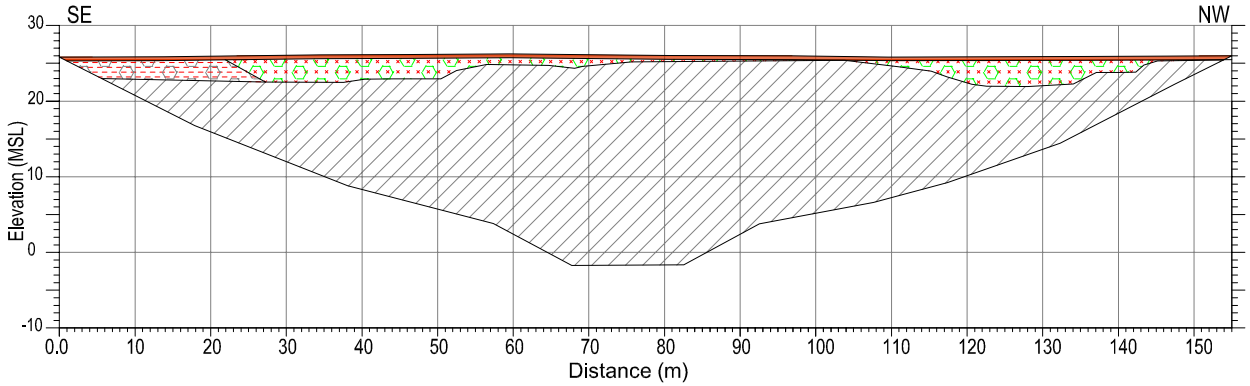

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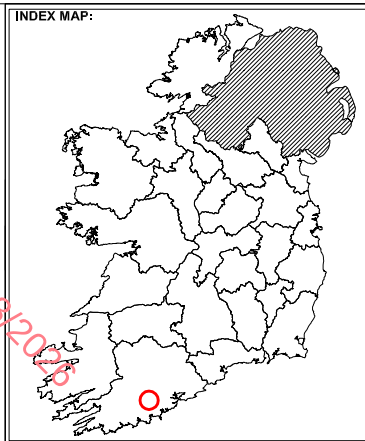

LEGEND:

- Topsoil/Overburden
- clayey SAND/GRAVEL
- silty SAND/GRAVEL
- SAND/GRAVEL
- MUDSTONE
- PTP1 Proposed trial pit

The information displayed here is to be used in conjunction with Report AGP19198_01 Report on the Kilmore Sand & Gravel Geophysical Investigation at Brinny, Co. Cork for Keohane Readymix, APEX Geophysics Ltd. 5th November 2019

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PROJECT:	KILMORE SAND & GRAVEL GEOPHYSICAL SURVEY
CLIENT.:	KEOHANE READYMIX
DRAWING NO:	AGP19198_R4
SCALE:	AS INDICATED @ A4
DATE:	05-11-2019

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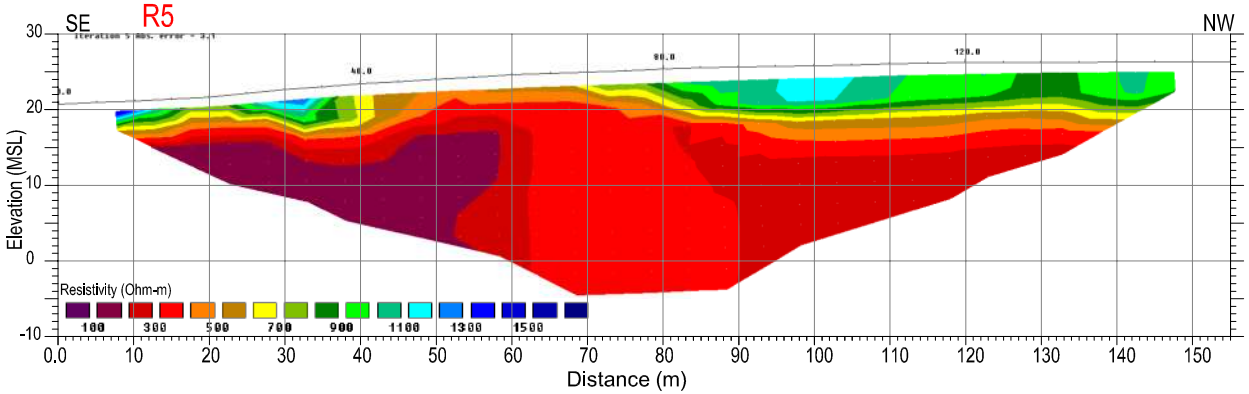
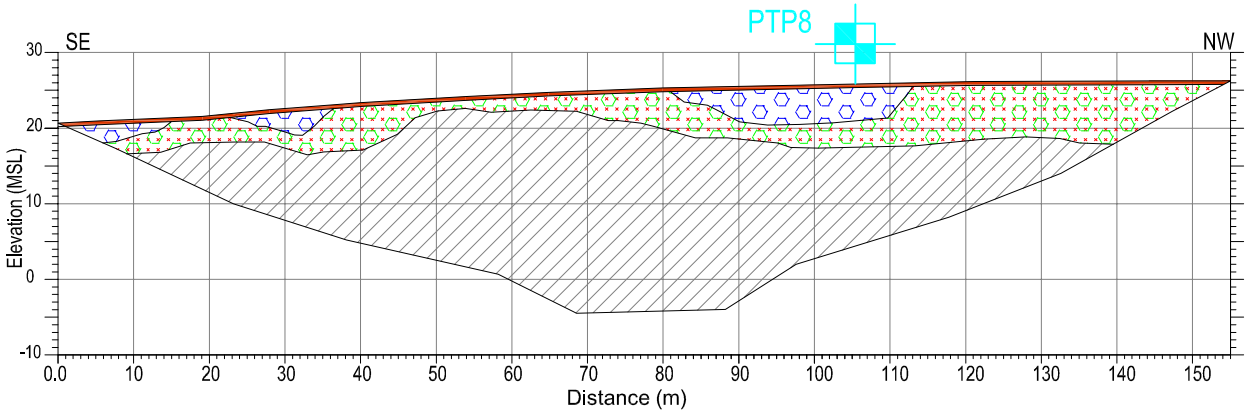
FIGURE 1: RESULTS & INTERPRETATION - ERT R5

SCALE 1:1000

RECEIVED: 13/03/2025





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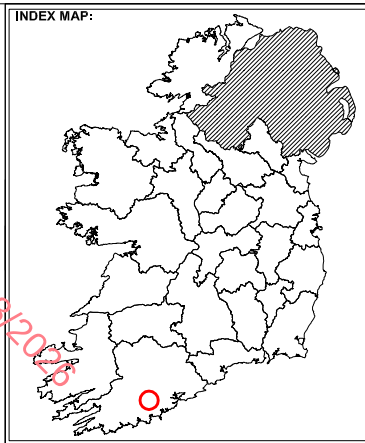

LEGEND:

- Topsoil/Overburden
- clayey SAND/GRAVEL
- silty SAND/GRAVEL
- SAND/GRAVEL
- MUDSTONE
- PTP1 Proposed trial pit

The information displayed here is to be used in conjunction with Report AGP19198_01 Report on the Kilmore Sand & Gravel Geophysical Investigation at Brinny, Co. Cork for Keohane Readymix, APEX Geophysics Ltd. 5th November 2019

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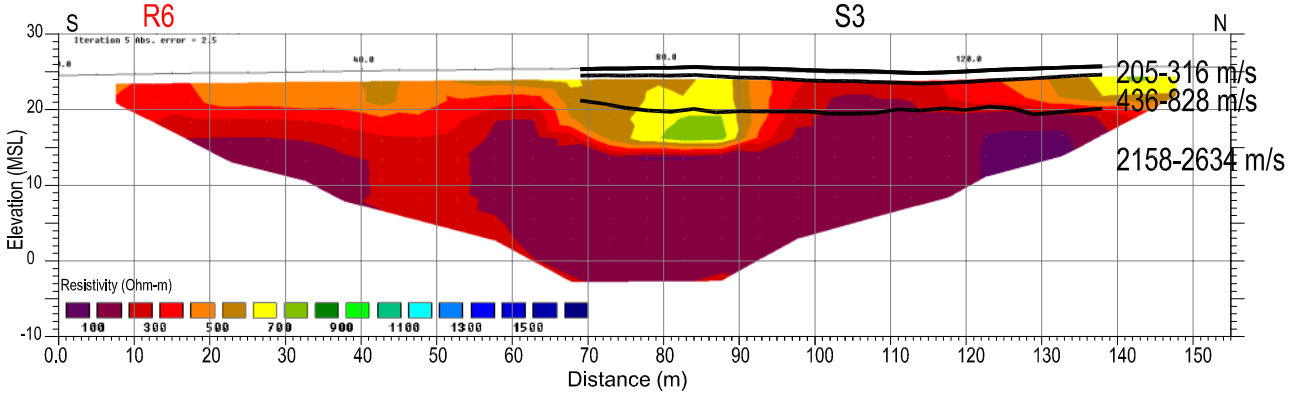
PROJECT:	KILMORE SAND & GRAVEL GEOPHYSICAL SURVEY
CLIENT.:	KEOHANE READYMIX
DRAWING NO:	AGP19198_R5
SCALE:	AS INDICATED @ A4
DATE:	05-11-2019

