

7 LAND AND SOILS

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7.1 Introduction

This chapter has been prepared by Waterman Moylan Consulting Engineers.

This section of the Environmental Impact Assessment Report describes the natural characteristics of the proposed residential development at 'The Grange', Brewery Road, Stillorgan, Co. Dublin in terms of bedrock geology and drift geology.

The impact of the proposed development on the soils and geology of the subject site is assessed, and mitigation measures where necessary are proposed to reduce the impact of any development.

7.2 Study Methodology

In determining the impact of the proposed development on the prevailing geological conditions, key sources of information were consulted, including the Map of the Bedrock Geology of Ireland, produced by the Geological Survey of Ireland available on www.gsi.ie. Guidance on relevant assessment methods is obtained from "Geology in Environmental Impact Statements – a guide", September 2002, published by the Institute of Geologists of Ireland.

An extensive site investigation (SI) was carried out within the proposed development site. The purpose of the site investigation was to investigate subsurface conditions utilising different methodologies. The results of the site investigation have been compiled in a report prepared by Ground Investigations Ireland Ltd (GII), (Report Job Number: 7967-08-18).

7.3 The Existing Receiving Environment (Baseline)

This section describes the land, soils and geology in the subject site and its surroundings. It also states the historic land use of the subject site.

Site Development

The site is in Stillorgan, Co. Dublin. It is bounded to the north by Brewery Road, to the east by Stillorgan Road, to the southwest by the Leopardstown Tennis Club and to the southeast by existing residential developments. The proposed development is approximately 2.5km from the coastline at Blackrock and 440m north of Mulchanstown Reservoir.

The total site area is approximately 1.6 hectares and is currently 50% hardstanding. A survey was carried out on the site and determined that the site falls from south east to northwest ranging in level from 74.00m in the south east to 66.00m in the northwest. The "Grange Marketing Suite", "Oaktree Business Centre", "The Lodge" and the now redundant site set up for the neighbouring development currently occupy the site. There are also a number of well-established trees and foliage on site occupying an area of approximately 257m².

Historic Land use

The Ordnance Survey of Ireland (OSI) has been consulted to review historic maps and aerial photographs. From 1837 through 1842, the subject site appeared to be an agricultural site. Later, in the period between 1888-1913, the map shows The Grange Cottages on the proposed site and The Grange Development in the surroundings. In the aerial map from 1995 it can be seen that the junction between Brewery Road and Stillorgan road has been moved south to form a 90 degree angle. No further development was carried out on the subject site. It should also be noted that the surroundings have been developed with several residential developments and tennis courts to the south. No significant changes can be observed from 2000 to 2005 aerial survey in the surroundings of the site.

