

7. LAND, SOILS AND GEOLOGY

7.1 Introduction

7.1.1 Background & Objectives

MKO, on behalf of Kingston Stables Ltd., has assessed the potential significant effects of a proposed large-scale residential development (Proposed Development) at Knocknacarra, west of Galway, on the local land, soils and geology.

This chapter provides a baseline assessment of the environmental setting of the Proposed Development site, focusing on land, soils, and geology. It examines the potential impacts of the Proposed Development's construction and operation and outlines appropriate mitigation measures to minimize any significant impacts. Additionally, it includes an evaluation of residual impacts and the overall significance of these effects.

7.1.2 Statement of Authority

This section of the Environmental Impact Assessment Report (EIAR) has been prepared by Monika Kabza and Dr Bébhinn Anders and reviewed by Michael Watson, all of MKO. Monika has a MSc in Groundwater Engineering from the AGH University of Science and Technology Krakow, Poland and is a Professional Hydrogeologist (PGeo & EurGeol) with over 16 years of experience in environmental and infrastructural projects, groundwater management and geological/hydrogeological assessments. Monika has been a lead hydrogeologist for Tobin and Arup, delivering projects for Uisce Éireann, GSI, NFGWS, Dublin Airport, and the private industry. Her experiences include preparing the EIAR Geology and Soils, and Hydrology and Hydrogeology chapters for infrastructure project, including the N11/M11 Improvement Scheme (TII), solar farms and confidential developments.

Dr Bébhinn Anders has a BSc in Earth and Ocean Sciences and a PhD from the University of Galway titled "Investigating sediment source, supply and evolution in the Northwest Carboniferous Basin: A multi-proxy provenance approach". Bébhinn has 4 years of practical field experience with projects that involve environmental monitoring, hydrogeological data analysis, and flood risk assessments. She has conducted geological mapping, supervised borehole drilling, and coordinated and led water sampling campaigns. Her experience also includes preparing Hydrology and Hydrogeology chapter for EIAR.

Michael Watson has over twenty years' experience in the environmental sector and had worked for the Geological Survey of Ireland and then a prominent private environmental & hydrogeological consultancy prior to joining MKO in 2014. Michael completed an MA in Environmental Management at NUI, Maynooth in 1999. Michael is a professional geologist (PGeo) and full member of IEMA (MIEMA) as well as a Chartered Environmentalist (CEnv).

7.1.3 Relevant Legislation

The EIAR has been prepared in accordance with the requirements of Directive 2011/92/EU of the European Parliament and of the Council on the assessment of the effects of certain public and private projects on the environment (the 'EIA Directive'), as amended by Directive 2014/52/EU.

The following legislation have been complied with:

- The Planning and Development Acts 2000 to 2023 and the Planning and Development Regulations 2001 to 2023, as amended.

- Directive 2011/92/EU and Directive 2014/52/EU, including Circular Letter PL 1/2017: Implementation of Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment (EIA Directive).
- The Planning and Development Act, 2000, as amended.
- The Planning and Development Regulations 2001, as amended including the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 which transposes Directive 2014/52/EU into Irish law; and,
- The Heritage Act 1995, as amended.

7.1.4 Relevant Guidance

The land, soils and geology chapter of this EIAR was prepared with due regard to relevant guidance, including:

- Environmental Protection Agency (EPA) (2022). Guidelines on the Information to be contained in Environmental Impact Assessment Reports;
- Institute of Geologists Ireland (IGI) (2013). Guidelines for Preparation of Soils, Geology & Hydrogeology Chapters in Environmental Impact Statements;
- Transport Infrastructure Ireland (TII) (formerly NRA) (2008). Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;
- Department of Housing, Planning and Local Government (2018). Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment; and
- European Commission (2017). Environmental Impact Assessment of Projects: Guidance on the Preparation of the Environmental Impact Assessment Report (Directive 2011/92/EU as amended by 2014/52/EU).

7.2 Assessment Methodology

7.2.1 Desk Study

A desk study of the Proposed Development site, EIAR Study Area and the cumulative study area, was completed, along with a walkover survey and site investigations. The desk study involved the collection and review of relevant geological and soil data for the EIAR Study Area. This included consultation with the following data sources:

- Environmental Protection Agency database (www.epa.ie).
- Geological Survey Ireland - National Draft Bedrock Aquifer map.
- Geological Survey Ireland - Groundwater Database (www.gsi.ie).
- Bedrock Geology 1:100,000 Scale Map Series, Sheet 14 (Geology of Galway Bay), Geological Survey Ireland (GSI, 2003).
- Soils Information System (SIS) – National Soil Map of Ireland, developed by Teagasc in collaboration with the EPA and GSI).

7.2.2 Baseline Data & Site Investigations

A walkover survey was conducted in June 2024 by Bébhinn Anders (MKO). During this walkover proposed trial pit locations provided by Causeway were assessed and groundwater well locations were identified. Two rounds of site investigations were carried out in June 2019 and 22nd May – 20th June 2025 by Causeway Geotech to obtain geotechnical and environmental information for the site.

In summary, the 2019 Site Investigation comprised the excavation of three boreholes (BH) by dynamic sampling methods, eleven boreholes by dynamic sampling methods and rotary follow-on drilling, one

borehole by rotary drilling methods, twelve machine dug trial pits, and indirect California Bearing Ratio (CBR) tests at eight locations. Environmental laboratory testing of twelve soil samples was also undertaken (Appendix 7-1).

The 2025 Site Investigation comprised twenty-one light cable percussion boreholes, five rotary drilled boreholes, standpipe installation's in fifteen boreholes, thirty-three machine-dug trial pits, fifteen sampling locations, eighteen machine-dug soakaway pits, in-situ testing (including: Standard Penetration Tests, eighteen infiltration tests, and indirect CBR (Dynamic Cone Penetrometer (DCP)) tests at forty-two locations. A total of 78 soil samples were analysed for soil classification and soil chemistry (Appendix 7-2).

The trial pits were logged in accordance with BS5930:2015+A1:2020¹. The Site Investigation Reports are included in Appendix 7-1 and Appendix 7-2.

7.2.3 Scoping & Consultation

The scope for this chapter of the EIAR has also been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties. This consultation process is outlined in Section 2.5 of this EIAR. The GSI was consulted, who had provided and encouraged use of GSI databases. MKO use the GSI referenced databases throughout our baseline assessment. No geological or geological heritage sensitivities were identified in the GSI scoping response.

7.2.4 Impact Assessment Methodology

The importance of the soil and geological environment within the EIAR Study Area was assessed using information obtained from the desk study and site investigations. The assessment was conducted in accordance with the criteria outlined in Table 7-1 below and Table 4.1 of the National Roads Authority (NRA) (now Transport Infrastructure Ireland (TII)) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology, and Hydrogeology for National Road Schemes (NRA, 2008).