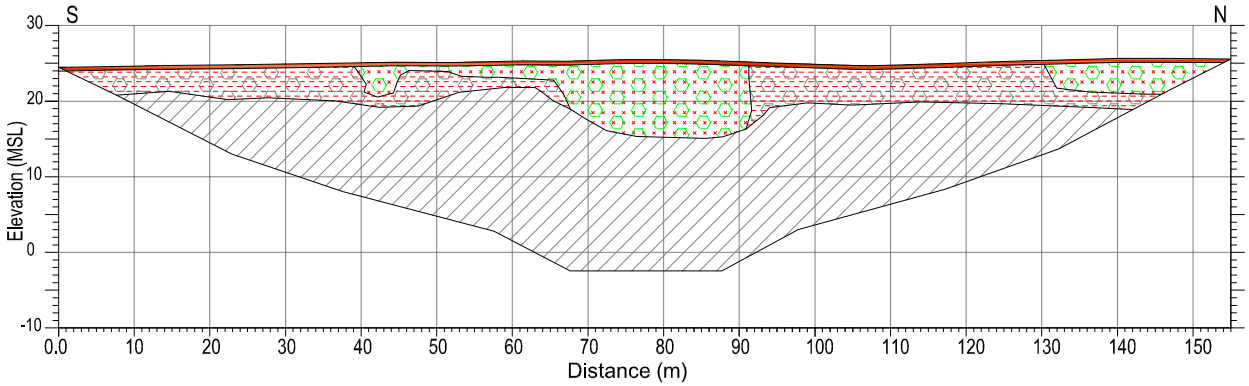
Version:	Date:	Drawn By:	Checked:
01	05-11-2019	YOC	TL

FIGURE 1: RESULTS & INTERPRETATION - ERT R6 & S3

SCALE 1:1000

RECEIVED: 13/03/2025





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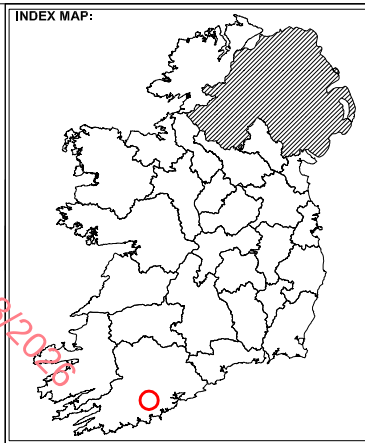

LEGEND:

- Topsoil/Overburden
- clayey SAND/GRAVEL
- silty SAND/GRAVEL
- SAND/GRAVEL
- MUDSTONE
- PTP1 Proposed trial pit

The information displayed here is to be used in conjunction with Report AGP19198_01 Report on the Kilmore Sand & Gravel Geophysical Investigation at Brinny, Co. Cork for Keohane Readymix, APEX Geophysics Ltd. 5th November 2019

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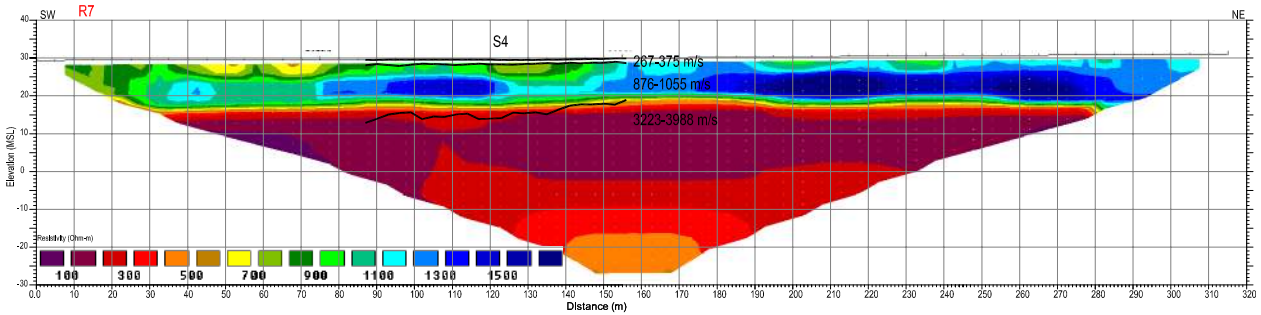
PROJECT:	KILMORE SAND & GRAVEL GEOPHYSICAL SURVEY
CLIENT.:	KEOHANE READYMIX
DRAWING NO:	AGP19198_R6
SCALE:	AS INDICATED @ A4
DATE:	05-11-2019

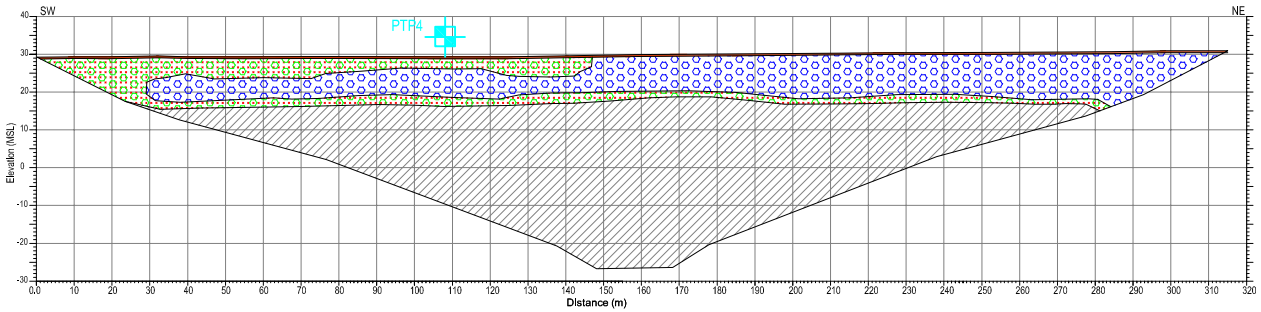
Version:	Date:	Drawn By:	Checked:
01	05-11-2019	YOC	TL

FIGURE 1: RESULTS & INTERPRETATION - ERT R7 & S4

SCALE 1:2000

RECEIVED: 13/03/2025





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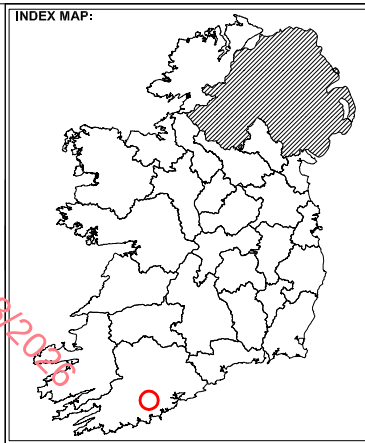

LEGEND:

- Topsoil/Overburden
- clayey SAND/GRAVEL
- silty SAND/GRAVEL
- SAND/GRAVEL
- MUDSTONE
- PTP1 Proposed trial pit

The information displayed here is to be used in conjunction with Report AGP19198_01 Report on the Kilmore Sand & Gravel Geophysical Investigation at Brinny, Co. Cork for Keohane Readymix, APEX Geophysics Ltd. 5th November 2019

