SDCC Rathcoole Housing Development

Environmental Impact Assessment Report (EIAR)
Chapter 07: Land, Soils & Geology

South Dublin County Council (SDCC)

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Quality information

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7 Land, Soils & Geology

7.1 Introduction

This chapter identifies, describes and assesses the likely significant effects of the Proposed Development on land, soils and geology, including potential effects associated with ground contamination. Groundwater is principally addressed in Chapter 08: Water Environment. The Proposed Development application site is referred to herein as the 'Site'.

This chapter describes the methodology used for the assessment and the existing land, soil and geological conditions at the Site. It assesses the potential effects of the Proposed Development during construction and operational phases, and identifies mitigation measures, where required, to avoid, prevent or reduce potential adverse effects.

7.2 Legislation, Policy and Guidance

7.2.1 Legislation

The following legislation relevant to this chapter has been consulted as part of the land, soils and geology assessment:

- EIA Directive 2011/92/EU (as amended by Directive 2014/52/EU);
- Planning and Development Act 2000, as amended, insofar as applicable;
- Planning and Development Act 2024, insofar as relevant commenced provisions apply;
- Planning and Development Regulations 2001, as amended; and
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296/2018).

7.2.2 Policy

South Dublin County Council issued in 2022 the South Dublin County Development Plan 2022 - 2028, prepared in accordance with the provisions of the Planning and Development Act 2000 (as amended), and which sets out a range of proposed policy objectives for development within South Dublin County up to 2028. The plan incorporates the mandatory objectives listed in the Act, including conservation and protection of the environment, and promotion of compliance with environmental standards.

7.2.3 Guidance

The following guidance documents have informed the land, soils and geology assessment:

- Transport Infrastructure Ireland (TII) (2008), Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (PE-ENV-01116).
- Environmental Protection Agency (EPA) (2022), 'Guidelines on the Information to be Contained in Environmental Impact Assessment Reports' (hereafter referred to as 'the EPA Guidelines')[1]; and
- Institute of Geologists of Ireland (IGI) (2013), 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements[2].

[1] Available at: Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EIAR) | Environmental Protection Agency https://www.epa.ie/publications/monitoring--assessment/assessment/guidelines-on-the-information-to-be-contained-in-environmental-impact-assessment-reports-eiar.php. (Last accessed: February 2026).
[2] Available at: IGI guidelines on Environmental Impact Assessment Reports https://gsi.ie/en-ie/publications/Pages/IGI-guidelines-on-EIARs.aspx (Last accessed: February 2026).

7.3 Methodology

The land, soils and geology assessment has been carried out following the methodology as detailed below, with reference to the EPA Guidelines (2022):

- Establishment of the baseline conditions, including identification and assessment of the receiving environmental and receptor sensitivity;
- Identification of potential sources of impact/contamination, potential sensitive receptors which may be impacted by each source, and the potential pathways by which the impact may occur. Mitigation measures ave been devised for each potential impact;
- Identification of environmental design measures and applicable mitigation measures;
- Identification of the likely significant effects, taking account of impact magnitude and receptor sensitivity;
- Assessment of residual effects; and
- Consideration of potential cumulative effects.

7.3.1 Study Area

The Proposed Development is located to the south/ south-east of Rathcoole, County Dublin. A full description of the Proposed Development is provided in Chapter 02: Description of Development.

The study area encompasses the Proposed Development footprint (i.e. the Site) and, in the case of groundwater, the Site with a 1 km buffer. The specified buffer area is considered appropriate based on the spatial extent to which potentially complete pollutant linkages are likely to be viable.

The Proposed Development outlined is shown in Figure 7-1; see also Plate 8-1 of EIAR Volume 3. A site walkover was conducted by the land and soils team on 08 May 2025 verify the desk study data, assess surface geology, and identify local environmental sensitivities or contamination risks.

7.3.2 Baseline Environment

Data and background information in relation to the land, soils and geology were obtained from publicly available sources, including the following:

- Geological Survey Ireland (GSI) Spatial Resources Map Viewer, including Teagasc Soils Database[3];
- EPA Maps Viewer[4]which included SIS National Soils mapping and CORINE 2018/2024 land use mapping;
- Tailte Éireann (formerly Ordnance Survey of Ireland (OSI)) GeoHive Map Viewer[5]; and
- Google Earth[6].

7.3.3 Identifying Significant Environmental Effects

The site assessment identifies potential source(s) of impact associated with the Proposed Development, and pathway(s) linking the potential source(s) of impact with potential receptor(s).

The first stage is to identify the causes/ sources of potential impact from a proposed development. The sources have been identified through a review of the details of the Proposed Development, including the size and nature of the development, proposed construction and operational methodologies and associated

[3] Available at: Geological Survey Ireland Spatial Resources https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228 (Last accessed: February 2026)
[4] Available at: EPA Maps https://gis.epa.ie/EPAMaps/ (Last accessed: February 2026)
[5] Available at: GeoHive Map Viewer https://www.arcgis.com/apps/webappviewer/index.html?id=3ae19cc156bf4706a929304bf8fcc4f6 (Last accessed: February 2026)
[6] Available at: Google Earth https://earth.google.com/web/@53.280546,-6.45691193,120.81995857a,1908.11366769d,35y,0h,0t,0r/data=CgRCAggBOgMKATBCAggASg0I_____ARAA (Last accessed: February 2026)

timescales. The next step in the model is to undertake a review of the potential receptors, that is, the soil/ geology/ groundwater receptors that have the potential to be affected by the potential impact sources.

The last stage of the model is to determine if there is a viable exposure pathway or a 'mechanism' linking the impact source to the receptor. This has been undertaken in the context of local conditions relative to soil/ geology/ groundwater receptors within the defined study area and the nature of the impact.

Linkages can take many forms. For example, where a development is proposed within an area of very high geological sensitivity and importance, it may result in the direct destruction or damage of that geological feature. The pathway in this instance would be short. However, when it comes to contamination in soil/ groundwater, the pathway can be more elongated.

From a contaminated land perspective:

- A contaminant source is a substance that is in, on or under the land and has the potential to cause harm or to cause environmental pollution;
- A receptor (such as people, an ecological system, property or a waterbody) could be adversely affected by a contaminant; and
- A pathway is the route or means by which a receptor can be exposed to, or affected by, a contaminant.

Each of these elements can exist independently, but they create a risk only where they are linked together, so that a particular contaminant affects a particular receptor through a particular pathway.