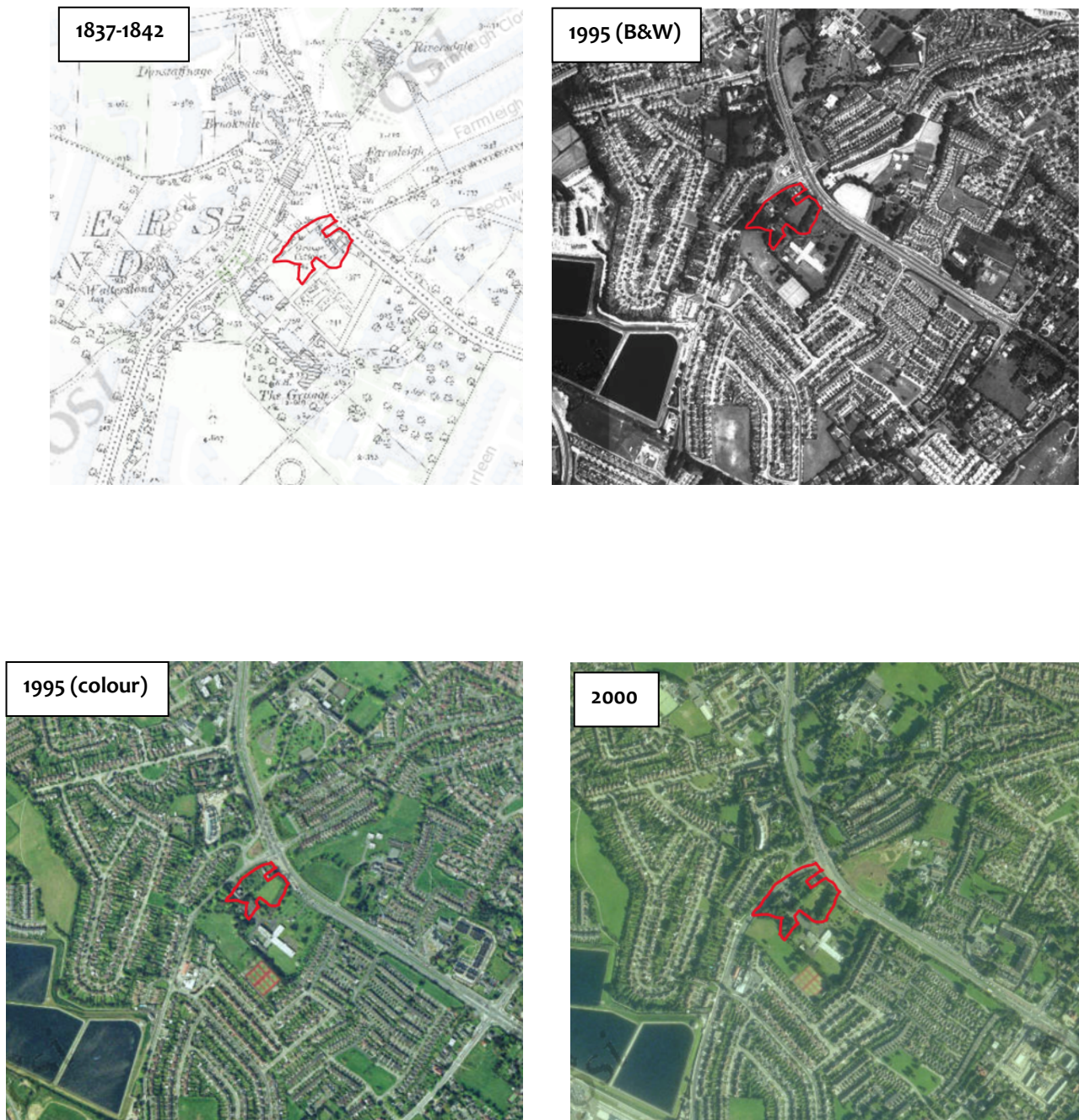


Figure 7.1 - Historic Maps and Aerial Photos of the Site

Ground Investigation

An extensive site investigation (SI) was carried out within the proposed development site. The purpose of the site investigation was to investigate subsurface conditions utilising different methods. SI comprised the following scope of work:

- 3 No. Trial Pits to a maximum depth of 2.50m BGL.
- 14 No. Rotary Core Boreholes to a maximum depth of 6.60 m BGL.
- Installation of 3 No. Groundwater monitoring wells.
- Geotechnical & Environmental Laboratory testing.

Refer to Figure 7.2 for the location of Trial Pits and Boreholes.