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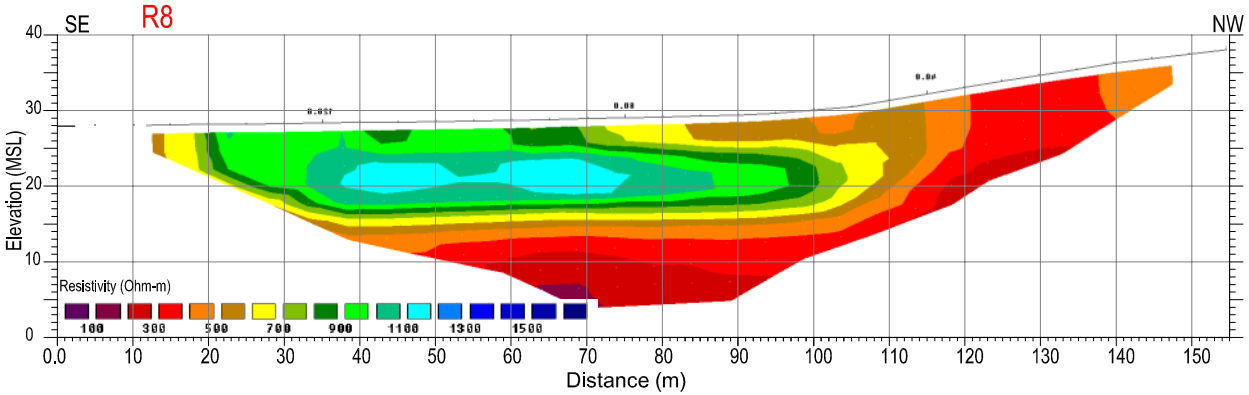
PROJECT:	KILMORE SAND & GRAVEL GEOPHYSICAL SURVEY
CLIENT.:	KEOHANE READYMIX
DRAWING NO:	AGP19198_R7
SCALE:	AS INDICATED @ A4
DATE:	05-11-2019

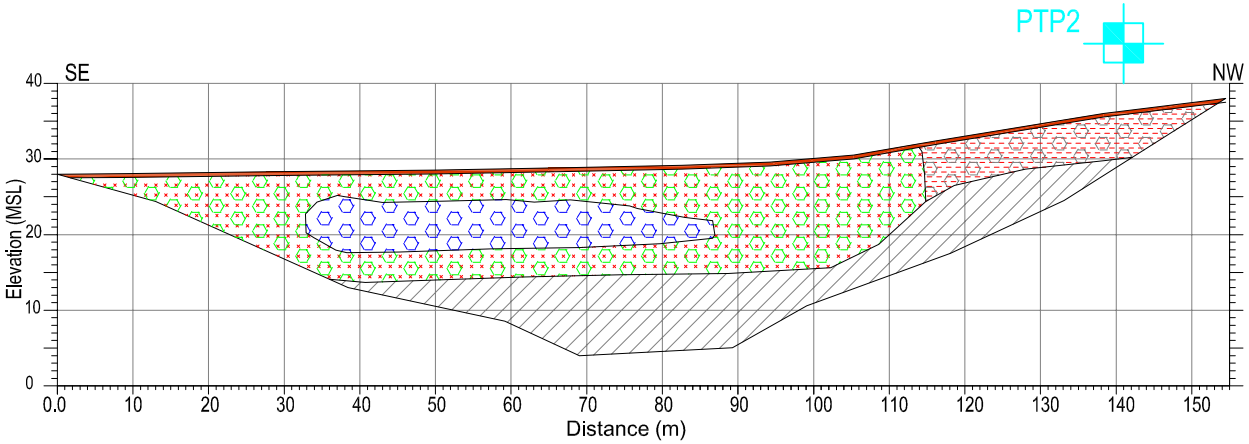
Version:	Date:	Drawn By:	Checked:
01	05-11-2019	YOC	TL

FIGURE 1: RESULTS & INTERPRETATION - ERT R8

SCALE 1:1000

RECEIVED: 13/03/2025





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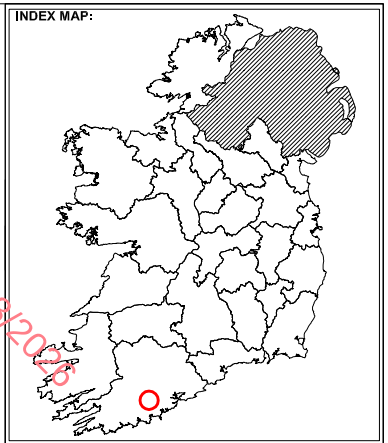

LEGEND:

- Topsoil/Overburden
- clayey SAND/GRAVEL
- silty SAND/GRAVEL
- SAND/GRAVEL
- MUDSTONE
- PTP1 Proposed trial pit

The information displayed here is to be used in conjunction with Report AGP19198_01 Report on the Kilmore Sand & Gravel Geophysical Investigation at Brinny, Co. Cork for Keohane Readymix, APEX Geophysics Ltd. 5th November 2019

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PROJECT:	KILMORE SAND & GRAVEL GEOPHYSICAL SURVEY
CLIENT.:	KEOHANE READYMIX
DRAWING NO:	AGP19198_R8
SCALE:	AS INDICATED @ A4
DATE:	05-11-2019

Version:	Date:	Drawn By:	Checked:
01	05-11-2019	YOC	TL

RECEIVED: 13/03/2026

Appendix 6-B Trial Pit Logs

SLR

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No **TP01**

Client: **Keohane Readymix Ltd.**

Project: **Trial Pit Survey, Brinny, Co. Cork**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550602 N559400	1 of 1

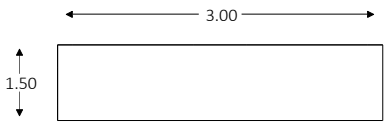
SAMPLES & TESTS				Water	STRATA				
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
					-0.50		(0.50) 0.50	Dark brown gravelly TOPSOIL	
1					-1.50		(1.00) 1.50	Sandy gravelly SILT/CLAY	
2					-4.00		(2.50) 4.00	Coarse SAND and GRAVEL with few small cobbles	
3.00 - 3.50 3	B			▼					
4					-5.10		(1.10) 5.10	Sandy SILT	
5								Trial Pit Complete at 5.10m	

GENERAL REMARKS:

GW Strike at 3.5m

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No **TP02**

Client: **Keohane Readymix Ltd.**

Project: **Trial Pit Survey, Brinny, Co. Cork**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550647 N559321	1 of 1

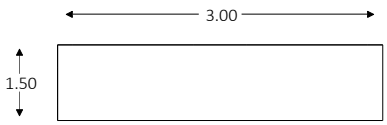
SAMPLES & TESTS				Water	STRATA				
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
							(0.50)	Dark brown gravelly TOPSOIL	
					-0.50		0.50		
1							(2.60)	Slightly clayey silty GRAVELS	
2									
2.50 - 3.00	B								
3					-3.10		3.10		
							(1.90)	Slightly sandy GRAVELS with some cobbles and a few small boulders	
4				▼					
4.50 - 5.00	B								
5					-5.00		5.00		
								Trial Pit Complete at 5.00m	

GENERAL REMARKS:

GW Strike at 4.2m

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No **TP03**

Client: **Keohane Readymix Ltd.**

Project: **Trial Pit Survey, Brinny, Co. Cork**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550460 N559315	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					-0.50		(0.50) 0.50	Dark brown gravelly TOPSOIL	
1					-1.50		(1.00) 1.50	Slightly sandy clayey SILT	
2, 3, 4, 5					-5.00		(3.50) 5.00	Slightly sandy SILT	
3.50 - 4.00	B								
								Trial Pit Complete at 5.00m	

GENERAL REMARKS:

No Groundwater

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:

3.00

1.50

Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No **TP04**

Client: **Keohane Readymix Ltd.**

Project: **Trial Pit Survey, Brinny, Co. Cork**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550352 N559310	1 of 1

SAMPLES & TESTS				Water	STRATA				
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
							(0.50)	Dark brown gravelly TOPSOIL	
					-0.50		0.50		
1							(1.00)	Silty CLAY	
					-1.50		1.50		
								Trial Pit Complete at 1.50m	
2									
3									
4									
5									

GENERAL REMARKS:

No Groundwater

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:

3.00

1.50

Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No **TP05**

Client: **Keohane Readymix Ltd.**

Project: **Trial Pit Survey, Brinny, Co. Cork**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550336 N559435	1 of 1

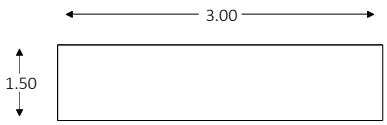
SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					-0.50		(0.50) 0.50	Dark brown gravelly TOPSOIL	
1					-2.00		(1.50) 2.00	Sandy GRAVEL	
2				▼	-3.50		(1.50) 3.50	Slightly sandy SILT	
								Trial Pit Complete at 3.50m	
3									
4									
5									

GENERAL REMARKS:

GW Strike at 2m

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No **TP06**

Client: **Keohane Readymix Ltd.**

Project: **Trial Pit Survey, Brinny, Co. Cork**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550471 N559504	1 of 1

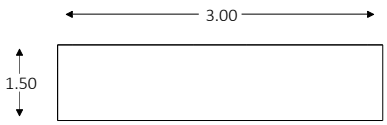
SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					-0.50		(0.50) 0.50	Dark brown gravelly TOPSOIL	
1								SAND and GRAVEL with few small coBbles	
2.00 - 2.50 2	B						(3.50)		
3									
4					-4.00		4.00		
								Trial Pit Complete at 4.00m	
5									

GENERAL REMARKS:

GW Strike at 2.7m

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

TRIAL PIT No
TP07

RECEIVED: 13/03/2026

Client:
Keohane Readymix Ltd.