A new development has the potential to create new pathways for contaminant migration and expose receptors to sources of contamination from which they were previously shielded.

The assessment of the likely significant effects reported herein is qualitative, and considers Proposed Development construction and operational phases, as well as potential cumulative effects with other environmental factors and with other developments.

7.3.4 Determination of Sensitive Receptors

7.3.4.1 Soils and Geology

Sensitivity describes the potential of a receptor to be significantly affected. Receptors have been identified during the baseline study, and a qualitative assessment has been used to assign a sensitivity rating from low to extremely high based on the TII Guidelines. Table 7.1 sets out the criteria used to assign importance or sensitivity to the receptors.

7.3.4.2 Use of Natural Resources

Regarding natural resource use, the materials themselves have been identified as the sensitive receptors. Consuming materials impact upon their immediate and (in the case of primary materials) long-term availability; this results in the depletion of natural resources and adversely impacts the environment.

7.3.5 Describing Potential Effects

The methodology used for describing the potential effects considers the 'quality' of the effects (i.e. whether it is adverse or beneficial), the 'likelihood' of the event occurring, and the extent, magnitude, duration, significance and reversibility as set out in **Chapter 01: Introduction & Methodology**.

Specific assessment criteria for describing potential effects and typical examples based on information within the EPA Guidelines and the IGI Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements are outlined in

Table 7.1: Sensitivity Rating of Geological Attributes, Soil Resources and Contamination

Importance/ Sensitivity	Criteria	Geology	Soil Resources	Contamination
Extremely High	• Attribute has a high quality or value on an international scale.	• (None in guidance)	• (None in guidance)	• (None in guidance)
Very High	• Attribute has a very high quality and rarity on international or nation scale or high sensitivity.	• Geological feature rare on a regional or national scale (NHA). • Large existing quarry or pit. • Proven economically extractable mineral resource.	• Volume of peat and/ or soft organic soil underlying route is significant on a national or regional scale.	• Degree or extent of soil contamination is significant on a national or regional scale.
High	• Attribute has a high quality, significance or value on a local scale.	• Geological feature of high value on a local scale (County Geological Site). • Moderately sized existing quarry or pit. • Marginally economic extractable mineral resources.	• Volume of peat and/ or soft organic soil underlying route is significant on a local scale. Well drained and/ or high fertility soils.	• Degree or extent of soil contamination is significant on a local scale. • Contaminated soil on site with previous heavy industrial usage. • Large recent landfill site for mixed wastes.
Medium	• Attribute has a medium quality, significance, or value on a local scale.	• Sub-economic extractable mineral resource.	• Moderately drained and/ or moderate fertility soils. • Volume of peat and/or soft organic soil underlying route is moderate on a local scale.	• Degree or extent of soil contamination is moderate on a local scale. • Contaminated soil on site with previous light industrial usage. • Small recent landfill site for mixed wastes.
Low	• Attribute has a low quality, significance, or value on a local scale.	• Volume of peat and/ or soft organic soil underlying route is small on a local scale.	• Volume of peat and/ or soft organic soil underlying route is small on a local scale.	• Degree or extent of soil contamination is minor on a local scale. • Large historical and/ or recent site for construction and demolition wastes. • Small historical and/ or recent landfill site for construction and demolition wastes.

Source: IGI, 2013, Table C2.

Table 7.2: Magnitude of Impact on Geology Attributes, Soil Resources and Contamination (EPA sensitivity terminology in brackets)

Magnitude of Impact	Criteria	Geology	Soil Resources	Contamination
Large Adverse (High)	• Results in loss of attribute.	• Loss of high proportion of future quarry or pit reserves. • Removal of entirety of geological heritage feature.	• Irreversible loss of high proportion of local high fertility soils. • Requirement to excavate and replace high proportion of peat, organic soils and/ or soft mineral soils beneath alignment.	• Requirement to excavate/ remediate entire waste site.
Moderate Adverse (Medium)	• Results in effect on integrity of attribute, or loss of part of attribute.	• Loss of moderate proportion of future quarry or pit reserves. • Removal of part of geological heritage feature.	• Irreversible loss of moderate proportion of local high fertility soils. • Requirement to excavate and replace moderate proportion of peat, organic soils and/ or soft mineral soils beneath alignment.	• Requirement to excavate/ remediate significant proportion of waste site.
Small Adverse (Low)	• Results in minor impact on integrity of attribute or loss of small part of attribute.	• Loss of small proportion of future quarry or pit reserves. • Removal of small part of geological heritage feature.	• Irreversible loss of small proportion of local high fertility soil and/ or high proportion of local low fertility soils. • Requirement to excavate and replace small proportion of peat, organic soils and/ or soft mineral soils beneath alignment.	• Requirement to excavate/ remediate significant proportion of waste site.
Negligible (Negligible)	• Results in effect on attribute, but of insufficient magnitude to affect the use or integrity.	• No measurable changes in attributes.	• No measurable changes in attributes.	• No measurable changes in attributes.
Minor Beneficial	• Results in minor improvement of attribute quality.	• Minor enhancement of geological heritage feature.		
Moderate Beneficial	• Results in moderate improvement of attribute quality.	• Minor enhancement of geological heritage feature.		
Major Beneficial	• Results in major improvement of attribute quality.	• Minor enhancement of geological heritage feature.		

Source: IGI, 2013, Table C4.

7.3.6 Significance of Effect

7.3.6.1 Soils, Geology & Hydrogeology

A qualitative approach has been used to determine the likely significant effects as set out in **Chapter 01: Introduction & Methodology**, comparing the sensitivity of the attributes (refer to Table 7.1 and the magnitude of the potential impact (refer to

Table 7.2), based on professional opinion and professional judgement. Where uncertainty exists, this is noted.

The magnitude of the effect is judged on a six-point scale as illustrated in Table 7.3 and described below:

- **Imperceptible** – An effect capable of measurement, but without significant consequences;
- **Slight** – An effect which causes noticeable changes in the character of the attribute without affecting its sensitivities;
- **Moderate** – An effect that alters the character of an attribute in a manner that is consistent with existing and emerging baseline trends;
- **Significant** – An effect, which by its character, magnitude, duration or intensity, alters the sensitive aspects of an attribute;
- **Severe** – An effect which by its character, magnitude, duration or intensity significantly alters most of the sensitive aspect of an attribute; and
- **Profound** – An effect which obliterates the sensitive characteristics of an attribute.