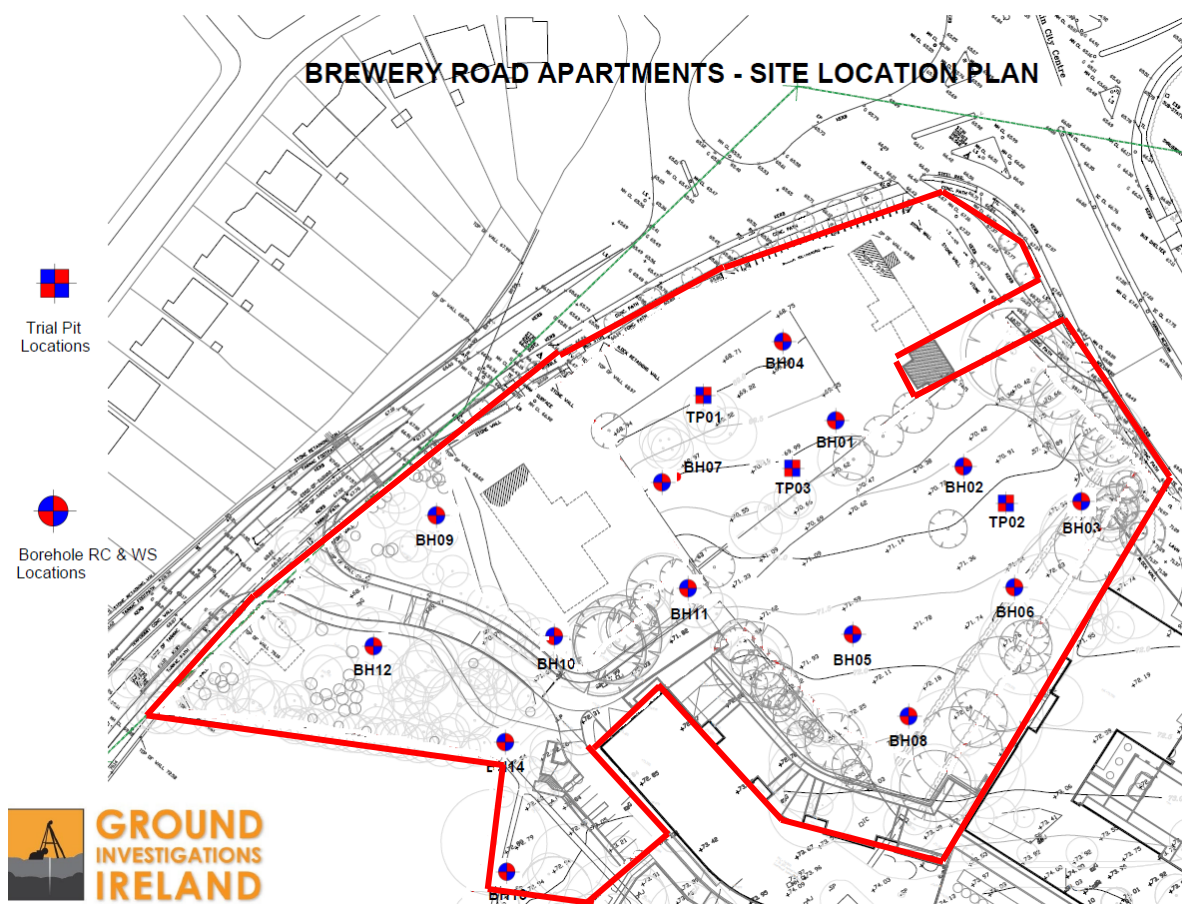


Figure 7.1 - Site Location Plan

Laboratory testing was undertaken on selected soil samples collected during the investigation. Testing focused on mechanical properties primarily, with some samples also tested for chemical properties. The results indicated organic and arsenic content are above the inert limits. Also, asbestos was detected in two of the boreholes and was further quantified to be less than 0.001% by mass. A waste classification report is recommended to be carried out to determine the most appropriate disposal options for any soil to be taken off site.

The ground conditions encountered during the investigation are summarised below with reference to in situ and laboratory results:

- **Topsoil:** Only 3 boreholes (BH05, BH08 and BH14) had presence of topsoil to a maximum depth of 0.35m BGL. In other locations, gravel hardstanding was found.

- **Made ground:** it was found beneath the Topsoil or from ground level to a maximum depth of 1.40 BGL. These deposits were described as brown/grey slightly sandy slightly gravelly Clay with occasional fragments of concrete and plastic.
- **Drift Geology: Cohesive deposits and Granular Deposits/weathered Rock**

The exploratory holes showed the proposed development to be underlain predominately from brown slightly sandy gravelly clay. The secondary sand and gravel constituents varied across the site and with depth. Under these cohesive deposits, granular deposits were encountered and were typically described as brown/orange slightly clayey gravelly fine to coarse SAND or grey slightly clayey sandy angular GRAVEL with cobbles of Granite. This stratum is the weathered rock corresponding to the underlying intact Granite bedrock recovered in the rotary core boreholes. Shallow rock is present across the site with outcrops visible to the south of the area of the investigation. The secondary sand/gravel and silt/clay constituents varied across the site and with depth while occasional or frequent cobble content also present where noted on the exploratory hole logs.
- **Bedrock Geology:** is formed by weak to medium strong occasionally strong massive crystalline coarse grained greyish white granite. The depth to rock varies from 0.65m to a maximum of 2.65 m below ground level. SI states that SCR and RQD indexes are poor in the upper weathered zone but they improve as the depth increases.

Geology

The Bedrock Geology Map of Ireland produced by the Geological Survey of Ireland (GSI), describes the prevalent geology of the area. The proposed development spans an area predominantly underlain by two geological formation:

- Type 2p microcline porphyritic which is described as granite with microcline phenocrysts. This type of formation is located to the northern part of the site.
- Type 2e equigranular which is described as Pale grey fine to coarse-grained granite. This formation underlains the majority of the subject site.

An extract from the GSI map showing the area of the proposed development is shown in Figure 7.3 below.