Project:
Trial Pit Survey, Brinny, Co. Cork

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550544 N559534	1 of 1

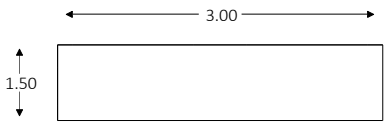
SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					-0.50		(0.50) 0.50	Dark brown gravelly TOPSOIL	
1, 2					-3.00		(2.50) 3.00	Silty sandy GRAVEL	
3				▼	-3.50		(0.50) 3.50	Sandy GRAVEL	
4					-4.00		(0.50) 4.00	Sandy SILT	
5								Trial Pit Complete at 4.00m	

GENERAL REMARKS:

GW Strike at 3.5m

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No
TP08

Client:
Keohane Readymix Ltd.

Project:
Trial Pit Survey, Brinny, Co. Cork

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550586 N559565	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					-0.50		(0.50) 0.50	Dark brown gravelly TOPSOIL	
1, 2, 3.00 - 3.50 3	B			▼	-4.00		(3.50) 4.00	Sandy coarse GRAVEL with few small cobbles	
4, 5								Trial Pit Complete at 4.00m	

GENERAL REMARKS:

GW Strike at 3.4m

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:

3.00

1.50

Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No
TP09

Client:
Keohane Readymix Ltd.

Project:
Trial Pit Survey, Brinny, Co. Cork

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550439 N559646	1 of 1

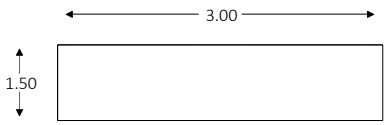
SAMPLES & TESTS				Water	STRATA				
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
					-0.50		(0.50) 0.50	Dark brown gravelly TOPSOIL	
1					-1.20		(0.70) 1.20	Silty sandy GRAVEL	
2, 3				▼	-3.50		(2.30) 3.50	SAND and GRAVEL	
4					-4.00		(0.50) 4.00	Sandy SILT	
5								Trial Pit Complete at 4.00m	

GENERAL REMARKS:

GW Strike at 3.2m

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No
TP10

Client:
Keohane Readymix Ltd.

Project:
Trial Pit Survey, Brinny, Co. Cork

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550389 N559617	1 of 1

SAMPLES & TESTS				Water	STRATA				
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
							(0.50)	Dark brown gravelly TOPSOIL	
					-0.50		0.50		
1							(1.00)	Silty CLAY	
					-1.50		1.50		
								Trial Pit Complete at 1.50m	
2									
3									
4									
5									

GENERAL REMARKS:

No Groundwater

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:

3.00

1.50

Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No **TP11**

Client: **Keohane Readymix Ltd.**

Project: **Trial Pit Survey, Brinny, Co. Cork**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550431 N559767	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					-0.50		(0.50) 0.50	Dark brown gravelly TOPSOIL	
1					-1.70		(1.20) 1.70	Gravelly SILT	
2, 3, 4				▼	-4.20		(2.50) 4.20	Slightly silty SAND and GRAVEL with few small cobbles	
5								Trial Pit Complete at 4.20m	

GENERAL REMARKS:

GW Strike at 4m

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:

3.00

1.50

Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No **TP12**

Client: **Keohane Readymix Ltd.**

Project: **Trial Pit Survey, Brinny, Co. Cork**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550530 N559814	1 of 1

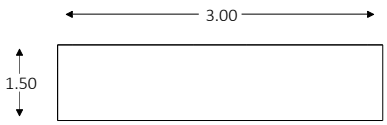
SAMPLES & TESTS				Water	STRATA				
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
							(0.70)	Dark brown gravelly TOPSOIL	
					-0.70		0.70		
1							(0.80)	Gravelly SILT	
					-1.50		1.50		
2							(3.00)	Sandy coarse GRAVEL and COBBLES	
3									
4									
					-4.50		4.50		
								Trial Pit Complete at 4.50m	
5									

GENERAL REMARKS:

No Groundwater

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No **TP13**

Client: **Keohane Readymix Ltd.**

Project: **Trial Pit Survey, Brinny, Co. Cork**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550605 N559855	1 of 1

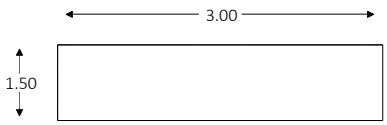
SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					-0.50		(0.50) 0.50	Dark brown gravelly TOPSOIL	
					-1.00		(0.50) 1.00	Gravelly SILT	
1								Sandy coarse GRAVEL and COBBLES	
2							(3.00)		
3.00 - 3.50 3	B								
4					-4.00		4.00		
								Trial Pit Complete at 4.00m	
5									

GENERAL REMARKS:

No Groundwater

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No **TP14**

Client: **Keohane Readymix Ltd.**

Project: **Trial Pit Survey, Brinny, Co. Cork**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550692 N559855	1 of 1

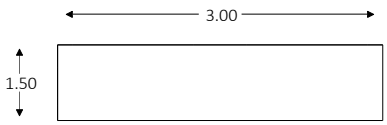
SAMPLES & TESTS				Water	STRATA				
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
					-0.50		(0.50) 0.50	Dark brown gravelly TOPSOIL	
					-1.00		(0.50) 1.00	Gravelly SILT	
1, 2, 3					-4.00		(3.00) 4.00	Sandy coarse GRAVEL and COBBLES with few small boulders	
4								Trial Pit Complete at 4.00m	
5									

GENERAL REMARKS:

No Groundwater

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No **TP15**

Client: **Keohane Readymix Ltd.**

Project: **Trial Pit Survey, Brinny, Co. Cork**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550616 N559864	1 of 1

SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					-0.50		(0.50) 0.50	Dark brown gravelly TOPSOIL	
1					-1.50		(1.00) 1.50	Gravelly SILT	
								Trial Pit Complete at 1.50m	
2									
3									
4									
5									

GENERAL REMARKS:

No Groundwater

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:

3.00

1.50

Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant: Tracked excavator		Peter Glanville	Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

TRIAL PIT LOG

DRAFT

RECEIVED: 13/03/2026

TRIAL PIT No **TP16**

Client: **Keohane Readymix Ltd.**

Project: **Trial Pit Survey, Brinny, Co. Cork**

Project No:	Date:	Ground Level:	Co-ordinates:	Sheet
501.0033.00032	27/02/2020	0.00m	E550552 N559836	1 of 1

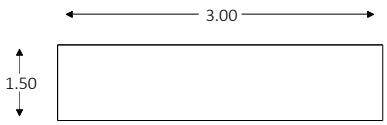
SAMPLES & TESTS				Water	STRATA				
Depth	Sample Type	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument Backfill
					-0.50		(0.50) 0.50	Dark brown gravelly TOPSOIL	
1					-1.50		(1.00) 1.50	Gravelly SILT	
								Trial Pit Complete at 1.50m	
2									
3									
4									
5									

GENERAL REMARKS:

No Groundwater

KEY
V = Hand Vane Shear Strength
PP = Pocket Penetrometer Shear Strength
ES = Environmental Sample Soil
D = Disturbed Sample
LB = Large Bulk Sample
HS = Soil Head Space Measurement

Trial Pit Dimensions:



Shoring/Support:

Stability:

All dimensions in metres	Contractor:	Method: Trial pit/trench	Logged By:	Approved By:
Scale 1:35	Plant:			Peter Glanville

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015

RECEIVED: 13/03/2026

Appendix 6-C Particle Size Distribution Results

SLR

Laboratory Test Report

MATTEST (IRELAND) LIMITED

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.286T

Mattest Ireland Ltd.
Unit 2
Northwest Business Park
Ballycoolin
Dublin 15

Tel: 01 8278600
Fax: 01 8278601
e-mail: info@mattest.ie
Web: www.mattest.ie

RECEIVED: 13/03/2020

Particle Size Distribution in accordance with BS 1377-2 : 1990

Report No: MIL SA 20-2054
Report Date: 13/03/2020

Customer: SLR Consulting Ireland
Address: Northern Cross
Malahide Rd. , Co. Dublin