Table 7.3: Rating of Environmental Effects (EPA sensitivity terminology in brackets)

Importance of Attribute	Magnitude of Impact (Sensitivity)			
	Negligible (Negligible)	Small Adverse (Low)	Moderate Adverse (Medium)	Large Adverse (High)
Extremely High	Imperceptible	Significant	Profound	Profound
Very High	Imperceptible	Significant/ Moderate	Profound/ Significant	Profound
High	Imperceptible	Moderate/ Slight	Significant/ Moderate	Profound/ Significant
Medium	Imperceptible	Slight	Moderate	Significant
Low	Imperceptible	Imperceptible	Slight	Moderate/ Slight

Source: IGI, 2013, Table C6; EPA ,2022, Figure 3.4

Table 7.3 indicates how the magnitude of the impact and the importance of the attribute interact to determine the significance of the resulting environmental effect. Broadly speaking, impacts having a large magnitude and/ or affecting important or sensitive receptors are more likely to lead to significant effects.

In general, effects found to be 'Profound', 'Severe' or 'Significant' are deemed to be Significant, whilst effects found to be 'Moderate', 'Slight', or 'Imperceptible' are considered Not Significant.

7.3.6.2 Use of Natural Resources

Table 7.4 outlines the effect significance criteria used regarding the use of natural resources.

Table 7.4: Effect Significance Criteria for Assessment of Natural Resource Usage

Effect	Criteria for Effects of Natural Resource Used	Significance
Major	Large decrease in material asset availability, greater than 5% of current baseline, potentially causing significant burden to the national material asset market.	Significant

Effect	Criteria for Effects of Natural Resource Used	Significance
Moderate	Moderate decrease in material asset availability, between 2% and 5% of current baseline, potentially causing moderate burden to the national material asset market.	Not Significant
Minor	Minor decrease in material asset availability, between 0.1% and 1.9% of current baseline, causing a minor burden to the national material asset market.	
Negligible	Negligible decrease in material asset availability, less than 0.1% of current baseline causing insignificant burden to the local and regional material asset market.	

Under the assessment of effects upon natural resources, a 'Major' effect is considered Significant, whilst a 'Moderate', 'Minor' or 'Negligible' effect is considered Not Significant.

7.3.7 Mitigation of Significant Effects and Re-assessment

Once a significant effect has been identified, additional mitigation measures may be used to offset or compensate adverse effects, or to enhance beneficial effects. Where appropriate, mitigation measures have been described and assessed for each potential complete pollutant linkage (comprising a source, pathway and receptor). Re-assessing the significance of the effect after applying additional mitigation allows the level of residual effect to be assessed.

7.3.8 Assumptions and Limitations

The assessment has been based on the description of the Proposed Development detailed within Chapter 02: Description of Development.

In the absence of site investigation data and detailed plans, excavations across the Proposed Development are assumed to remain within the superficial deposits and not extend into the underlying bedrock.

No ground investigations have been conducted to inform this land, soils and geology assessment; therefore, the assessment has been undertaken using publicly available geo-environmental data from sources such as GSI and EPA mapping, and a site walkover conducted on 8 May 2025. It has been assumed that a programme of ground investigation will be undertaken prior to Proposed Development construction.

In the absence of detailed ground investigation results, it has been assumed that the superficial deposits contain groundwater and are in hydraulic continuity with the underlying bedrock formations underlying the Site and adjacent watercourses.

The location accuracy of published data is variable. For example, the location of boreholes, wells and springs on GSI mapping is generally to within a radius of 10 m to 500 m. In addition, the GSI groundwater dataset may be incomplete, as there is no statutory requirement to register boreholes or wells unless the well has an abstraction rate of 25 m^3/d. Hence, the presence (historical or current) of boreholes or wells not recorded on the GSI website cannot be discounted. Additionally, no details on the borehole construction or current operational status are available on third party mapped boreholes.

7.4 Baseline Environment

7.4.1 Site History

Historical mapping from the 1830s – 1930s indicates that the Proposed Development Site and the surrounding areas to the south and south-east were primarily utilised for agricultural purposes with minimal infrastructure and roads. On the earliest map (6-inch:1mile map series), the town of Rathcoole is somewhat formed to the north of the Site, with private dwellings, a post office and a police station present. There is a road that goes through Rathcoole town and continues north-east towards Dublin City, which was potentially part of the main road that is the N7 today. To the north-east of the Site there is a church and Rathcoole House, just north of where Rathcoole Park is today.

Historical photography from 1995 indicates that the eastern part of the Site, where Rathcoole Park is today, is still occupied by agricultural fields. There are additional housing developments to the north-west and west of the Proposed Development, continuing the growth of the town of Rathcoole. The N7 primary route, north of Rathcoole town, is fully developed, connecting to the main road through Rathcoole town by means of a slip way and roundabout off the N7.

Aerial photographs dating from 1996–2000, 2001-2005, 2006-2012, 2013-2018, and present-day maps have also been reviewed which indicates that the rest of the surrounding area remains the same as the previous maps, with Rathcoole Park being fully formed to the north-east of the Site. Elsewhere the same housing developments are present, noting that these do not appear to have been extended other than to the east of the Site where construction of additional housing appears in the 2006 - 2012 aerial photograph being completed in the 2013 aerial photograph.

7.4.2 Land Use

The town of Rathcoole is located to the north of the Site and consists of housing, shops, schools, restaurants, sports grounds and public recreational areas. Rathcoole Park is a recreation area and extends along the north-western boundary of the Site.

Immediately south-west of the Site is a wooded and vegetated area (Rathcoole Wood), which is bordered by agricultural fields to the south. Approximately 600 m to the south is Coolmine Road which has dwellings present along the road.

Immediately east of Rathcoole Park and north-east of the Site is the town of Saggart which consists of shops, housing developments, a school and playing fields. To the south of Saggart town, approximately 500 m south-east of the Site, is a major water supply facility (Saggart Reservoir), Ireland's largest water treatment works which supplies approximately 70% of Dublin's drinking water demand.

Surface cover across the Site is predominantly scrubland, agricultural grassland and hedgerows, with areas of overgrown vegetation, with the proposed Site vehicular access to be from Greenogue Drive via a new T-junction, with separate pedestrian/cycle connections.

Site history, current land use and the 08 May 2025 site walkover do not indicate any potentially contaminative land uses on the Site, so contaminated soils are not suspected to be present, though this will be re-assessed at ground investigation stage.