Table 7-1 Estimation of Importance of Soil and Geology Criteria (NRA, 2008).

Importance	Criteria	Typical Example
Very High	<p>Attribute has a high quality, significance or value on a regional or national scale.</p> <p>Degree or extent of soil contamination is significant on a national or regional scale.</p> <p>Volume of peat and/or soft organic soil underlying route is significant on a national or regional scale.</p>	<p>Geological feature rare on a regional or national scale (NHA).</p> <p>Large existing quarry or pit.</p> <p>Proven economically extractable mineral resource.</p>

¹ BS5930:2015+A1:2020 Code of practice for ground investigations (British Standards Institute 2020)

Importance	Criteria	Typical Example
High	<p>Attribute has a high quality, significance or value on a local scale.</p> <p>Degree or extent of soil contamination is significant on a local scale.</p> <p>Volume of peat and/or soft organic soil underlying site is significant on a local scale.</p>	<p>Contaminated soil on site with previous heavy industrial usage.</p> <p>Large recent landfill site for mixed wastes.</p> <p>Geological feature of high value on a local scale (County Geological Site).</p> <p>Well-drained and/or high fertility soils.</p> <p>Moderately sized existing quarry or pit.</p> <p>Marginally economic extractable.</p>
Medium	<p>Attribute has a medium quality, significance or value on a local scale.</p> <p>Degree or extent of soil contamination is moderate on a local scale.</p> <p>Volume of peat and/or soft organic soil underlying site is moderate on a local scale.</p>	<p>Contaminated soil on site with previous light industrial usage.</p> <p>Small recent landfill site for mixed Wastes.</p> <p>Moderately drained and/or moderate fertility soils.</p> <p>Small existing quarry or pit.</p> <p>Sub-economic extractable mineral resource.</p>
Low	<p>Attribute has a low quality, significance or value on a local scale.</p> <p>Degree or extent of soil contamination is minor on a local scale.</p> <p>Volume of peat and/or soft organic soil underlying site is small on a local scale.</p>	<p>Large historical and/or recent site for construction and demolition wastes.</p> <p>Small historical and/or recent landfill site for construction and demolition wastes.</p> <p>Poorly drained and/or low fertility soils.</p> <p>Uneconomically extractable mineral resource.</p>

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The statutory criteria for impact assessment, as outlined in the EPA (2022), require that likely impacts be described with respect to their extent, magnitude, type (i.e., negative, positive, or neutral), probability, duration, frequency, reversibility, and transfrontier nature (if applicable). The descriptors used in this EIAR are those set out in the EPA (2022) *Glossary of Impacts*, as presented in Chapter 1, Table 1-1 of this EIAR.

In addition, the two impact characteristics of proximity and probability are described for each impact, with their definitions provided in Table 7-2.

To facilitate understanding of this system of impact description in relation to the geological and hydrological environment, elements of the impact assessment system are linked to examples of potential impacts on the geology and morphology of the existing environment, as listed in Table 7-3.

Table 7-2 Additional Impact Characteristics.

Impact Characteristic	Degree/Nature	Description
Proximity	Direct	An impact which occurs within the area of the proposed project, as a direct result of the proposed project
	Indirect	An impact which is caused by the interaction of effects, or by off-site developments
Probability	Low	A low likelihood of occurrence of the impact
	Medium	A medium likelihood of occurrence of the impact
	High	A high likelihood of occurrence of the impact

Table 7-3 Impact descriptors related to the receiving environment.

Impact Characteristics		Potential Geological/Hydrological Impacts
Quality	Significance	
Negative only	Profound	<p>Widespread permanent impact on:</p> <ul style="list-style-type: none"> ➤ The extent or morphology of a SAC. ➤ Regionally important aquifers. ➤ Extents of floodplains. <p>Mitigation measures are unlikely to remove such impacts.</p>
Positive or Negative	Very Significant/ Significant	<p>Local or widespread time dependent impacts on:</p> <ul style="list-style-type: none"> ➤ The extent or morphology of a SAC / ecologically important area. ➤ A regionally important hydrogeological feature (or widespread effects to minor hydrogeological features). ➤ Extent of floodplains. ➤ Widespread permanent impacts on the extent or morphology of a NHA/ecologically important area, ➤ Mitigation measures (to design) will reduce but not completely remove the impact – residual impacts will occur.
Positive or Negative	Moderate	<p>Local time dependent impacts on:</p> <ul style="list-style-type: none"> ➤ The extent or morphology of a SAC / NHA / ecologically important area. ➤ A minor hydrogeological feature. ➤ Extent of floodplains. <p>Mitigation measures can mitigate the impact OR residual impacts occur, but these are consistent with existing or emerging trends</p>
Positive, Negative or Neutral	Slight	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Positive, Negative or Neutral	Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Neutral	Imperceptible	No impacts, or impacts which are beneath levels of perception, within normal bounds of variation, or within the bounds of measurement or forecasting error.

7.3 Receiving Environment

7.3.1 Existing Landuse & Topography

The Proposed Development site covers approximately 5.37 hectares (ha) of land, located in the townland of Knocknacarra, Co. Galway, approximately 3 km to the west of Galway City. The Proposed Development is described in Chapter 4 and will consist of 362 no. residential units in 4 no. development areas with a mix of apartment and house types. The Proposed Development is a component of a larger residential development project (Proposed Project).

The Proposed Development involves the construction of more than 500 residential units and the development will require separate, individual planning applications for each part of the project. The EIAR Study Area encompasses an overall area of 8.74 ha and covers the entire Proposed Development area.

This EIAR which is prepared to accompany the planning application will assess all project components of the Proposed Development that will be submitted within the planning application to Galway City Council (GCC). All elements of the proposed works included as part of the planning application will henceforth be referred to as the 'Proposed Development' throughout the EIAR.

The site comprises a mix of agricultural grassland in the south and brownfield land to the north of the EIAR Study Area. Stone walls and treelines are present along the site boundaries. An existing dwelling is located in the centre of the site, accompanied by several agricultural buildings. The surrounding area is primarily urban, with the site bordered by several residential estates, as well as commercial and industrial buildings. The site's elevation ranges from approximately 22 m to 34 m OD (metres above Ordnance datum). The overall local topography is undulating and generally slopes from northeast to south.