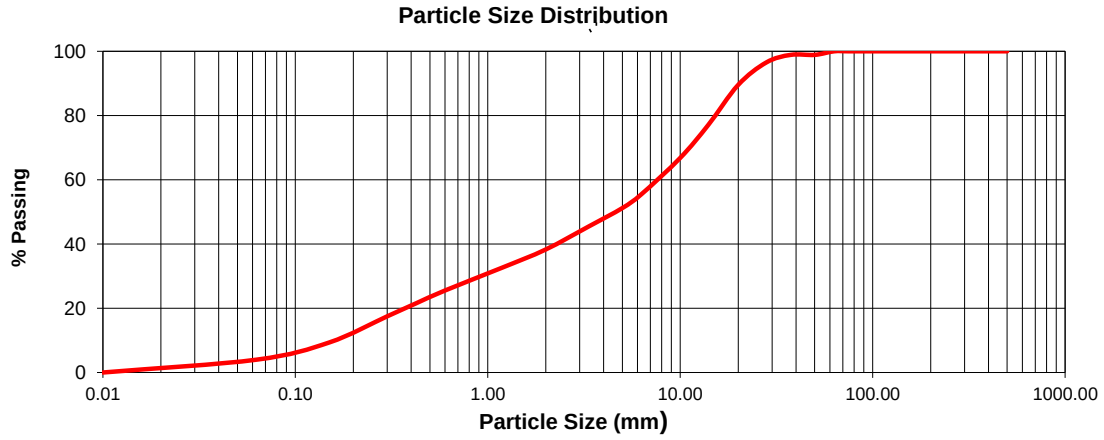
Contract: Brinny
Site Address: Co. Cork

Location: TP01 / 3.0m
Sample Description: Soil
Source/Supplier: n/a
Site Ref: PO5630
Sample Cert: No
Uniformity Coefficient: n/a

Sampled By: Customer
Date Sampled: 27/02/2020
Date Received: 06/03/2020
Date Tested: 13/03/2020
Method Used: Wet / ~~Dry Sieving~~

Specification: NRA : SHW : Series 600 : 2013 : Class 1A/B

Sieve Size (mm)		Wt Retained (g)	% Passing	Specified Limits	
500.00		0.0	100		
125.00		0.0	**100**	**100**	**100**
100.00		0.0	100		
75.00		0.0	100		
63.00		0.0	100		
50.00		159.2	99		
37.50		0.0	99		
28.00		337.8	97		
20.00		999.5	90		
14.00		1774.5	77		
10.00		1469.4	67		
6.30		1607.4	56		
5.00		624.4	51		
3.35		813.4	45		
2.00		1026.9	**38**		
1.18		817.3	33		
0.600		1003.7	26		
0.425		567.6	22		
0.300		583.1	17		
0.150		1162.4	9		
0.063		763.1	**4**	**0**	**15**
0.01	(Pan)	574.1	0		



Comments:-

Authorised Signatories

- ■ B. Gilroy - Technical & Area Manager
- ☐ B. Fitzsimons - Quality Manager
- ☐ R. McCormack - Laboratory Manager
- ☐ M. Bain - Operations Manager

Signed: For Mattest (Ireland) Ltd.

Laboratory Test Report

MATTEST (IRELAND) LIMITED

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.2861

Mattest Ireland Ltd.
Unit 2
Northwest Business Park
Ballycoolin
Dublin 15

Tel: 01 8278600
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e-mail: info@mattest.ie
Web: www.mattest.ie

RECEIVED: 13/03/2020

Particle Size Distribution in accordance with BS 1377-2 : 1990

Report No: MIL SA 20-206-1
Report Date: 13/03/2020

Customer: SLR Consulting Ireland
Address: Northern Cross
Malahide Rd. , Co. Dublin

Contract: Brinny
Site Address: Co. Cork

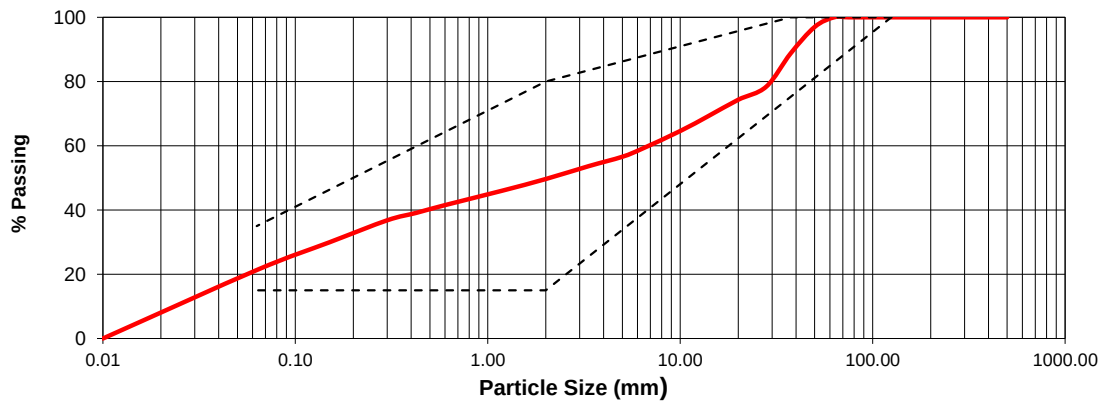
Location: TP02 / 3.0m
Sample Description: Soil
Source/Supplier: n/a
Site Ref: PO5630
Sample Cert: No
Uniformity Coefficient: n/a

Sampled By: Customer
Date Sampled: 27/02/2020
Date Received: 06/03/2020
Date Tested: 12/03/2020
Method Used: Wet / ~~Dry Sieving~~

Specification: NRA : SHW : Series 600 : 2013 : Class 2C2

Sieve Size (mm)		Wt Retained (g)	% Passing	Specified Limits	
500.00		0.0	100		
125.00		0.0	**100**	**100**	**100**
100.00		0.0	100		
75.00		0.0	100		
63.00		0.0	100		
50.00		235.5	97		
37.50		648.3	89		
28.00		817.5	78		
20.00		322.5	74		
14.00		399.6	69		
10.00		366.6	65		
6.30		440.9	59		
5.00		191.0	57		
3.35		229.1	54		
2.00		316.9	**50**	**15**	**80**
1.18		290.2	46		
0.600		349.1	42		
0.425		191.0	39		
0.300		183.0	37		
0.150		540.8	30		
0.063		679.1	**21**	**15**	**35**
0.01	(Pan)	1679.1	0		

Particle Size Distribution



Comments:-

Authorised Signatories

- ■ B. Gilroy - Technical & Area Manager
- ☐ B. Fitzsimons - Quality Manager
- ☐ R. McCormack - Laboratory Manager
- ☐ M. Bain - Operations Manager

Signed:

For Mattest (Ireland) Ltd.

Laboratory Test Report

MATTEST (IRELAND) LIMITED

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.286T

Mattest Ireland Ltd.
Unit 2
Northwest Business Park
Ballycoolin
Dublin 15

Tel: 01 8278600
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e-mail: info@mattest.ie
Web: www.mattest.ie

RECEIVED: 13/03/2020

Particle Size Distribution in accordance with BS 1377-2 : 1990

Report No: MIL SA 20-207-1
Report Date: 13/03/2020

Customer: SLR Consulting Ireland
Address: Northern Cross
Malahide Rd. , Co. Dublin

Contract: Brinny
Site Address: Co. Cork

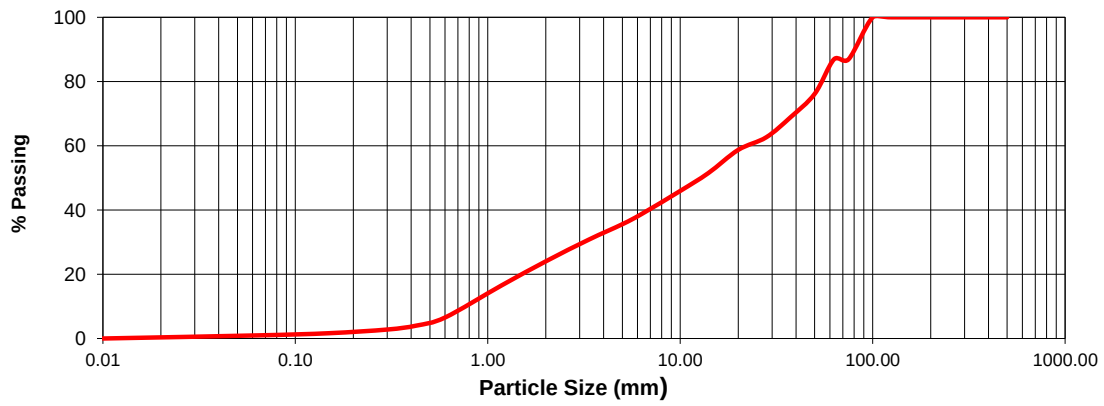
Location: TP02 / 5.0m
Sample Description: Soil
Source/Supplier: n/a
Site Ref: PO5630
Sample Cert: No
Uniformity Coefficient: n/a