The Camac River flows northwards between Rathcoole and Saggart just to the east of the Site. The Crockshane Stream flows towards the north-east along south-southeast boundary of the Site and joins the Camac River at the south-eastern corner of the Site. The Coolmine Stream flows north-east through Rathcoole Park to the north of the Site boundary and joins the Camac River at the north-eastern corner of the Site.

7.4.3 Topography

The topography of the Site is relatively level, with a gentle downward gradient slope noted from 126.7 m OD (metres above Ordnance Datum) in the south-west to 113 m OD in the north-east, with a gradient of approximately 0.016 across the Site.

7.4.4 Agricultural Land

The Site soils are mapped as 'the 'Drumkeeran Association' in the SIS National Soils mapping available via the EPA mapping website, which is described as 'Clayey drift with siliceous stones' and 'Surface-water Gley: Poorly drained mineral soil' - Figure 7-2.

The land-use is described under both the CORINE 2018 and 2024 mapping available via the EPA mapping website as an 'Heterogeneous agricultural area' Code 243 described as "*Land principally occupied by agriculture with significant areas of natural vegetation*".

7.4.5 Geology

7.4.5.1 Bedrock Geology

Geological mapping by GSI shows that the majority of the Site is underlain by the Pollaphuca Formation, consisting of medium-grey, coarse, graded greywackes and dark-grey shales – Figure 7-5.

Approximately 250 m west of the Site and underlying most of Rathcoole town, is the Carrighill Formation, consisting of calcareous greywacke siltstone and shale. This unit is separated from the Pollaphuca Formation by a faulted contact running north-south in the north-west corner of the Site and under the entrance road to the Proposed Development.

Approximately 10-20 m north of the Site is the Lucan Formation, consisting of dark Limestone and shale, separated from the Pollaphuca Formation by a faulted contact running east-west (see Figure 7-5).

The bedrock geology map indicates that the bedrock units are dipping towards the south-east at angles of 30 to 50 degrees, with strata further to the south-east being overturned (>1 km from the Site). There are no mapped Karst features within 1 km of the Site

Historical site investigation data from the GSI mapping website indicates that there are no records of boreholes located within the Site, however the GSI Geotechnical Site Investigations layer indicates that the Saggart to Leixlip Trunk Watermain investigation area (unique report ID: 1800) runs through the Site from north-west to south-east through the centre of the Site. The Proposed Liffey Aqueduct project site (unique report ID: 1367) runs east-west within 250 m to the south of the Site, whilst an unnamed project (unique report ID: 6835) parallels the N7 road approximately 250 m north of the Site.

There are bedrock outcrops present is the Lucan Formation approximately 350 m north of the Site along the N7 and also further north at Collegeland and close to Greenogue

There are no Geological Heritage Sites within 1 km of the Site.

7.4.5.2 Overburden Geology

Geological mapping (GSI Subsoils mapping – Quaternary sediments) indicates that the subsoils across the Site are comprised of glacial deposits (tills) derived from Lower Palaeozoic rocks, which extends to the south of the Site into the surrounding agricultural land (refer to Figure 7-4). To the north of the Site in Rathcoole town, the subsoils are mapped as Made Ground.

GSI Physiographic mapping (Quaternary Geomorphology) indicates that a glaciofluvial terrace is present along the Camac River at the eastern edge of the Site which forms part of the ‘Cammock River System’ glacial landform.

There are multiple small areas >150 m to the south-west of the Site which have bedrock at, or very close to, the surface and the thin soils in these areas are mapped by Teagasc as Lithosols or Regosols (refer to Figure 7-2).

Landslide susceptibility at the Site is mapped by GSI as being Low, with small areas within 1 km of the Site mapped as having Moderate landslide susceptibility (e.g. approximately 300 m to the north along the N7, 400m to the south-east and 500m to the south-west of the Site). There are no landslide events recorded by GSI within a 1 km radius of the Site.

7.4.6 Hydrogeology

Hydrogeology is considered in Chapter 08: Water. In summary, the majority of the Site is underlain by the Pollaphuca Formation which is classified by GSI as a ‘Poor Bedrock Aquifer’ which is ‘General Unproductive Except for Local Zones’ (Pl). The Pollaphuca Formation at the site is part of the Kilcullen Ground Water Body (GWB), an extensive but Poorly Productive bedrock Aquifer (see also Chapter 08 Water for further discussion).

There is no gravel aquifer mapped beneath the Site or within a 1 km radius.

Groundwater is mapped as having ‘High’ vulnerability to contamination across the Site (refer to Figure 7-3), with moderate subsoil permeability. Recharge to groundwater is mapped as 51 - 100 mm per year, which is low.

Online mapping from GSI records one well or spring (St Bridget's Well) within a 1 km radius of the Site – refer to Table 7.5.

Table 7.5: Groundwater Abstraction Wells or Springs

GSI Reference	Type	Year Drilled	Source Use	GSI Yield Class	Approx. Distance from Site Boundary
2921NWW007	Spring	Not applicable	Not recorded	Not recorded	0.6 km north-west, at the western side of Rathcoole Village.

Source: Geological Survey Ireland (GSI) (2026)

7.4.7 Designated Sites

There are no designated sites from a geological heritage perspective within a 1 km radius of the Site. The closest geological heritage site is Newcastle Buried Channel, a County Geological Site (site code SD010) which is located approximately 2.5 km to the north-west of the Site. Newcastle Buried Channel is a deep buried channel in the Carboniferous limestone bedrock and is not seen at the surface.

Groundwater beneath the Site is protected under the Water Framework Directive (WFD) (for further detail see Chapter 08: Water).

7.4.8 Ground Investigation

No intrusive ground investigations have been conducted specifically to inform the Proposed Development design.

GSI has mapped five geotechnical reports within 1 km of the Site (Unique Report IDs 1367 (Proposed Liffey Viaduct), 1800 (Saggart to Leixlip Trunk Watermain), 5858 (unnamed), 6225 (unnamed) and 6835 (unnamed but aligned along the N7). Associated mapping indicates that bedrock was generally met within 5 m of the surface approximately 200 m north of the Site (around Fitzmaurice Road (R120) and the Naas Road (N7)).