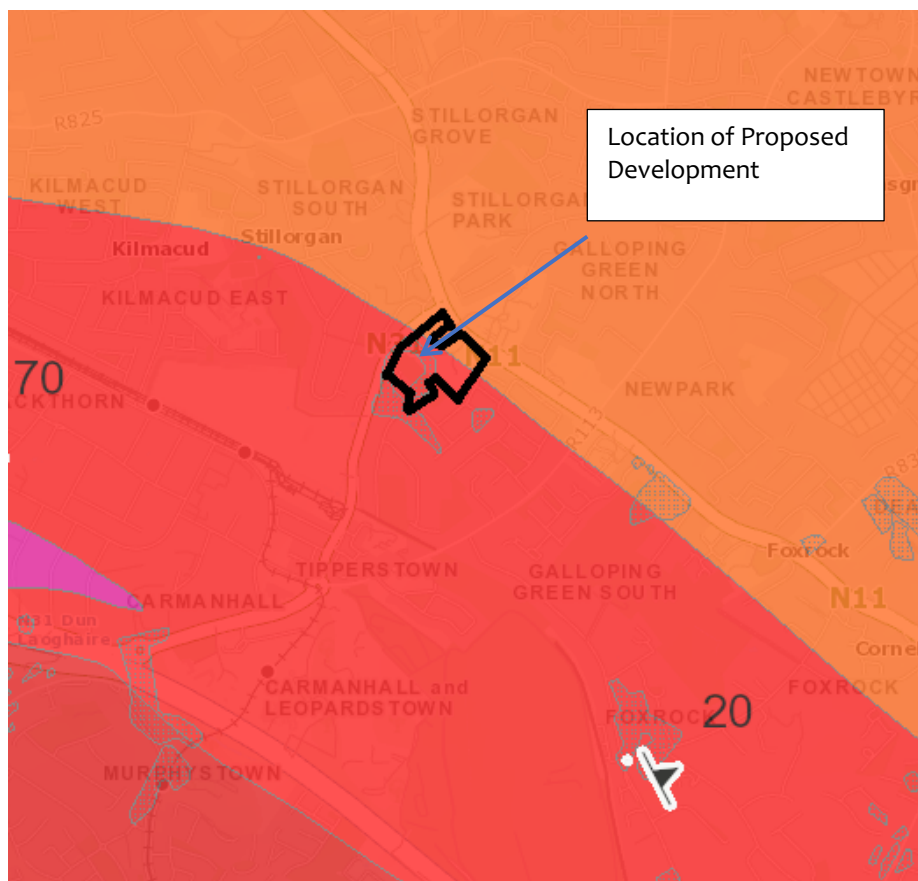


Figure 7.2 Extract from GSI Bedrock Map

Soils

According to the Teagasc Soils website datasets (www.gis.teagasc.ie) indicates the site is underlain by made ground soil, confirming the site investigation results. The map also shows a shallow well drained mineral to the northwest of the site.