Sampled By: Customer
Date Sampled: 27/02/2020
Date Received: 06/03/2020
Date Tested: 13/03/2020
Method Used: Wet / ~~Dry Sieving~~

Specification: NRA : SHW : Series 600 : 2013 : Class 1A/B

Sieve Size (mm)		Wt Retained (g)	% Passing	Specified Limits	
500.00		0.0	100		
125.00		0.0	**100**	**100**	**100**
100.00		0.0	100		
75.00		1249.1	87		
63.00		0.0	87		
50.00		1030.6	76		
37.50		693.1	69		
28.00		601.7	63		
20.00		377.7	59		
14.00		688.4	52		
10.00		532.7	46		
6.30		687.8	39		
5.00		304.0	36		
3.35		458.3	31		
2.00		648.8	**24**		
1.18		715.0	17		
0.600		955.9	7		
0.425		242.6	4		
0.300		116.5	3		
0.150		109.3	2		
0.063		66.1	**1**	**0**	**15**
0.01	(Pan)	91.5	0		

Particle Size Distribution



Comments:-

Authorised Signatories

- ■ B. Gilroy - Technical & Area Manager
- ☐ B. Fitzsimons - Quality Manager
- ☐ R. McCormack - Laboratory Manager
- ☐ M. Bain - Operations Manager

Signed:

For Mattest (Ireland) Ltd.

Laboratory Test Report

MATTEST (IRELAND) LIMITED

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.286T

Mattest Ireland Ltd.
Unit 2
Northwest Business Park
Ballycoolin
Dublin 15

Tel: 01 8278600
Fax: 01 8278601
e-mail: info@mattest.ie
Web: www.mattest.ie

RECEIVED: 13/03/2020

Particle Size Distribution in accordance with BS 1377-2 : 1990

Report No: MIL SA 20-208-1
Report Date: 13/03/2020

Customer: SLR Consulting Ireland
Address: Northern Cross
Malahide Rd. , Co. Dublin

Contract: Brinny
Site Address: Co. Cork

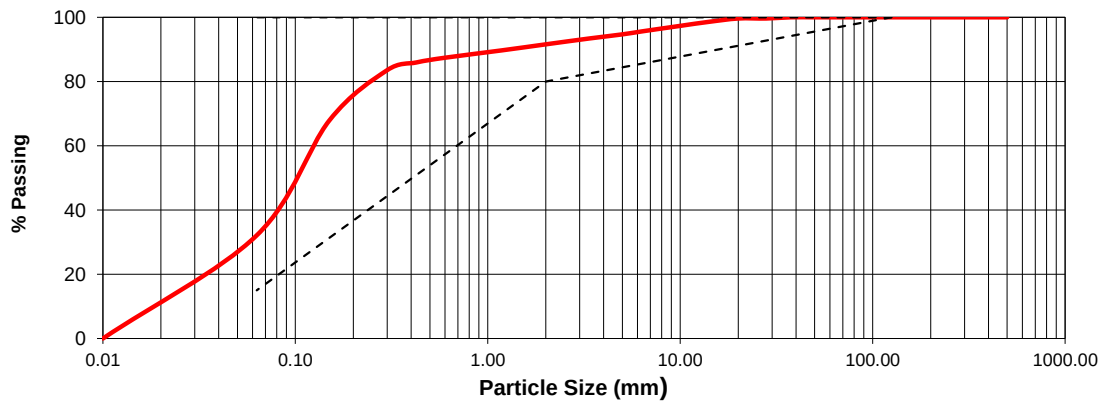
Location: TP03 / 3.5m
Sample Description: Soil
Source/Supplier: n/a
Site Ref: PO5630
Sample Cert: No
Uniformity Coefficient: n/a

Sampled By: Customer
Date Sampled: 27/02/2020
Date Received: 06/03/2020
Date Tested: 12/03/2020
Method Used: Wet / ~~Dry Sieving~~

Specification: NRA : SHW : Series 600 : 2013 : Class 2A/2B

Sieve Size (mm)		Wt Retained (g)	% Passing	Specified Limits	
500.00		0.0	100		
125.00		0.0	**100**	**100**	**100**
100.00		0.0	100		
75.00		0.0	100		
63.00		0.0	100		
50.00		0.0	100		
37.50		0.0	100		
28.00		25.8	100		
20.00		0.0	100		
14.00		72.5	99		
10.00		84.2	97		
6.30		119.0	96		
5.00		62.7	95		
3.35		88.7	93		
2.00		123.6	**92**	**80**	**100**
1.18		129.4	90		
0.600		155.6	87		
0.425		101.8	86		
0.300		164.3	84		
0.150		1075.1	68		
0.063		2446.0	**32**	**15**	**100**
0.01	(Pan)	2198.6	0		

Particle Size Distribution



Comments:-

Authorised Signatories

- ■ B. Gilroy - Technical & Area Manager
- ☐ B. Fitzsimons - Quality Manager
- ☐ R. McCormack - Laboratory Manager
- ☐ M. Bain - Operations Manager

Signed:

For Mattest (Ireland) Ltd.

Laboratory Test Report

MATTEST (IRELAND) LIMITED

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.286T

Mattest Ireland Ltd.
Unit 2
Northwest Business Park
Ballycoolin
Dublin 15

Tel: 01 8278600
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e-mail: info@mattest.ie
Web: www.mattest.ie

RECEIVED: 13/03/2020

Particle Size Distribution in accordance with BS 1377-2 : 1990

Report No: MIL SA 20-2091
Report Date: 13/03/2020

Customer: SLR Consulting Ireland
Address: Northern Cross
Malahide Rd. , Co. Dublin

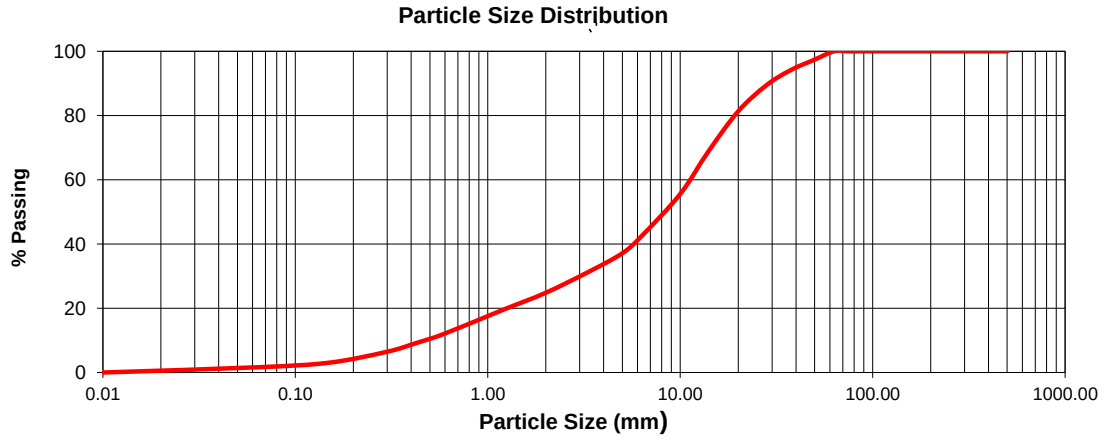
Contract: Brinny
Site Address: Co. Cork

Location: TP06 / 2.0m
Sample Description: Soil
Source/Supplier: n/a
Site Ref: PO5630
Sample Cert: No
Uniformity Coefficient: n/a

Sampled By: Customer
Date Sampled: 27/02/2020
Date Received: 06/03/2020
Date Tested: 12/03/2020
Method Used: Wet / ~~Dry Sieving~~

Specification: NRA : SHW : Series 600 : 2013 : Class 1A/B

Sieve Size (mm)		Wt Retained (g)	% Passing	Specified Limits	
500.00		0.0	100		
125.00		0.0	**100**	**100**	**100**
100.00		0.0	100		
75.00		0.0	100		
63.00		0.0	100		
50.00		263.8	97		
37.50		335.4	94		
28.00		485.4	89		
20.00		828.6	81		
14.00		1275.8	69		
10.00		1354.1	56		
6.30		1339.8	42		
5.00		546.5	37		
3.35		587.3	31		
2.00		670.5	**25**		
1.18		560.0	19		
0.600		735.8	12		
0.425		303.9	9		
0.300		276.5	6		
0.150		348.3	3		
0.063		146.8	**2**	**0**	**15**
0.01	(Pan)	165.6	0		



Comments:-

Authorised Signatories

- ■ B. Gilroy - Technical & Area Manager
- ☐ B. Fitzsimons - Quality Manager
- ☐ R. McCormack - Laboratory Manager
- ☐ M. Bain - Operations Manager

Signed: For Mattest (Ireland) Ltd.