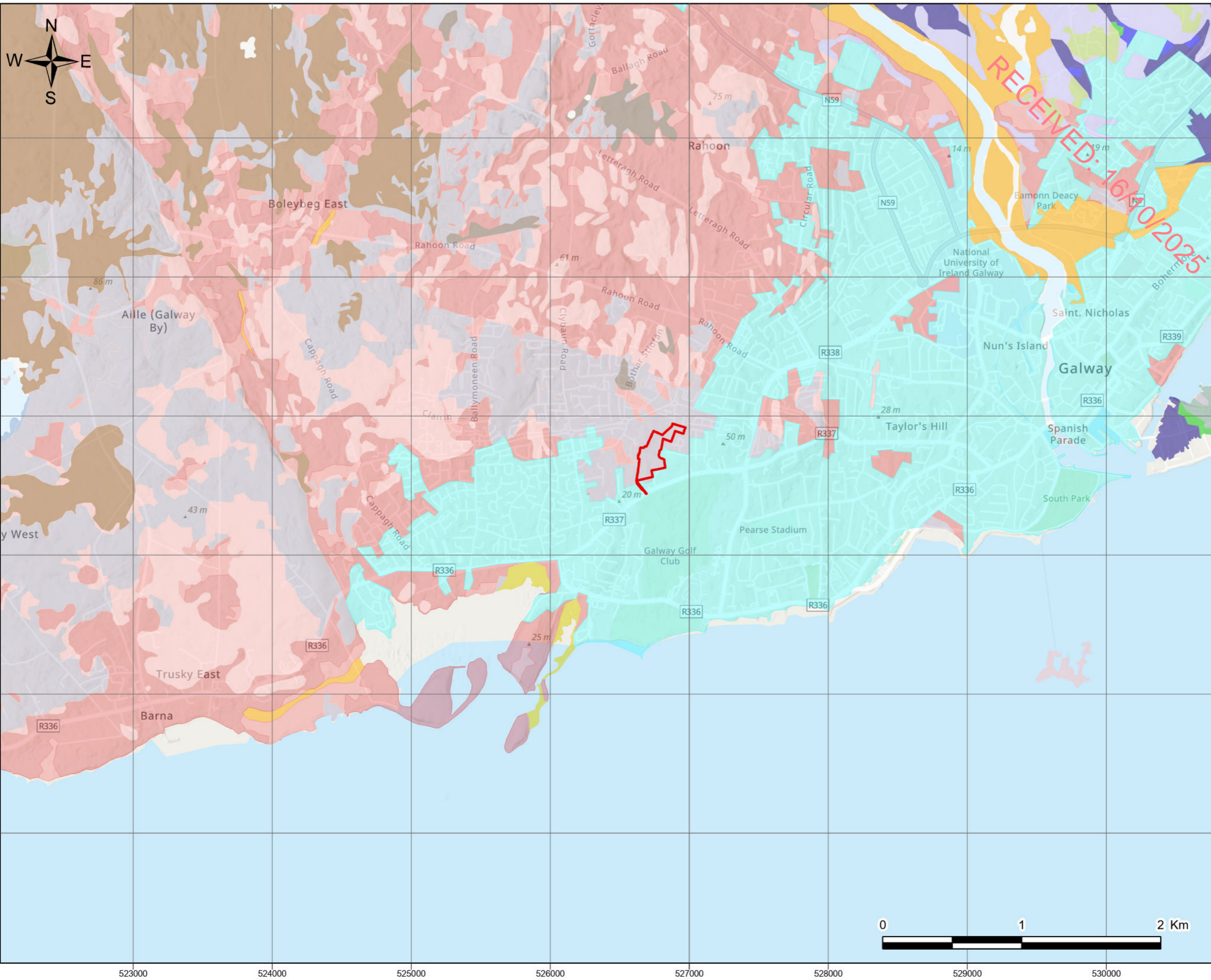
7.3.2 Soils and Subsoils

According to the national soils map (Teagasc, 2006), the site is predominantly underlain by shallow, reasonably drained mineral soil derived mainly from acidic parent materials (AminSRPT), which belong to the soil group comprising podzols (peaty), lithosols and peats. An area along the site's western boundary is classified as having deep, poorly drained mineral soils derived primarily from non-calcareous parent material (AminPD), associated with the soil group of surface and groundwater gleys. The soil map is shown in Figure 7-1.

The mapped Quaternary Sediments (subsoils) (GSI) for the proposed site indicate that the majority of the site is underlain by granite till (TGr), with a localised area of bedrock at the surface (Rck) identified in the northwestern portion of the site. The Quaternary Sediments (subsoils) map is presented in Figure 7-2.

The sequence of the strata encountered during the Causeway site investigations was variable across the site and generally comprised of topsoil encountered in 300 mm to 500 mm thick, made ground (fill) comprising sandy gravelly clay fill extending to a depth of 3 m, peat, fluvio-glacial deposit (firm to stiff sandy gravelly clay with frequent low cobble content and bedrock (granite) ranging from 0.7 m to 3.3 m in general. One trial pit (TP11) was excavated to 4.5 m without encountering rockhead.

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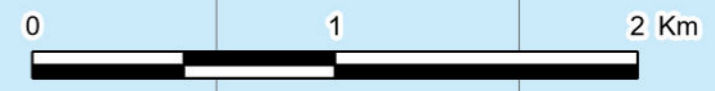


- ### Map Legend
- Planning Application Boundary
 - National Soils (Teagasc, 2006)**
 - Mineral alluvium
 - Acid Brown Earths / Brown Podzolics
 - Surface water Gleys / Ground water Gleys Acidic
 - Podzols Peaty
 - Lithosols / Regosols
 - Blanket peat
 - Grey Brown Podzolics / Brown Earths Basic
 - Surface water Gleys / Ground water Gleys Basic
 - Peaty Gleys Basic Parent Materials Basic
 - Lithosols Peats
 - Renzinas / Lithosols
 - Raised Bog cutaway/cutover
 - Made
 - Marine Sands
 - Marine Sediments
 - Water