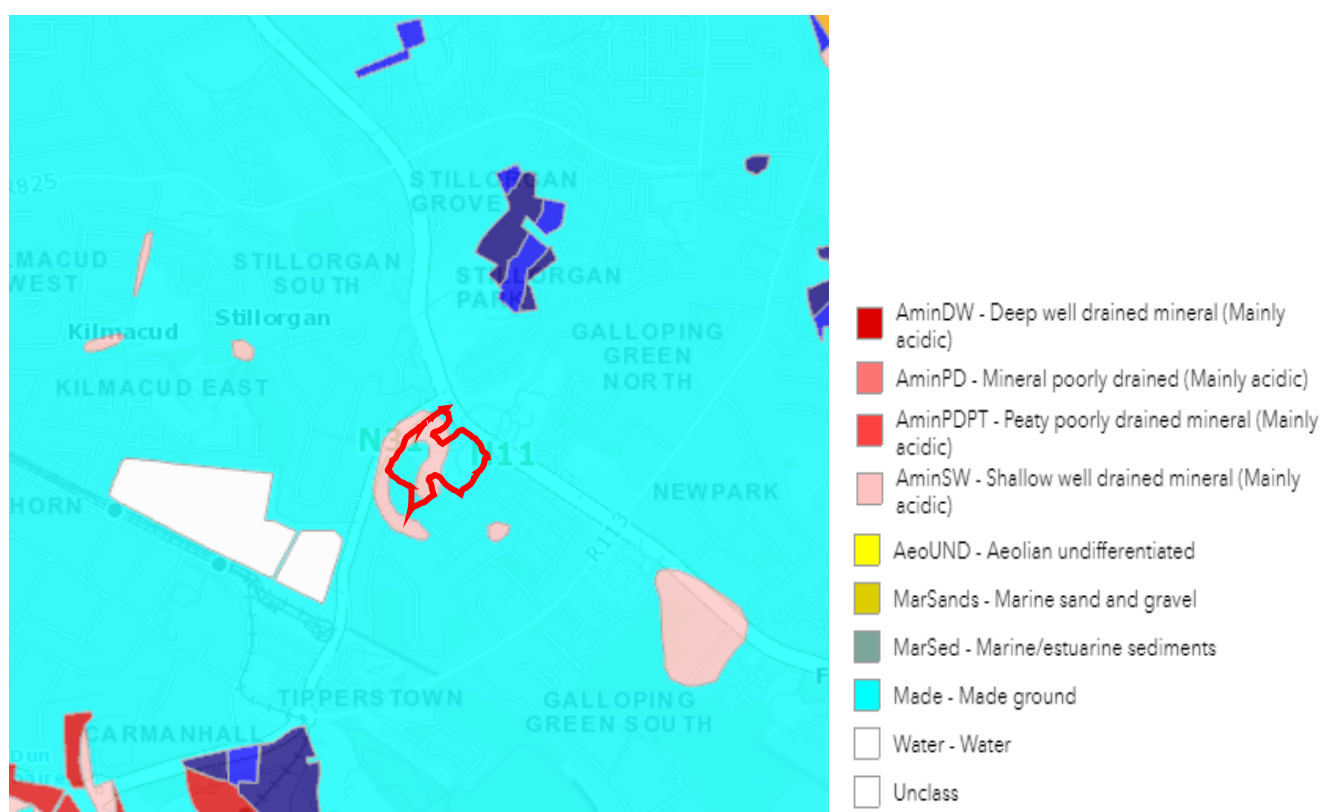


Figure 7.4 - Teagasc Soil Mapping

7.4 Characteristics of the Proposed Development

In summary, the project provides for the demolition (total c.1,398 sq m GFA) of:

- The Grange Select Marketing Suite' (1 storey)
- 'Oaktree Business Centre' (2 storeys)
- 'The Lodge' (2 storeys)

and the construction of a new 'Build to Rent' residential scheme of 287 residential apartment units; residential tenant amenity space of 961.5 sq m; a crèche facility of 658 sq m; and a substation of 96.5 sq m in the form of 6 new blocks (Blocks H, J, M, N, P and Q) ranging in height from 1 - 11 storeys. The residential element of the scheme provides for the following development mix:

- 19 x Studio Units (6.6%)
- 125 x 1 Bedroom Units (43.6%)
- 143 x 2 Bedroom Units (49.8%)

A total of 100 no. car parking spaces, 596 no. cycle spaces and 5 no. motorcycle spaces are also proposed together with all associated site development works.

The developer will construct all associated infrastructure to service the development including a network of foul water and surface water drains, watermain and a realigned access road and footpaths.

The proposed development of the site will incorporate the following works which will be likely to have an impact on the soils and geology:

- Cutting and filling of subsoil and rock to form finished floor levels and development roads
- Excavations for utilities and services
- Importation of suitable material

- Reinstatement of excavations and topsoil and removal off-site of unsuitable and surplus material.

It is intended that any surplus of materials generated on the site will be minimized.

7.5 Potential Impact of the Proposed Development during Construction Phase

Prior to commencement of any construction works, the topsoil on the site will be stripped and removed to stockpiles in designated areas within the site boundary for re-spreading on completion of the works where possible.

The removal of topsoil and the earthworks will expose subsoil to weathering and may result in some minor erosion of the soils during the short construction period, in particular following extreme dry and sunny or prolonged wet weather conditions. The lack of topsoil is likely to give rise to dust from the subsurface during dry periods.

Construction traffic movements involved in the construction of the proposed development and access roads may result in local compaction of the subsoil along haulage routes, but this will be a very limited area.

During the construction phase there is a risk for construction traffic to damage the structure of some of the adjoining road network and to increase the amount of mud and dust on the roads providing access to the site. A dilapidation survey should be undertaken to mitigate the risk of damage exposure to the client. There will also be a temporary increase in traffic volumes due to deliveries of fill materials and removal of surplus unsuitable cut materials.

During adverse weather conditions surface water runoff across the exposed sub-soil could result in increased levels of silt being deposited in the public sewer.