Laboratory Test Report

MATTEST (IRELAND) LIMITED

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.286T

Mattest Ireland Ltd.
Unit 2
Northwest Business Park
Ballycoolin
Dublin 15

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RECEIVED: 13/03/2020

Particle Size Distribution in accordance with BS 1377-2 : 1990

Report No: MIL SA 20-2101
Report Date: 13/03/2020

Customer: SLR Consulting Ireland
Address: Northern Cross
Malahide Rd. , Co. Dublin

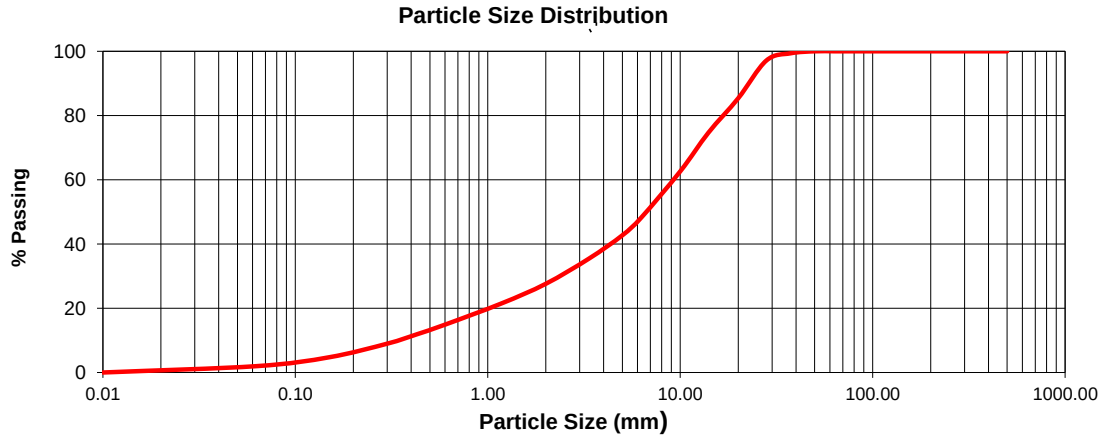
Contract: Brinny
Site Address: Co. Cork

Location: TP08 / 3.0m
Sample Description: Soil
Source/Supplier: n/a
Site Ref: PO5630
Sample Cert: No
Uniformity Coefficient: n/a

Sampled By: Customer
Date Sampled: 27/02/2020
Date Received: 06/03/2020
Date Tested: 12/03/2020
Method Used: Wet / ~~Dry Sieving~~

Specification: NRA : SHW : Series 600 : 2013 : Class 1A/B

Sieve Size (mm)		Wt Retained (g)	% Passing	Specified Limits	
500.00		0.0	100		
125.00		0.0	**100**	**100**	**100**
100.00		0.0	100		
75.00		0.0	100		
63.00		0.0	100		
50.00		0.0	100		
37.50		58.3	99		
28.00		215.8	97		
20.00		1111.7	85		
14.00		1011.8	75		
10.00		1136.9	63		
6.30		1348.9	48		
5.00		532.9	43		
3.35		687.4	35		
2.00		739.9	**28**		
1.18		575.4	22		
0.600		624.4	15		
0.425		291.2	12		
0.300		270.3	9		
0.150		399.7	5		
0.063		261.4	**2**	**0**	**15**
0.01	(Pan)	186.9	0		



Comments:-

Authorised Signatories

- ■ B. Gilroy - Technical & Area Manager
- ☐ B. Fitzsimons - Quality Manager
- ☐ R. McCormack - Laboratory Manager
- ☐ M. Bain - Operations Manager

Signed:

For Mattest (Ireland) Ltd.

Laboratory Test Report

MATTEST (IRELAND) LIMITED

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO.286T

Mattest Ireland Ltd.
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Dublin 15

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e-mail: info@mattest.ie
Web: www.mattest.ie

RECEIVED: 13/03/2020

Particle Size Distribution in accordance with BS 1377-2 : 1990

Report No: MIL SA 20-2111
Report Date: 13/03/2020

Customer: SLR Consulting Ireland
Address: Northern Cross
Malahide Rd. , Co. Dublin

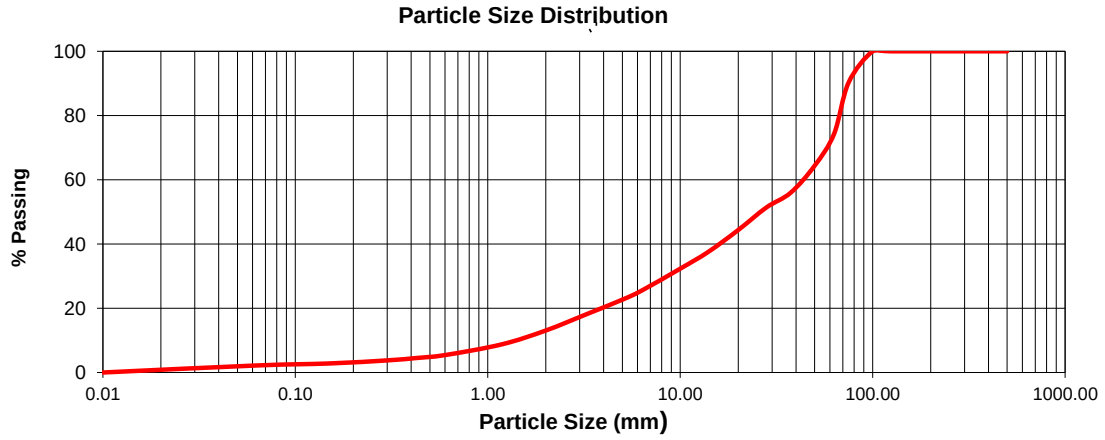
Contract: Brinny
Site Address: Co. Cork

Location: TP13 / 3.0m
Sample Description: Soil
Source/Supplier: n/a
Site Ref: PO5630
Sample Cert: No
Uniformity Coefficient: n/a

Sampled By: Customer
Date Sampled: 27/02/2020
Date Received: 06/03/2020
Date Tested: 12/03/2020
Method Used: Wet / ~~Dry Sieving~~

Specification: NRA : SHW : Series 600 : 2013 : Class 1A/B

Sieve Size (mm)		Wt Retained (g)	% Passing	Specified Limits	
500.00		0.0	100		
125.00		0.0	**100**	**100**	**100**
100.00		0.0	100		
75.00		1326.0	90		
63.00		2184.6	74		
50.00		1346.3	64		
37.50		1150.8	56		
28.00		631.0	51		
20.00		956.8	44		
14.00		925.3	38		
10.00		715.1	32		
6.30		932.5	25		
5.00		385.8	23		
3.35		576.1	18		
2.00		733.2	**13**		
1.18		589.9	9		
0.600		452.2	5		
0.425		125.8	5		
0.300		101.1	4		
0.150		130.5	3		
0.063		84.5	**2**	**0**	**15**
0.01	(Pan)	299.2	0		