Spatial Reference
 Datum: IRENET95
 Projection: Transverse Mercator

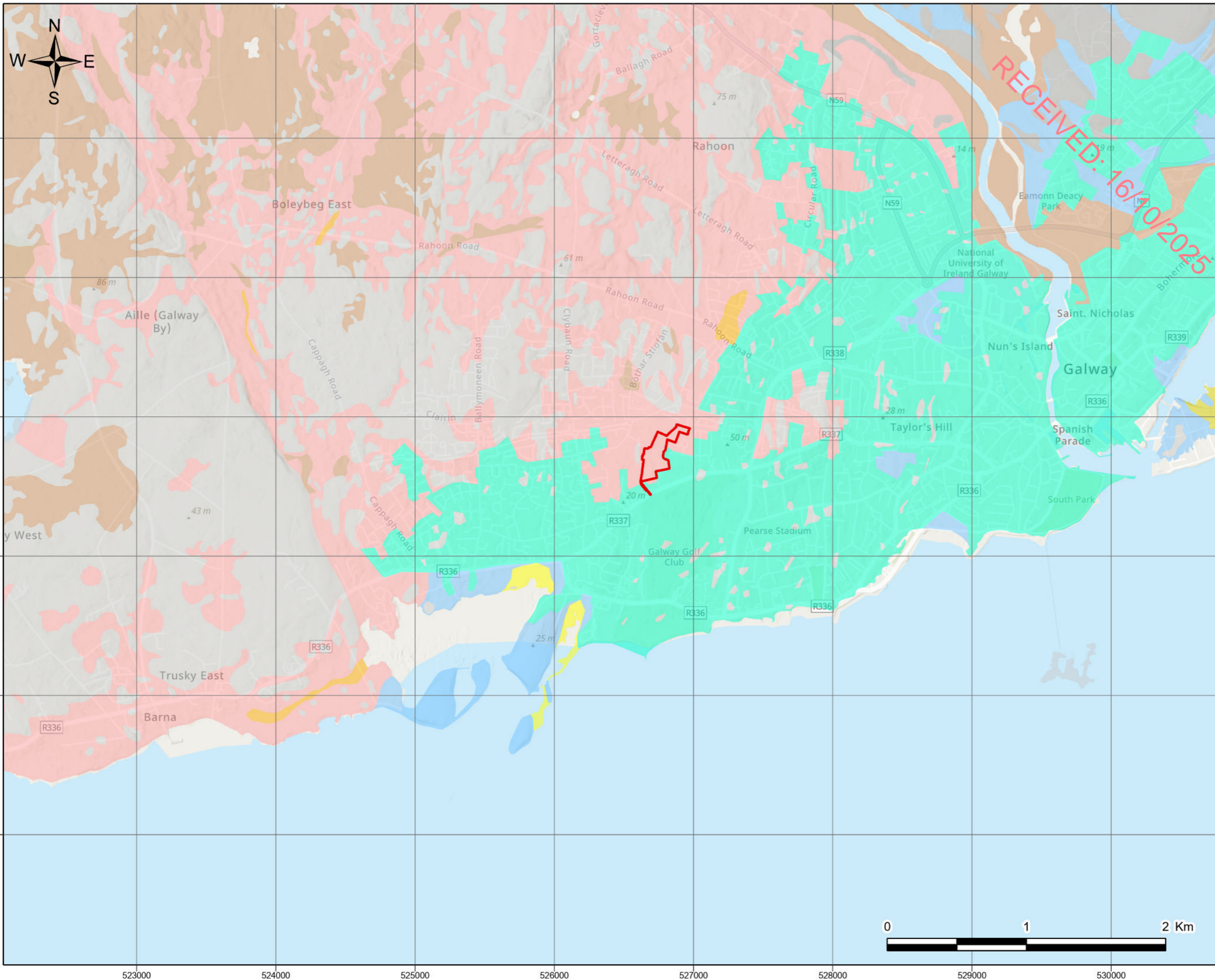


Soils Map		
Project Title Kingston Knocknacarra		
Project No. 240142	Drawing No. 7-1	Scale 1:25,000
Drawn By OM	Checked By BA	Date 10/10/2025



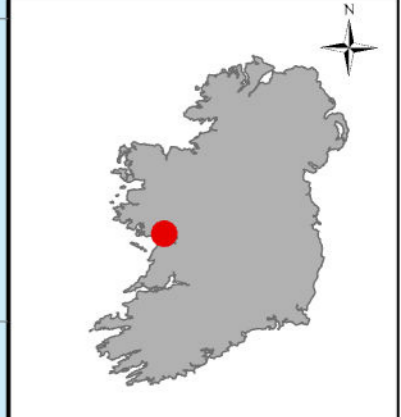
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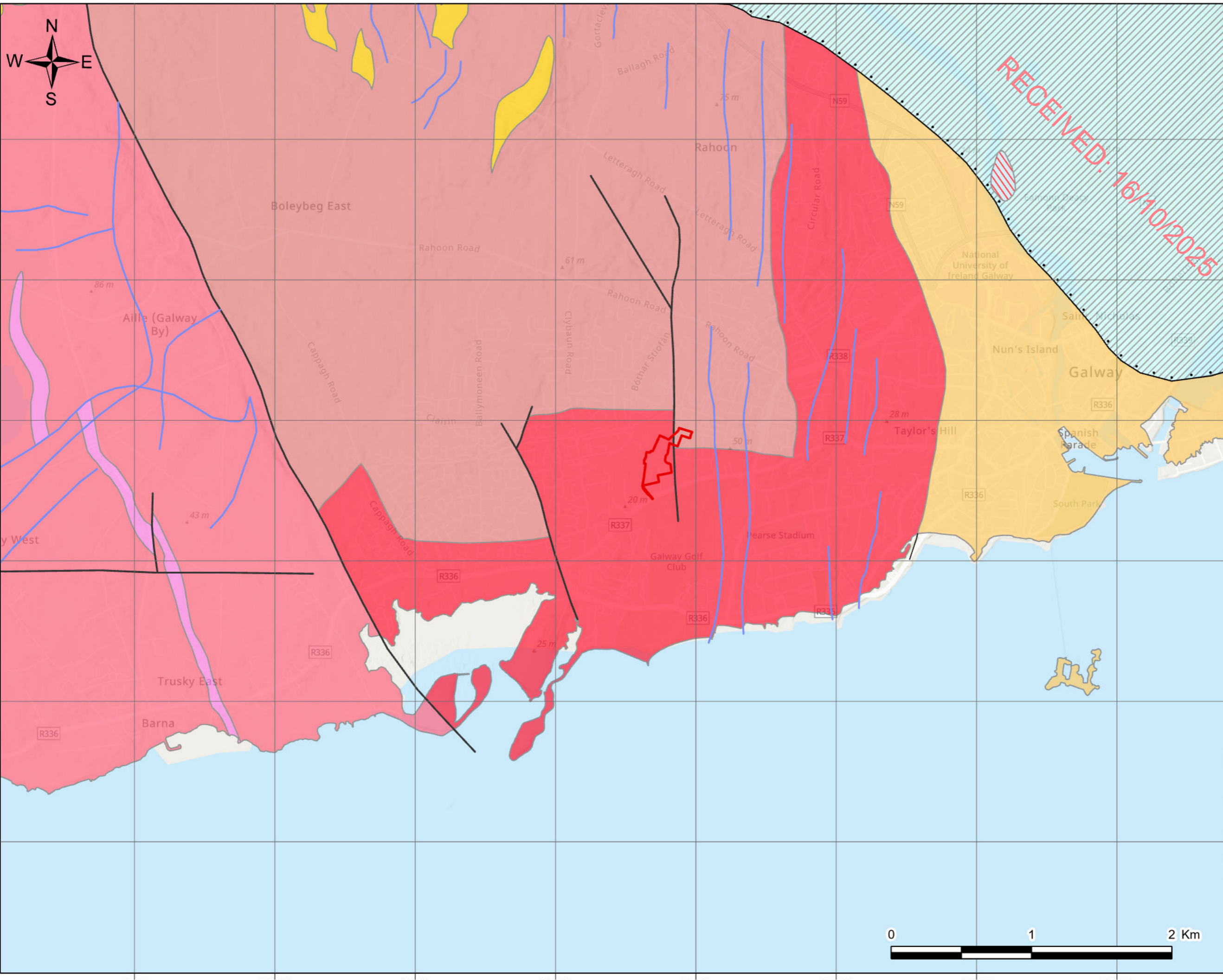
- ### Map Legend
- Planning Application Boundary
 - Sediments (Subsoils, GSI)**
 - Alluvium
 - Blanket Peat
 - Cut over raised peat
 - Fen Peat
 - Karstified bedrock outcrop or subcrop
 - Marine beach sands
 - Esturine silts and clays
 - Bedrock outcrop or subcrop
 - Till derived from granites
 - Till derived from limestones
 - Urban
 - Water