Previous intrusive investigation locations were advanced close to the eastern edge of the Site in 1985 as part of Saggart to Leixlip Trunk Watermain, including one borehole at the north-eastern corner of the Site (BH 4) and one on the eastern bank of the Camac River just south of the south-eastern corner of the Site, (BH 3). The report on this site investigation including maps and borehole logs available via GSI website (no reports are available for the other four schemes referenced above). Data is reported as follows:

- BH 3 (offsite) encountered topsoil over a layer of fill material containing ash and cinders, which extended to 1.5 m below ground (m bgl). Beneath this was a sequence of firm to stiff, brown or black, silty, stony clay with boulders recorded below 2.8 m bgl. The hole was terminated at 4.0m bgl; and
- BH 4 (onsite) encountered 0.4 m of topsoil over soft to medium gravelly clay with cobbles which extended to 2.8m bgl, where an obstruction was met. This borehole was terminated at 3.1 m bgl after chiselling for 0.3m (potentially a boulder or bedrock).

7.4.9 Summary of Baseline Conditions

A summary of the baseline conditions at the Site is presented in Table 7.6.

Table 7.6: Summary of the Baseline Conditions

Baseline Aspect	Description
Context	There has been little development to date across the Site, with most ground surfacing consisting of grass and hedgerow, and some areas of dense vegetation. Overburden soil cover consists of poorly-drained glacial material/till derived from Lower Palaeozoic rocks (glacial till). There is historical site investigation evidence of some localised anthropogenic infill (using fill material including ash and cinder) close to the Site, but on the eastern side of the Camac River. There is no evidence of potentially contaminative current or former activities at the Site.

Baseline Aspect	Description
	Bedrock consists of the Pollaphuca Formation consisting of coarse greywacke and shale. Boreholes records held by GSI indicate that bedrock was met within 5 m bgl approximately 200 m to the north-east of the Site and bedrock outcrops exist along the south side of the N7 road. There are mapped bedrock faults close to the northern and western boundaries of the Site
Character	Bedrock beneath the Site is classified as a Poor Aquifer. Due to the presence of relatively thin, moderate permeability overburden soils, groundwater beneath the Site is mapped as having 'High' vulnerability.
Significance	The Site has a long history of agricultural use. There are no designated sites from a geological heritage perspective within a 1 km radius of the Site. There are no public water supply or group water scheme source protection areas mapped within a 1 km radius of the Site. The general groundwater flow direction is expected to follow the topographic gradient from west to east, though this may vary within overburden depending on composition, local permeability differences and the proximity of surface water. There is historical site investigation evidence of some localised anthropogenic infill (using fill material including ash and cinder) close to the Site, but on the eastern side of the Camac River.
Sensitivity	Regarding land, soils and geology, the Site is considered to be of Low sensitivity. • Land Use - Heterogeneous agricultural areas - extensive in the locality (within 1km) – Low sensitivity • Soils – Poorly drained, clay rich gley soils common through the local area (within 1km) – Low sensitivity • Bedrock Geology – Pollaphuca Formation – extensive in the locality (within 1km), poor aquifer, not exploited as a resource locally – Low sensitivity • Contamination - no evidence of potentially contaminative current or former activities – Low sensitivity

7.5 Potential Impacts

7.5.1 Construction

7.5.1.1 Excavation & Infilling

Construction works, such as excavations prior to constructing foundations, roadways or installing/ relocating underground services, will remove Made Ground, topsoil and subsoil.

Based on the cut-and-fill modelling undertaken for the Site, approximately 65,971 m³ of excavated material (cut), excluding topsoil, will be exported off-site (37,083 m³ from the residential areas and 28,888 m³ from the non-residential areas, including the pitch area). The subsoils will then be regraded and reprofiled to form the new pitch platform, requiring approximately 12,000 m³ of stockpiled subsoil material to be moved within the site.

Approximately 100 mm of topsoil will be stripped across the Site and retained in stockpiles for re-use, with an indicative volume of 10,602 m³. The stored topsoil will subsequently be respread and improved through the import of approximately 3,849 m³ of sand, which will be used to ameliorate the top 100 mm of the soil, and sand slits will be installed as secondary drainage at 1 m centres across the pitches. This approach has been informed by the site's existing topography and has been designed to minimise cut and fill requirements and to avoid the export of topsoil from the site.

These excavated materials will need to be stockpiled on Site prior to reuse or removal. Stockpiling of excavated soils would, in the absence of mitigation, have the potential to impact on soil and groundwater, through the leaching of contaminants, if present, or from runoff of silt from soil stockpiles. There is no known source of significant contamination present in soils, subsoils or groundwater within the Site. However, during ground works there is potential to uncover previously-unknown zones of localised contamination.

When excavated soil and subsoils are removed off-site for disposal/reuse or brought on to Site as infill material, if they are not properly classified (from a reuse and waste disposal perspective), there is the potential for contamination to be imported, be spread off-site or for waste soil to be sent to an incorrect facility and thereby be inappropriately managed.

In the absence of mitigation measures, excavation, stockpiling and infilling impacts, through the removal and movement of soil and potentially contaminated soil, could result in a permanent, direct, small adverse

impact on the character of the soil and geological environment of low sensitivity but would be certain to occur and be irreversible, resulting in Slight adverse effect, which is Not Significant.

7.5.1.2 Stockpiles

Provision will be made for the on-Site stockpiling of up to 12,000 m³ of excavated topsoil material. In addition, other soil/stone materials to be imported and temporarily stockpiled on Site are listed in Table 7.7.

Table 7.7: Proposed Soil/Stone Import

Material	Import Volume (approx. m^3)
Hardcore - T1 structural material	845
Hardcore - T2 permeable material	380
T3 Blinding	84
Clause 804/803 granular sub-base material	3,014
Breedon Decorative Gravel	202
Sand (for topsoil amelioration)	3,849
Subsoil (for pitch platform)	1,500
Totals	**9,874**

With stockpiling there is a potential for soil compaction which can also be caused by heavy traffic on haul roads. Further to this, there is a potential effect of soil erosion and unstable slopes if the stockpiles are of an inappropriate angle or protection. Uncontrolled stockpiling would result in an increased risk to soil and subsoil structure and integrity of slope stability and will require implementation of mitigation measures.

7.5.1.3 Dewatering

The proposed civil works comprise roads, drainage infrastructure, lined attenuation features, watermain and foul drainage networks, together with associated earthworks. The deepest excavations are likely to be associated with drainage infrastructure, attenuation features and the wastewater pump station. From the current civil design, there are no permanent structures that have been designed to require ongoing dewatering during operation.