Comments:-

Authorised Signatories

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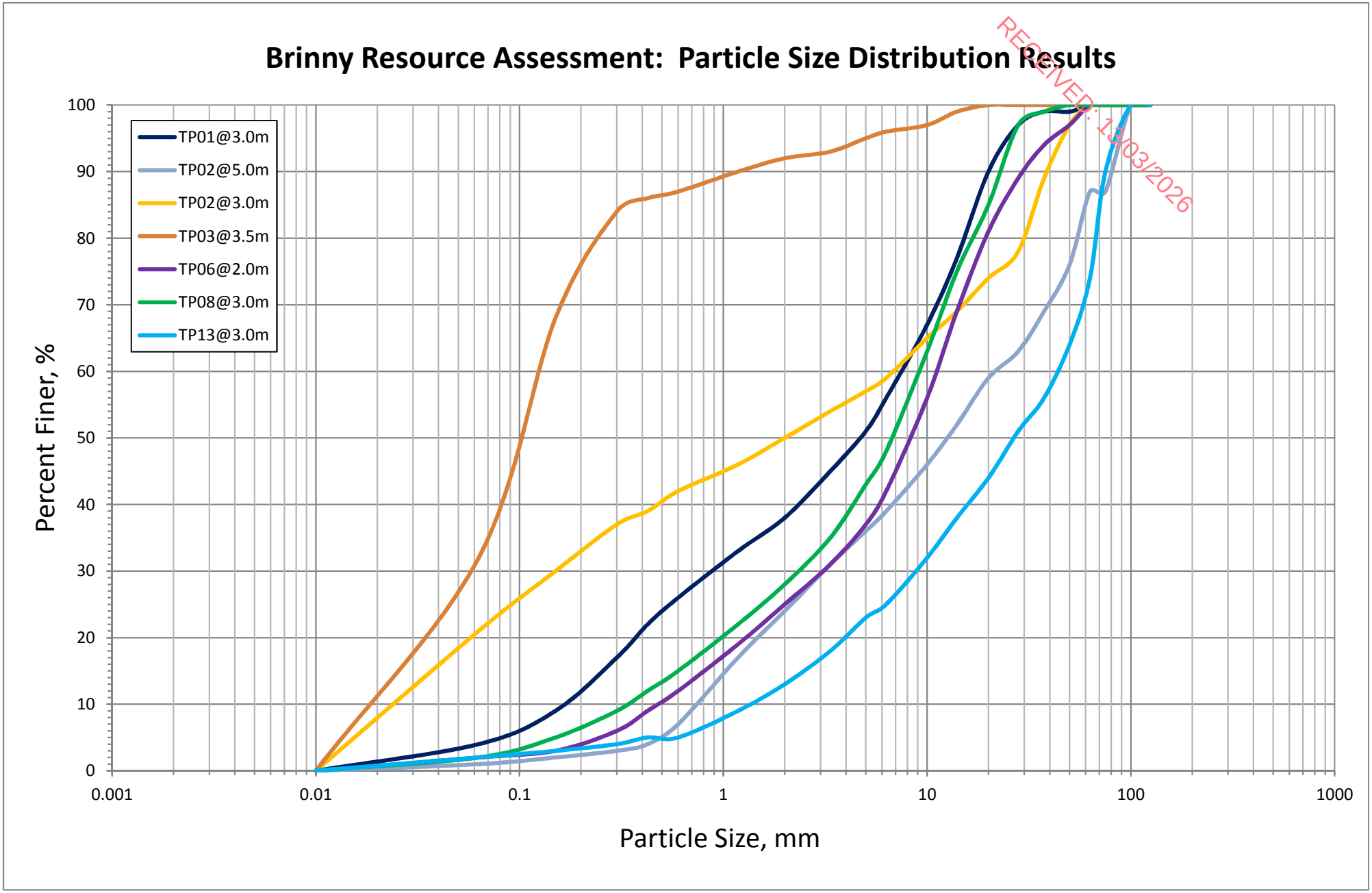
- ☐ B. Fitzsimons - Quality Manager
- ☐ R. McCormack - Laboratory Manager
- ☐ M. Bain - Operations Manager

Signed:

For Mattest (Ireland) Ltd.


Brinny Resource Assessment: Particle Size Distribution Results
RECEIVED: 13/03/2026
TP01@3.0m
TP02@5.0m
TP02@3.0m
TP03@3.5m
TP06@2.0m
TP08@3.0m
TP13@3.0m
Percent Finer, %
100
90
80
70
60
50
40
30
20
10
0
0.001
0.01
0.1
1
10
100
1000
Particle Size, mm

RECEIVED: 13/03/2026

Appendix 6-D Borehole Logs

SLR

BOREHOLE LOG

BOREHOLE No
BH 1

RECEIVED: 13/03/2026

Client:
Keohane Readymix Ltd.

Project No:	Date:	Ground Level:	Co-ordinates:
501.00033.0034	23/09/2021	31.18m	E150682 N59810

Project:
Brinny, Inishannon, Co. Cork

Sheet 1 of 2

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument / Backfill
					30.88		0.30	Firm brown sandy silty TOPSOIL	
1					29.98		(0.90) 1.20	Loose to Medium dense fine orangish brown silty SAND AND GRAVEL	
2, 3					28.18		(1.80) 3.00	Dense brown sub-rounded silty SAND AND GRAVEL with frequent cobbles and boulders	
4					27.08		(1.10) 4.10	Medium dense medium coarse brown sub-rounded SAND AND GRAVEL	
5					25.88		(1.20) 5.30	Loose to Medium dense brown slightly silty SAND	
6, 7, 8, 9, 10					20.28		(5.60) 10.90	Medium dense medium coarse brown sub-angular SAND AND GRAVEL	

Borehole Continued on Next Page

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	
23/09/2021			Start of shift							
23/09/2021			End of shift							

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:73	Plant: Knebel HY79	Hole Size: 154mm	SP	

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No
BH 1

RECEIVED: 13/03/2026

Client:
Keohane Readymix Ltd.

Project No:	Date:	Ground Level:	Co-ordinates:
501.00033.0034	23/09/2021	31.18m	E150682 N59810

Project:
Brinny, Inishannon, Co. Cork

Sheet 2 of 2

SAMPLES & TESTS				Water	STRATA				Instrument Backfill
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	
					19.68		(0.60) 11.50	Weak brownish grey weathered laminated SHALE	
								Borehole Complete at 11.50m	
12									
13									
14									
15									
16									
17									
18									
19									
20									
21									

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:73	Plant: Knebel HY79	Hole Size: 154mm	SP	

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No
BH 2

RECEIVED: 13/03/2026

Client:
Keohane Readymix Ltd.

Project No:	Date:	Ground Level:	Co-ordinates:
501.00033.0034	22/09/2021	26.55m	E150486 N59429

Project:
Brinny, Inishannon, Co. Cork

Sheet
1 of 1

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument / Backfill
					26.25		0.30	Firm brown sandy TOPSOIL	
					25.45		(0.80) 1.10	Loose to Medium dense orangish brown sub-rounded very sandy SAND AND GRAVEL	
					22.55		(2.90) 4.00	Dense medium coarse brown SAND AND GRAVEL with frequent cobbles and boulders	
					15.55		(7.00) 11.00	Firm brown becoming grey clayey SILT	
								Borehole Complete at 11.00m	

Depth scale: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Boring Progress and Water Observations					Chiselling			Water Added	
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To
22/09/2021			Start of shift						
22/09/2021			End of shift						

General Remarks
General; no water strike encounted during drilling appart from little moisture in and above the silt layer

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:73	Plant: Knebel HY79	Hole Size: 154mm	SP	

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020

BOREHOLE LOG

BOREHOLE No
BH 3

RECEIVED: 13/03/2026

Client:
Keohane Readymix Ltd.

Project No:	Date:	Ground Level:	Co-ordinates:
501.00033.0034	22/09/2021	26.00m	E150791 N59290

Project:
Brinny, Inishannon, Co. Cork

Sheet
1 of 1

SAMPLES & TESTS				Water	STRATA				
Depth	Type No	Test Type	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION	Instrument / Backfill
					25.75		0.25	Firm brown sandy sandy TOPSOIL	
					25.00		(0.75) 1.00	Loose orangish brown sub-rounded SAND AND GRAVEL	
					21.80		(3.20) 4.20	Dense medium coarse brown sub-rounded slightly silty SAND AND GRAVEL frequent cobbles and boulders	
					18.00		(3.80) 8.00	Firm to stiff brown very sandy silty gravelly CLAY with occasional lenses of gravel	
								Borehole Complete at 8.00m	

1 2 3 4 5 6 7 8 9 10

Boring Progress and Water Observations					Chiselling			Water Added		General Remarks
Date	Depth	Casing Dpt	Casing Dia	Water Dpt	From	To	Hours	From	To	
22/09/2021			Start of shift							
22/09/2021			End of shift							

All dimensions in metres	Contractor: Petersen Drilling Services	Method: Rotary open hole	Logged By:	Approved By:
Scale 1:73	Plant: Knebel HY79	Hole Size: 154mm	SP	

LOGGING HAS BEEN CARRIED OUT IN ACCORDANCE WITH BS5930:2015+A2:2020