Spatial Reference
 Datum: IRENET95
 Projection: Transverse Mercator



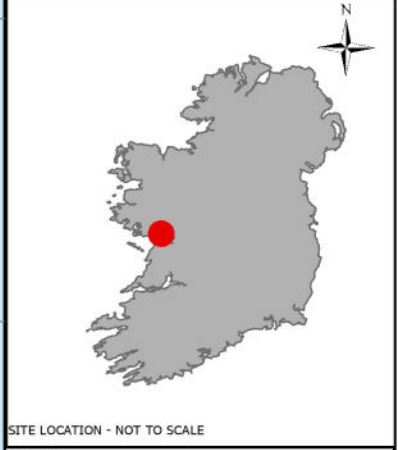
Drawing Title		
Sediments (Subsoils) Map		
Project Title		
Kingston Knocknacarra		
Project No.	Drawing No.	Scale
240142	7-2	1:25,000
Drawn By:	Checked By:	Date
OM	BA	10/10/2025

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- ### Map Legend
- Planning Application Boundary
 - Faults**
 - Dyke
 - Fault
 - Lithological boundary offshore
 - Unconformity, dots on younger side
 - Bedrock**
 - Burren Formation
 - Visean Limestones (undifferentiated)
 - Porphyritic-Megacrystic Granite
 - Errisbeg Townland Granite
 - Murvey Granite
 - Quartz porphyry and Felsite
 - Fine-grained foliated granite
 - Metagabbro & orthogneiss suite

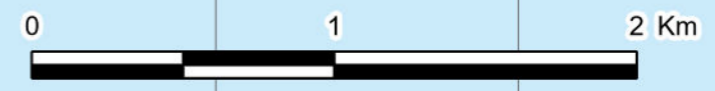
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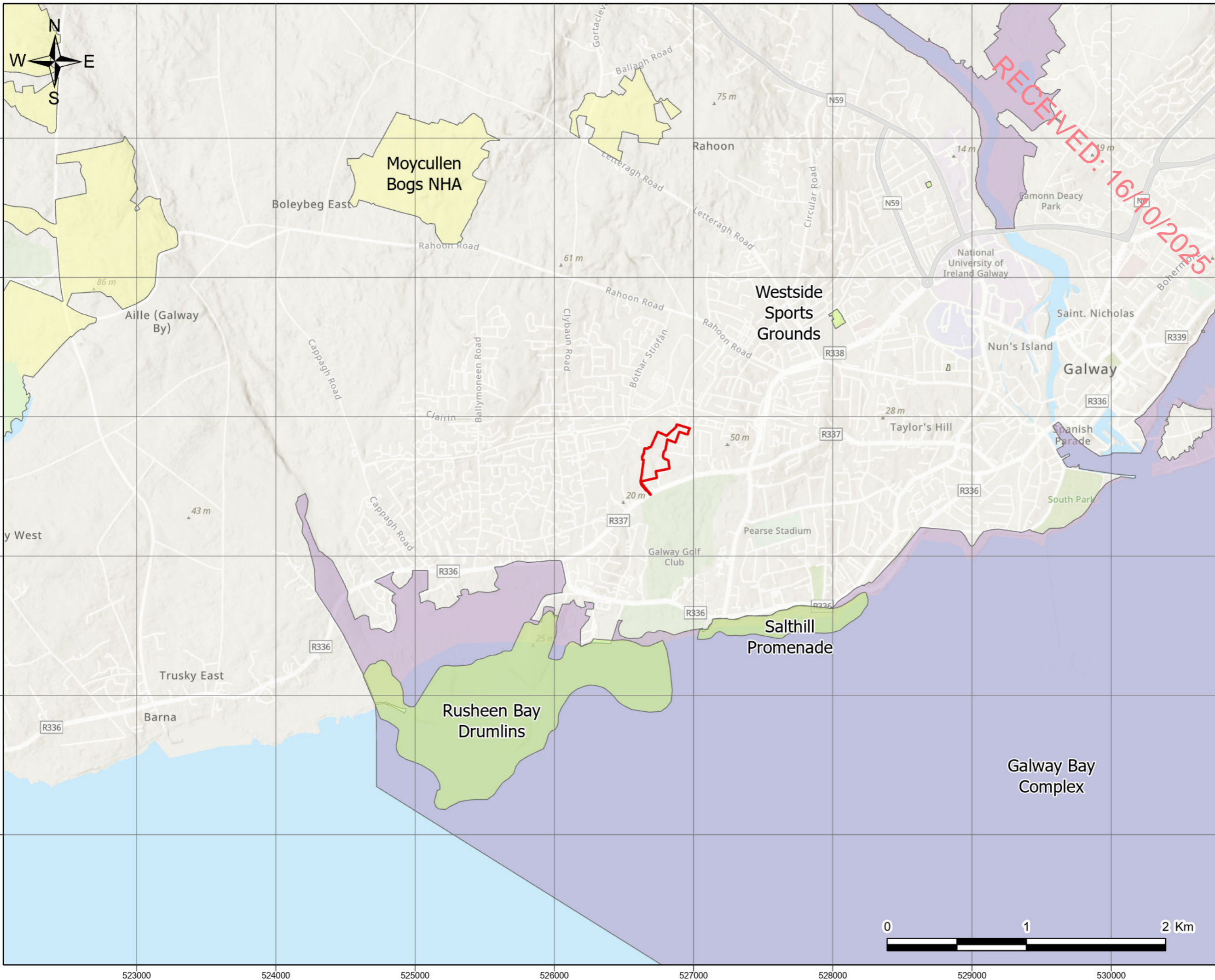