While there is no direct information on depth to groundwater within the overburden beneath the Site, this EIAR has assumed that limited quantities of groundwater are likely to be encountered during excavation works in the moderate permeability subsoils. It is anticipated that only localised dewatering via sumps will be required during construction, as there are no deeper foundation excavations required (see also Chapter 08: Water).

In the absence of mitigation, the magnitude of impact associated with localised dewatering where excavations extend below groundwater level is considered temporary and localised on groundwater levels and flows. The magnitude of the impact is predicted to be Low on the water environment, and the significance of effect is anticipated to be **Moderate** on the underlying WFD groundwater bodies (e.g. Dublin and Kilcullen) and **Slight** on Camac_020, Coolmine Stream, drains and ditches encountered on the Site and the Rathcoole wet woodland. The significance of effect from localised dewatering is anticipated to be **Not Significant** or **Imperceptible** where required (see also Chapter 08: Water).

7.5.1.4 Accidental Spills and Leaks

During Proposed Development construction phase, there is a risk of accidental pollution incidents from the following sources:

- Spillage or leakage of chemicals stored and used on-site as part of construction works;
- Spillage or leakage of oils and fuels from construction machinery or site vehicles; and
- Spillage of oil or fuel from refuelling machinery on-site.

Accidental spillage of fuels or chemicals could potentially result in impacts on soils and groundwater underlying the Site if inappropriately handled or stored during construction. Potential contaminants could migrate through the subsoils and impact underlying groundwater or nearby surface water.

With respect to soils and geology, spills and leaks are considered a direct negative effect and, if they occur, would likely occur as one-off releases. In the absence of mitigation, the impact could alter the character of soil and/or groundwater at the Site and may range from temporary to prolonged in duration. The impact would, therefore, result in a Small to Moderate adverse impact on low sensitivity soil and geological environment, with effects being Slight or Imperceptible with regard to soils and geology which is Not Significant.

With respect to groundwater, in the absence of mitigation, accidental spillages and leaks are considered unlikely to occur and, should they occur, are likely to be temporary. The magnitude of impact is predicted to be Medium on the water environment in the absence of mitigation for all waterbodies that are worked on directly, and Low on the waterbodies that are worked on indirectly.

The effect is anticipated to be Significant for the underlying very high sensitivity WFD groundwater bodies, Moderate for surface waters and the Rathcoole wet woodland, and Slight for the rest of the relevant water receptors (see further detail in Chapter 08: Water).

7.5.1.5 Use of Concrete and Lime

Lime and concrete (specifically the cement component) is highly alkaline and any spillage which migrates through subsoil could impact groundwater quality. The activity most likely to result in contamination is during foundation construction works.

Such impacts are considered unlikely to impact on identified groundwater wells, but may locally impact the ground waterbody, assessed as being of Very High sensitivity (see Chapter 08 Water).

The impacts would result in an indirect negative effect, but are unlikely to occur and, if they occur, would be confined to one-off releases. In the absence of mitigation, the impacts could alter the character of soil and/or groundwater at the Site but would be temporary in nature. Therefore, use of concrete and lime is considered to have a potential Low or Negligible impact to a Low sensitivity Soil environment and a Very High sensitivity bedrock groundwater environment, with the resultant the effects being Imperceptible for soils and geology and to Moderate to Imperceptible for groundwater, which are Not Significant. See Chapter 08: Water for further details.

7.5.1.6 Land Use

The Proposed Development will result in the changes to amenity land on the south end of Rathcoole Park and clearance of vegetation to the south-west of the Proposed Development. The total area where land use will be changed is estimated at 11.4 ha, which breaks down as follows:

Zoning:

- Lands zoned Open Space: 9 ha;
- Lands zoned Residential: 6 ha;
- Lands zoned Rural: 2.8 ha.

Development use

- Residential areas: 3.9 ha;
- Recreational - GAA pitches: 6.7 ha;
- Recreational - GAA parking and pavilion: 0.19 ha.

Given that similar ‘Heterogeneous agricultural area’ extends to the southwest of the Site, the soils at the Site are classified as ‘Surface-water Gley: Poorly drained mineral soil’ (which are present extensively within 1 km of the site) and the Site is currently in non-agricultural use, this land use change is considered to be a Small adverse (Low), long term impact on a land use of Low sensitivity, giving a resultant effect of Imperceptible, which is Not Significant.

7.5.1.7 Use of Natural Resources

Construction will require the use of natural non-renewable resources, such as import of aggregates and concrete components (9,874 tonnes in total). In Ireland, the annual aggregate use (the consumption of

construction aggregates (such as sand, gravel, and crushed rock) sits at approximately 45 million tonnes per year (CSO Material Flow Accounts 2024). The use of natural resources for the Proposed Development is less than 0.1% and is therefore Negligible and considered to be Not Significant in EIA terms.

7.5.2 Operational Phase

7.5.2.1 Accidental Spills and Leaks

There is the potential for accidental spills and leaks to occur from vehicles using access roads around the Proposed Development when operational, from domestic fuel tanks or from firefighting during an incident. However, the impacts are unlikely to occur due to embedded control measures (drainage, interceptors) that have been incorporated into the Proposed Development design.

Potentially polluted surface water drainage (by fuel spillage or fire events) would run through the surface water network and pass through a fuel interceptor prior to being discharged. It is, therefore, unlikely to infiltrate into the ground and affect subsoils and groundwater.

If impacts from accidental spillage and leaks occur, these would be confined to one-off releases of limited volume. The impact could alter the character of soil, geology and/ or groundwater at the Site, although the effect would be temporary in nature.

In terms of soils and geology, accidental spills and leaks during the operational phase, such as from vehicles, are considered to have a potential Small Adverse (Low) impact on a low sensitivity soil and geological environment, resulting in effects that are Imperceptible, which is Not Significant.

The magnitude of potential groundwater impact from accidental spills and leaks is discussed in Chapter 08 Water and is predicted to be medium on the water environment in the absence of mitigation for all waterbodies that are worked on directly, and low on the waterbodies that are worked on indirectly. As a result, the significance of effects is anticipated to be Significant for the underlying WFD groundwater bodies, the Camac, Coolmine Stream and wet woodland and Slight for other water receptors.

7.5.3 Indirect, Secondary & Transboundary Effects

Indirect and secondary effects are described in the EPA Guidelines as "*effects on the environment, which are not a direct result of the project, often produced away from the project site or because of a complex pathway*". Transboundary effects are those affecting another state or jurisdiction. The zone of influence of the effects identified does not affect any other state or states.