Drawing Title
Bedrock Geology Map

Project Title
Kingston Knocknacarra

Project No. 240142	Drawing No. 7-3	Scale 1:25,000
Drawn By OM	Checked By BA	Date 10/10/2025





- ### Map Legend
- Planning Application Boundary
 - Geological Heritage Sites
 - Proposed Natural Heritage Areas (pNHA)
 - Natural Heritage Areas (NHA)

Spatial Reference
 Datum: IRENET95
 Projection: Transverse Mercator



SITE LOCATION - NOT TO SCALE

Drawing Title Geological Heritage and Designated Sites Map		
Project Title Kingston Knocknacarra		
Project No. 240142	Drawing No. 7-4	Scale 1:25,000
Drawn By OM	Checked By BA	Date 10/10/2025

MKO

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7.3.3 Bedrock Geology

Based on the GSI 1:100,000 scale bedrock map of the region, the EIAR Study Area site is predominantly underlain by Murvey Granite; a fine-grained, weathered pink, equigranular leucogranite (monzogranite) with occasional megacrysts. In the northeastern portion of the site, the Errisbeg Townland Granite is mapped, which comprises megacrystic pink to grey monzogranite (GaEb). A north-south trending fault is also mapped in this area. A bedrock geology map of the area is provided in Figure 7-3.

7.3.4 Geological Heritage and Designated Sites

There are no recorded Geological Heritage sites within the boundary of the EIAR Study Area. The nearest Geological Heritage sites are:

- > Salthill Promenade located approximately 1.2 km to the south-southeast.
- > Rusheen Bay Drumlins, approximately 1.3 km to the south-southwest, and
- > West Sports Grounds, approximately 1.5 km to the northeast.

The closest designated Natural Heritage Area (NHA) is Moycullen Bogs NHA, situated approximately 2.2 km to the north and northeast of the site. The closest proposed Natural Heritage Area (pNHA) is Galway Bay Complex, located approximately 1.1 km to the south.

7.3.5 Soil Contamination

A detailed ground investigation was conducted in June 2019 and May – June 2025 to assess soil conditions across the EIAR Study Area. Trial pits and boreholes were advanced, and representative soil samples were analysed for potential contaminants, including heavy metals, hydrocarbons (total petroleum hydrocarbons (TPH) and polycyclic aromatic hydrocarbons (PAHs)), volatile organic compounds (VOCs), asbestos, and key inorganic parameters.

Made ground was identified in central areas, consistent with past development or infill. No asbestos was detected, and minor hydrocarbon impacts were recorded in isolated locations but remained below relevant residential assessment criteria during the 2019 Site Investigation. Heavy metal concentrations were within acceptable limits and did not pose a risk to human health or controlled waters.

During the 2025 Site Investigation, laboratory analysis was carried out on soil/waste samples from twenty-seven representative trial pits, boreholes and soil locations targeting a broad coverage and areas where contaminants were indicated by the 2019 Causeway Site Investigation.

There were no detections of Asbestos, PAHs total, polychlorinated biphenyls (PCBs) total, benzene, toluene, ethylbenzene, and xylenes (BTEX) or methyl tertiary-butyl ether (MTBE) (Appendix 7-3).

Soil samples were screened against risks to human health, plant growth and controlled waters. Results from soil sample screening indicate that there are no unacceptable risks to human health and low risk to vegetation and plant growth which can be mitigated further using capping layers in communal landscaping and importation of clean topsoil and growth medium (Appendix 7-3).

A low to medium risk is considered for controlled waters as minor elevated concentrations of contaminants were encountered in isolated groundwater samples from the granite bedrock. The isolated nature of the recorded exceedances is not indicative of site-wide contamination. Elevated ammoniacal nitrogen concentrations are likely to be indicative of background concentrations found in the regional groundwater and not attributable to site concentrations. Some exceedances in groundwater e.g. manganese iron and potassium, may be due to natural enrichment by the local granite bedrock.

According to EPA online mapping (<https://gis.epa.ie/EPAMaps/>), there are no licenced waste facilities on or within the immediate environs of the Proposed Development. In addition, there are no historic mines at or near the site.

The Geo-environmental Interpretive Report is included in Appendix 7-3.

7.3.6 Economic Geology

The GSI Online Minerals Database indicates that there are no quarries located within or close to the EIAR Study area.

According to the GSI Aggregate Potential Mapping Database, the site is situated within an area classified as having either Very High or High potential for crushed rock aggregate resources. The site walkovers and the results of the site investigation confirm that there is no potential for significant aggregates on site.

7.4 Characteristics of the Proposed Development

The Proposed Development, fully described in Chapter 4, comprises a residential scheme located within Galway City, delivering a total of 362 residential units in 4 no. development areas with a mix of apartment and house types on a site area of 5.37 ha. The buildings range between 2 no. and 6 no. storeys in height.

In addition to residential components, the proposal incorporates a range of community and resident-focused facilities, including a childcare facility (440m²), and public open space. To support sustainable mobility and resident convenience, the development includes surface-level car parking (313 spaces) and parking spaces for 665 bicycles and a new cycle and pedestrian access from Millers Lane.

The Proposed Development will typically require minor alteration of ground levels to ensure it is at an adequate level for the proposed surface water drainage and foul water drainage, and to mitigate flood risk. Detailed drawings in respect ground levels accompany this planning application. The Proposed Development will require excavation of soil and subsoil and temporary stockpiling in preparation for the construction of building foundations and in the preparation of a suitable sub-formation for road construction, trenching for foul and drainage water infrastructure and other services. Rock for construction purposes will be sourced from local licenced quarries. The Geo-environmental Interpretive Report recommends the re-use of uncontaminated excavated materials and offsite disposal of inert and hazardous materials to a soil waste recovery facility.

Significant excavations are not required as there are no subsurface basement-type structures proposed and the existing topography does not require significant alteration.

Other elements of the Proposed Development that may influence soil conditions include:

- > Provision of underground utilities and services;
- > Formation of hard and soft landscaped areas;
- > Construction of bin storage areas, lighting, access roads, and footpaths.

The development will involve site clearance, shallow substructure works, and the introduction of new foundations, all of which will interact with the existing soil/subsoil profile. These aspects are considered in the subsequent assessment of likely significant effects on land, soil and geology.

7.4.1 Surface Water Drainage

Surface water management proposals are described in detail in Section 4.2 and 4.3 of the Infrastructure Civil Design Report (Tobin, 2025; Appendix 4-3) and are summarised below.

It is proposed to divert any existing surface water sewers drains within the site so that they outfall to their natural existing destination, without influence from construction activities.

A temporary drainage system shall be installed prior to the commencement of the construction works to collect surface water runoff from the site during construction. All works shall be undertaken in accordance with the CIRIA document, 'Control of Water Pollution from Construction Sites, guidance for consultants and contractors' (CIRIA, 2001). The construction phase of the Proposed Development will adhere to this guidance and will ensure that surface water arising during the course of construction activities will contain minimal sediment. To prevent this from occurring surface water discharge from the site will be managed and controlled for the duration of the construction works until the permanent surface water drainage system to existing stormwater infrastructure is complete (Tobin, 2025; Appendix 4-3).

The current conditions of the Proposed Development site are greenfield/brownfield. Therefore, there are no existing surface water drainage or sustainable drainage systems (SuDs) measures in place. Interception storage can be achieved by implementing infiltration/attenuation storage tanks. Growth factors are applied to the allowable discharge for the 100-year event. Therefore, treatment and/or long-term storage are not required (Tobin, 2025; Appendix 4-3).

7.4.1.1 Water Supply

Water will be supplied on site by water tankers for general use during the construction phase. Potable water will be provided in the form of bottled water for staff use.

In accordance with Local authority/Uisce Éireann standards, a water meter and Logging Device (Larson Type) are proposed at the entrance of the connection into the proposed site. A sluice valve, strainer and 150mm diameter by-pass arrangement are also proposed to allow for possible disconnection of water meters by the Local Authority/ Uisce Éireann. A Pre-Connection Enquiry for the water demand from the proposed residential development was submitted to Uisce Éireann, and a subsequent Confirmation of Feasibility (CoF) statement has been received.

The proposed watermain layout will be designed in accordance with Uisce Éireann Code of Practice for Water Infrastructure IW-CDS-5020-03 Revision 2.

The proposed watermain design and layout is in accordance with has been designed in accordance with Uisce Éireann Code of Practice for Watermain Infrastructure IW-CDS-5020-03.

7.4.1.2 Wastewater Infrastructure

The proposed foul drainage layout for the development will be similar to the surface water drainage. All wastewater generated from the Proposed Development will outfall, via gravity, to an existing Uisce Éireann owned 225 mm foul sewer line located west of the development along the southern arm junction of the adjacent roundabout and Altan road (Tobin, 2025, Appendix 4-3). The 225 mm sewer line will require upgrade to 300 mm to where it meets an existing Uisce Éireann 375 mm foul network. Foul sewer calculations are provided in Tobin, 2025, Appendix 4-3.

The proposed foul sewer design and layout is in accordance with the Uisce Éireann Code of Practice for Wastewater Infrastructure and 'Recommendations for Site Development Works' as published by the Department of Environment.

7.5

Potential Impacts of the Proposed Development

The Proposed Development site has a low quality, significance or value on a local scale, the degree or extent of soil contamination is minor on a local scale, and the volume of peat and/or soft organic soil underlying site is small on a local scale. Both the bedrock and the soil and subsoil deposits at the EIAR Study Area can be classified as of “Low” importance (Table 7-1).

7.5.1

Do Nothing Scenario

If the Proposed Development were not carried out, the site would remain in its current form of low intensity farmland and brownfield with overgrown scrub. The potential direct impacts to land, soils, and geology are considered to be long term, imperceptible, neutral in the Do-Nothing scenario.

The lands are zoned for development and so continuing the existing land uses would be contrary to local policy and would have a slight negative effect in the context of losing the benefits associated with the proposed land uses.

7.5.2

Receptor Sensitivity & Importance

Based on the criteria set out in Table 7-2, the soils and subsoils at the Proposed Development site can be classed as being of ‘low’ importance as the overlying deposits are not designated in this area and are degraded in places because of the agriculture and brownfield nature of the site. The bedrock geology underlying the site can be classed as being of ‘medium’ importance where the bedrock could be used on a sub-economic scale.

No geological heritage site or designated site will be included in the impact assessment due to their distant location from the Proposed Development. There is no potential for the Proposed Development to effect the land, soils and geological environment outside of the site. Therefore, there is no potential for effects to occur on any geological heritage site or designated site.

7.5.3

Likely Significant Effects and Mitigation Measures – Construction Stage

The likely impacts of the Proposed Development and mitigation measures that will be put in place to eliminate or reduce them are shown below. It should be noted that the main potential impacts on the existing land use, soils and geological environment will occur during the construction stage.

7.5.3.1

Subsoil Excavation and Bedrock Excavation

Excavation of existing fill, subsoil and bedrock will be required for site levelling, for the installation of foundations for the access roads, car park and buildings, and service trenching. This will result in a permanent relocation of soil and subsoil at most excavation locations. The excavated materials are expected to include existing fill material, topsoil/subsoil, and some granite bedrock.

All excavated material will be removed to an authorised waste recovery facility or, if suitable, stockpiled and reused for backfilling and landscaping where appropriate.

Mechanism: Extraction/excavation.

Receptor: Land, topsoil, subsoil and bedrock.

Receptor importance: Low

Pre-mitigation Potential Impact: Negative, slight, direct, likely, permanent impact on soil, subsoil and bedrock at a local level.

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7.5.3.1.1 **Mitigation Measures**

- Excavated (existing) overburden material will be reused on site, where possible;
- Temporary stockpiles will be covered with plastic sheeting;
- A minimal volume of topsoil and subsoil will be removed to allow for infrastructural work to take place due to optimisation of the layout by mitigation by design (no basement structures are proposed); and,
- Construction of service trenching, pumping station and surface water attenuation features will generate excess material. All excess material will be sent to an authorised soil and stone or waste recovery facility.

7.5.3.1.2 **Residual Impact Assessment**

Due to the shallow nature of the excavations, the design measure to reuse excavated materials onsite and the 'low' value of the soil and rock resource the magnitude of the effect is considered to be a negative, direct, not significant, likely, permanent impact on topsoil, subsoils and bedrock.

7.5.3.1.3 **Significance of Effects**

No significant effects on land, topsoil, subsoils or bedrock are anticipated.

7.5.3.2 **Contamination of Soil by Leakages and Spillages and Alteration of Soil Geochemistry**

Accidental spillage during refuelling of construction plant with petroleum hydrocarbons has the potential to be a significant pollution risk. The accumulation of spills of fuels and lubricants during routine plant use can also be a potential pollution risk. Hydrocarbon has a high toxicity to humans, and all flora and fauna, including fish, and is persistent in the environment. Large spills e.g. cement or hydrocarbons, or leaks have the potential to result in significant effects on the geological and water environment.

Pathway: Topsoil, subsoil and bedrock pore space.

Receptor: Topsoil, subsoil and bedrock.

Receptor Importance: Low

Pre-Mitigation Potential Impact: Negative, direct, slight, short term, medium probability impact on topsoil, subsoils and bedrock.