Potential indirect, secondary and transboundary environmental effects in relation to land, soils and geology has been considered in the preparation of this EIAR chapter. Indirect and secondary effects, including use of natural resources (aggregates and cement) and potential effects on downstream surface water receptors and groundwater-connected receptors (see also Chapter 08 Water) have been considered within the assessments presented above. No additional significant indirect or secondary effects have been identified.

Given the nature and location of the Proposed Development, no Land & Soils transboundary effects on another state or jurisdiction are anticipated.

7.6 Mitigation Measures

7.6.1 Construction Phase

7.6.1.1 General Management

All project stakeholders have a responsibility to protect the environment. The appointed contractor will comply with all national laws and regulations controlling pollution of the environment. Necessary precautions to prevent contamination of soil and groundwater with fuels, oils, bitumen, chemicals, or other harmful materials will be taken. All required permits and licences will be identified and planned before the start of the construction works.

All construction materials will be responsibly sourced, with assurances provided that goods and services are legitimately secured from legal and well-managed sources and from suppliers and contractors who can demonstrate responsible sourcing of their materials.

Periodic inspections of the construction works will be conducted to address issues including dust, litter, surface water, waste management and general housekeeping. These inspections will be conducted by the appointed contractor/dedicated environmental manager and will be documented and provided to the SDCC monthly. SDCC, or its appointed consultants, will also reserve the right to carry out audits, inspections, monitoring and/or spot checks of the works and any systems being implemented both on-site and off-site in connection with the works to ascertain whether they comply with the Contractor's CEMP. Audit findings in the form of Corrective Action Requests will be recorded and actioned.

All environmental observations, incidents and near-misses will be recorded and reported to the necessary stakeholders within 24-hours and the timeframe for close-out agreed at the outset of the Proposed Development between the Applicant and the contractor. Good practices will also be recorded.

7.6.1.2 Excavation, Stockpiling & Infilling

Excavation

The Proposed Development will incorporate the reduce, reuse and recycle approach in terms of soil excavations on-site. Excavation earthworks will be limited to the removal of topsoil and shallow subsoils for the construction of foundations for buildings within the Site and for access roads. The absence of mapped outcrops of the Pollaphuca Formation within 1 km of the Site means that excavation of bedrock is not anticipated. Infill earthworks will be required for the importation and compaction of acceptable fill material to achieve the required engineering design and grades.

The extent of exposed ground will be minimised during construction to that necessary to facilitate progress of works, and any stockpiles will be covered to prevent the creation of contaminated run-off or dust.

Stockpiling

Temporary storage of excavated soil and imported soil/stone materials will be carefully managed in such a way as to prevent potential adverse effect on the receiving environment. Handling of materials, such as soils, will be kept to a minimum and materials will be stockpiled at minimum practicable height.

For reusable topsoil, a 2 m height limit will be used to prevent the soil compressing under its own weight. Other excavated materials of lower engineering quality can be stored in higher stockpiles.

Spoil and temporary stockpiles will be positioned in locations which are distant from drainage systems and away from areas subject to flooding, so as not to cause potential run off to soil and groundwater receptors. Where required, silt fencing will be deployed at the base of stockpiles when storing fine material, to prevent fine sediment runoff outside the designated area.

Excavated soil and stone that is surplus to requirements will be managed through the contractor's Resource and Waste Management Plan. The excavated soil will be tested for potential contaminants and waste acceptance criteria to determine whether it can be stockpiled on Site for future reuse; sent to a soil recovery facility; or disposed as inert, non-hazardous or hazardous waste to an appropriately-licensed waste facility.

Infilling

Where possible and where supported by analytical data confirming the absence of contamination, material excavated from the Site will be reused to minimise the volume of imported fill required.

Where imported fill is required, the source will be carefully selected and vetted to ensure that it is of a reputable origin and that it is 'clean' (i.e. will not introduce contamination to the environment). Procurement procedures will be developed to ensure that aggregates are sourced from reputable suppliers who are vetted for their environmental management status, as well as regulatory and legal compliance.

If recycled aggregate is used as imported fill, rigorous chemical testing will be undertaken to confirm that it is 'clean' (i.e. will not introduce new contamination to the environment).

7.6.1.3 Dewatering

If, during the excavation works, either groundwater or surface water run-off enters the excavation, there will be a requirement to dewater the excavation. This will be achieved by pumping water from the excavation following silt mitigation measures either to the nearest watercourse or drain or to artificial recharge (re-infiltration) subject to monitoring of sediment, the contamination status of the water, compliance with the CEMP and agreement of SDCC (see Chapter 08 Water for further discussion).

7.6.1.4 Accidental Spills and Leaks

To prevent spillages to ground of fuels or other liquid chemicals, and to prevent consequent soil or groundwater quality impacts, it will be necessary to adopt mitigation measures during the construction phase.

Pollution prevention will be achieved with both physical and procedural measures. The contractor shall comply with all national laws and regulations controlling pollution of the environment. Necessary precautions to prevent pollution occurring to ground of fuels, oils, chemicals, or other harmful materials shall be taken.

The locations of refuelling, storage of oil/fuel, concrete mixing and washing areas are to be restricted to impermeable bunded areas with a minimum of 110% storage capacity and away from surface water. The Contractor will be required to submit a site layout plan which will detail the proposed location of these locations.

Oil and fuel storage tanks will be bunded to the greater volume of either 110% of the capacity of the largest tank/container within the bunded area or to a volume of 25% of the total capacity of all the containers in a single bund. Drainage from the bunded area will be diverted for collection, monitoring and safe disposal.

All containers within the bunded storage area will be clearly labelled, so that appropriate remedial action can be taken in the event of a spillage. When moving drums from the bunded storage area to locations within the Site, a suitably sized spill pallet will be used for containing any spillages during transit.

A spill response kit will be available onsite and accessible to all to control pollution incidents. These spill kits will contain absorbent pads, absorbent granules and methods of disposal of materials and used kit. These kits will be located at appropriate points around the Site which are considered to be at a higher risk of pollution (e.g. refuelling area and next to fuel tanks). Further spill kits and supplies will be in the stores within the Site, where replacements for used kits will be found. The spill kits will need to be regularly inspected and immediately replaced if used. Any used spill kit materials will be disposed of using a licensed hazardous waste contractor in accordance with relevant legalisation.