7.5.3.2.1 **Proposed Mitigation Measures**

- Minimal refuelling or maintenance of construction vehicles or plant will take place on site. Where possible, off-site refuelling will occur at a controlled fuelling station;
- On-site re-fuelling will be undertaken using a double skinned bowser or a refuelling truck with spill kits kept onboard;
- All oils, fuels, paints and other chemicals will be stored in a secure bunded construction hardstand area. Refuelling and servicing of construction machinery will take place in a designated hardstand area which is also remote from any drainage systems. A response procedure will be put in place to deal with any accidental

pollution events and spillage kits will be available and construction staff will be familiar with the emergency procedures and use of the equipment;

- A temporary drainage system shall be installed prior to the commencement of the construction works;
- All works shall be undertaken in accordance with the CIRIA document, 'Control of Water Pollution from Construction Sites, guidance for consultants and contractors'
- All plant and machinery will be serviced before being mobilised to site;
- No plant maintenance will be completed on site, any broken down plant will be removed from site to be fixed;
- Concrete batching will take place off site, wash down and wash out of concrete trucks will take place off site and any excess concrete is not to be disposed of on site. Pumped concrete will be monitored to ensure there is no accidental discharge. Mixer washings are not to be discharged into surface water drains/sewers;
- Discharge from any vehicle wheel wash areas is to be directed to on-site settlement tanks/ponds, debris and sediment captured by vehicle wheel washes are to be disposed off-site at a licensed facility;
- Foul drainage discharge from the construction compound will be transported off site to a licensed facility until a connection to the public foul drainage network has been established.

Highest standards of site management will be maintained, and utmost care and vigilance followed to prevent accidental contamination or unnecessary disturbance to the site and surrounding environment during construction. A named person, as set out in the CEMP, will be given the task of overseeing the pollution prevention measures agreed for the site to ensure that they are operating safely and effectively as well as having responsibility for the implementation of Emergency Procedures for spill control measures.

7.5.3.2.2 **Residual Impact**

The use and storage of hydrocarbons and small volumes of chemicals is a standard risk associated with all construction sites. The measures identified above to mitigate the risk of spills and leaks, will be applied during the construction phase. The residual effect is assessed as - negative, imperceptible, direct, short-term, low probability effect on subsoils and bedrock.

7.5.3.2.3 **Significance of Effects**

No significant effects on land, soils, subsoils or bedrock are anticipated.

7.5.3.3 **Geological impact on local Designated Sites**

Mechanism: Excavation / handling / storage of soil/subsoils.

Receptor: Land, topsoil, subsoil and associated designated sites.

Receptor importance: Very High

Potential Impact: None, no direct excavation or development of any local designated sites are proposed. No indirect impacts on Designated Sites are anticipated.

Residual Impact

None.

7.5.4 Potential Impacts and Mitigation Measures – Operational Stage

No impacts on land, soils and geology are anticipated during the operational phase. The operational stage of the development consists of the typical activities in a residential area and will not involve further disturbance to the topsoil, subsoils and geology of the area. All liquids with the potential for pollution, such as hydrocarbons at individual properties will conform with best practice storage requirements. The risk associated with these is low.

7.5.4.1 Assessment of Health Effects

Potential health effects arise mainly through the potential for soil and ground contamination. Residential developments are not a recognized source of significant pollution and so the potential for effects during the operational phase are negligible. Hydrocarbons will be used onsite during construction. However, the volumes will be small in the context of the scale of the project and will be handled and stored in accordance with best practice mitigation measures.

The Geo-environmental Interpretive Report (Appendix 7-3, Section 7.2) states that the measured concentrations for the determinants analysed in the samples from the Proposed Development site are below the assessment criteria and therefore are not considered to present an unacceptable risk to human health based on residential (without private gardens) and residential (with private gardens) land use scenarios. A low risk to future users is associated with the concentrations of methane and carbon dioxide recorded.

The potential residual impacts associated with soil or ground contamination and subsequent health effects are imperceptible.

7.5.5 Potential Cumulative Effects

7.5.5.1 Cumulative Effects Resulting from Interactions between Various Elements of the Proposed Development

The interaction of the various elements of the Proposed Development was considered and assessed in this EIAR with regards land, soils and geology. The potential for each individual element of the Proposed Development on its own to result in significant effects on land, soils and geology was considered in the impact assessment. The entire project including the interactions between all its elements was also considered and assessed for its potential to result in significant effects on geological receptors in the impact assessment presented. The complex interactions between the requirement for site grading and the requirement to protect downstream waters, human health, and other receptors were taken into account for the entire project and any impacts avoided through a series of mitigation measures that were fully described. The management and handling of potentially harmful materials across the entire project was assessed with mitigation proposed and described fully.

All interactions between the various elements of the project were considered and assessed both individually and cumulatively within this chapter. Where necessary, mitigation was employed to ensure that no cumulative effects will arise as a result of the interaction of the various elements of the development with one another.

7.5.5.2 Cumulative In-Combination Effects

The potential cumulative effects of the Proposed Development in combination with the other projects described in Section 2.6.2 of this report have been considered in terms of impacts on land, soils and geology. Where appropriate the application documentation, EIAR, Natura Impact Statement (NIS) and

Geo-environmental Interpretive Report have been reviewed to inform the assessment. There are no active quarries, major earthworks, or other associated activities which could impact upon the soils and geological environment adjacent the Proposed Development site.

The scale of the proposed earthworks at the Proposed Development site is negligible in the context of the other projects within and around the city and so the potential cumulative effects are considered imperceptible.

The potential for the Proposed Development to result in significant cumulative or in combination effects when assessed with the Proposed Project, was considered. The Proposed Project involves the construction of more than 500 residential units, and the development will require separate, individual planning applications for each part of the project. The individual planning applications will be subject to separate planning applications and Environmental Impact Assessment Reports. Each EIAR will include a cumulative assessment, which combines the individual project's impacts with those from other past, present, and future projects to understand the cumulative effect of the Proposed Project.

With the implementation of mitigation measures for the Proposed Development as outlined above, no significant cumulative impacts on land, soils and geology environment are anticipated during the construction or operation phases of the Proposed Development in combination with other developments. Potential cumulative impact will be permanent, imperceptible, and neutral.

7.5.6 Conclusion

Excavation of existing fill, topsoil, subsoil and bedrock will be required for site leveling and for the installation of drainage and services (wastewater, water supply, electricity, etc.) infrastructure. This will result in a permanent removal of subsoil and bedrock at most excavation locations.

Where possible, excess material will be used for reinstatement and landscaping works around the site at the end of the construction phase. Storage and handling of hydrocarbons/chemicals will be carried out using best practice methods. Measures to prevent subsoil erosion during excavation and reinstatement will be undertaken to prevent erosion and water quality impacts.

No significant impacts on the land, soil and geology of the site will occur due to the Proposed Development provided the mitigation measures are implemented.