Refuelling of construction vehicles and the addition of hydraulic oils or lubricants to vehicles will be conducted by appropriately trained personnel and take place in designated areas, which will be away from surface water gullies or drains. There will be no refuelling allowed within 50 m of a watercourse.

Where mobile fuel bowsers are used on the Site, in the event of a machine requiring refuelling outside of the designated area, fuel will be transported in a mobile double skinned tank. Any flexible pipe, tap or valve will be fitted with a lock where it leaves the container and be locked shut when not in use. Each bowser will carry a spill kit, and each bowser operator will have spill response training.

Pumps and generators used on the Site will have integral drip trays where possible. All items of plant without an integral drip tray will be stored over a portable drip tray. Drip trays will be inspected and kept free of accumulated rainwater as necessary. Any oily water will be disposed of at an appropriate licensed facility. Any cleaning/arisings from drip trays etc. to be disposed of as hazardous waste in accordance with EPA guidance and legislation.

All plant and equipment will be checked for leaks of fuel and lubricants before being allowed onto the site. The Contractor will allow for regular checks and maintenance as required.

No discharge to existing infrastructure/watercourses/ground will be permitted to take place without the appropriate consents or approvals.

The Contractor will provide suitable pumps, settlement tanks and filters to filter all water being pumped/ discharged from excavations into existing drains. The contractor will also take measures to ensure that runoff from open excavations does not enter the surrounding drainage system without being treated.

Ditches and water streams will be clearly identified onsite and shown on method statements and site plans. The Contractor carrying out the works will identify all watercourses, drains and potential conduits for silt-laden run-off and, where necessary, measures will be taken to minimise direct sediment run-off from the working site into watercourses.

7.6.1.5 Use of Concrete and Lime

The risks from concrete works when constructing the Proposed Development will be managed and mitigated by the Contractor. A suitable risk assessment for wet concreting will be completed prior to works being carried out, which will include measures to prevent discharge of alkaline wastewaters or wash-water to the surface water drainage system or to the underlying subsoil, including:

- No concrete is laid during wet weather, if achievable, so that there is no risk of concrete being washed off the Site and into the surface water drains or nearest watercourse.
- Ready-mixed concrete will be brought to the Site by truck. A suitable risk assessment for wet concreting will be completed prior to the works being carried out which will include measures to prevent discharge of alkaline wastewaters or contaminated water to the underlying subsoil and groundwater.
- The pouring of concrete will take place within a designated area protected to prevent concrete runoff into the soil/groundwater media.
- Washout of concrete transporting vehicles will take place at an appropriate facility, off-site where possible. Alternatively, where wash out takes place onsite, it will be carried out in carefully managed on-site wash-out areas.

7.6.2 Operational Phase

The Proposed Development will incorporate mitigation measures for potential spills of fuel and/or chemicals in accordance with best practices which will suffice to reduce the impact of such events if they occur.

There will not be significant on-site storage of fuels or chemicals, therefore only minor, localised minor risks to soils and geology may arise from vehicle fuels and lubricants (due to the parking for playing fields and the residential unit car parks) or from common maintenance chemicals (such as cleaning products and garden related chemicals like weed killers) during the operational phase requiring no additional mitigation other than the drainage management described in Chapter 08 Water.

7.7 Residual Impacts

Residual effects are those that remain following the implementation of mitigation measures. It is concluded that the effects of the Proposed Development on land, soils, geological and hydrogeological environment would be Slight to Imperceptible or, in the case of natural resources, Minor; all of which are considered Not Significant.

When the proposed mitigation during the construction phase is implemented in accordance with the CEMP, residual effects are anticipated to be Not Significant.

When the proposed mitigation during the operational phase is implemented, residual effects are anticipated to be Not Significant.

7.8 Cumulative Impacts

7.8.1 Construction Phase

Regarding cumulative impacts from other projects within the Proposed Development area these projects are all being completed on or under lands owed by either South Dublin County Council (SDCC) or Department of Education.

A search of planning applications within 1 km of the Site is presented in Volume 02; Appendix A8-4. Applications of note include:

- New primary school, including 20 classrooms, with a gross floor area of 3,449 m^2 over 3 storeys (SDCC planning ref: SD23A/0336). The Proposed Development will be using the new road approved under the school's application which will provide access to the school's site, although the Proposed Development will require some changes to the approved road layout to provide connection to the proposed residential and recreational areas.

Should this development be constructed at the same time as the Proposed Development, there is a potential for cumulative effects associated with accidental spills and leaks, and the use of concrete and lime.

Nearby projects are the subjects of their own, separate EIARs and planning applications, and incorporate measures to protect land, soils and geology (such as CEMPs). They are being constructed on lands that are subject to strict regulatory control. The Zone of Influence of each project is considered to be limited to its own boundary, so that there will be limited, if any, physical interaction with other projects in terms of land, soils and geology. The cumulative impact to land and soils is thus considered to be Short-Term, Negligible and Imperceptible, which is Not Significant.

7.8.2 Operational Phase

When operational, the Proposed Development will operate in accordance with relevant legislation and embedded control measures will be in place. Limited, if any, physical interaction with other operational or proposed projects is anticipated. Therefore, the cumulative effect on land and soils is considered to be Long-Term, Neutral and Imperceptible, which is Not Significant.

7.9 ‘Do Nothing’ Scenario

The ‘do nothing’ alternative describes the circumstance where no development occurs. Under a ‘do nothing’ scenario, in the absence of the Proposed Development, the land at the Site would remain in its current use, and no likely significant implications would arise in respect of soil or geology.

7.10 Summary

This chapter assesses the potential effects of the Proposed Development on land, soils and geology during construction and operation. The relevant land, soil and geological receptors have generally been assessed as having Low sensitivity.

During construction, potential effects include excavation and infilling, soil stripping and stockpiling, land-use change, accidental spills and leaks, use of concrete and lime, and consumption of natural resources. Mitigation includes appropriate management and reuse of excavated materials, pollution prevention and spill response measures, and controls for fuels, chemicals and concrete works.

During operation, potential effects are primarily associated with accidental spills and leaks and will be controlled through embedded drainage and pollution prevention measures.

Following implementation of mitigation, residual effects on land, soils and geology are anticipated to be Slight to Imperceptible and Not Significant. No significant cumulative effects with other relevant developments are anticipated during construction or operation.

7.11 References

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