Some minor local contamination of subsoils may occur should chemicals or fuels used during the construction phase spill.

Rock excavation will be required for the basement construction which could give rise to increased noise levels.

7.6 Potential Impact of the Proposed Development during Operational Phase

On completion of the construction phase and following replacement of topsoil and a planting programme, no further impacts on the soil environment are envisaged except for the possibility of contamination of soil from foul water effluent or oil/chemical spills.

7.7 Potential Cumulative Impacts

It is not anticipated that potential cumulative impacts will be generated on land, soils and geology during the construction or operation phases or in the event of future developments adjacent to the site should they implement the appropriate mitigation measures.

Existing Grange Development

There are no anticipated cumulative impacts arising from the existing Grange development in relation to lands, soils and geology.

Future Phase 2 Development

Evidently, the applicant does not control the entirety of remaining lands to provide consolidated development to the N11 frontage. This current application therefore relates to a Phase 1 development on lands that can deliver critically required residential units. OMP Architects have developed a phased Masterplan approach to provide an indicative future context for consideration by An Bord Pleanala,

which is enclosed with the application. There has been a carefully considered design approach to development to ensure that the subject application can be delivered without compromising existing amenity or the future potential for development addressing the N11.

The Masterplan successfully integrates this new phase of development with the existing built fabric of The Grange. The approach has been to set the blocks around a central garden, which complements the existing scheme and delivers significant enhancements to the public realm.

Overall, it is estimated that there is potential for a further c. 250 units as part of a Phase 2 development. There are no additional impacts anticipated on Land and Soil as a result of any future development.

7.8 Do Nothing Scenario

The Ground conditions will remain as they currently are.

7.9 Risks to Human Health

A potential risk to human health due to the associated works during construction is the direct contact, ingestion or inhalation of receptors (i.e. construction workers) with any soils which may potentially contain low level hydrocarbon concentrations from Site activities (potential minor leaks, oils and paint).

No human health risks associated with long term exposure to contaminants (via. direct contact, ingestion or inhalation) resulting from the proposed development are anticipated.

7.10 Mitigation Measures

Construction Stage

The provision of wheel wash facilities at the construction entrance to the development will minimise the amount of soils deposited on the surrounding road network. The adjoining road network will be cleaned on a regular basis, if required, to prevent the build-up of soils from the development site on the existing blacktop roads.

Measures will be implemented throughout the construction stage to prevent contamination of the soil and adjacent watercourses from oil and petrol leakages and significant siltation. Suitable bunded areas will be installed for oil and petrol storage tanks. Designated fuel filling points will be put in place with appropriate oil and petrol interceptors to provide protection from accidental spills. Spill kits will be provided by the Contractor to cater for any other spills.

Dampening down measures with water sprays will be implemented during periods of dry weather to reduce dust levels arising from the development works.

Noise attenuation will be used on rock breakers to reduce noise levels.

After implementation of the above measures the proposed development will not give rise to any significant long-term adverse impact. Negative impacts during the construction phase will be short term only in duration.

Operational Stage

Within the development, landscape areas will be topsoiled and planted in accordance with the proposed landscaping plan. Following completion of these reinstatement works, no significant adverse impacts on the soils and geology of the subject lands are envisaged.

A comprehensive drainage network will be constructed to ensure that the lands drain effectively following their reshaping / re-profiling. The drainage system shall incorporate sustainable urban drainage methods to clean flows prior to discharge.

7.11 Predicted Impacts of the Proposed Development

Construction Stage

Due to the implementation of the mitigation measures outlined above, the proposed development will not give rise to any significant long-term adverse impact. Negative impacts during the construction phase will not be significant once the appropriate mitigation measures are adopted and will be only short term in duration.

Operational Stage

No significant long-term impacts on soil, geology or hydrogeology, resulting from the proposed development are predicted.

7.12 Monitoring

Construction Stage

Monitoring as outlined below, during the construction phase will be undertaken; -

- Adequate protection of the topsoil stockpiled for reuse.
- Monitoring of surface water discharged to existing sewers.
- Monitoring cleanliness of the adjoining road network.
- Monitoring measures for prevention of oil and petrol spillages.
- Dampening down measures close to the boundaries of the site in dry weather.

Operational Stage

No operational stage / post-development monitoring will be required.

7.13 Reinstatement

Reinstatement measures in relation to soils consist primarily of the re-soiling of open areas / landscaping and the replanting of these areas. No post development reinstatement works will be required.

7.14 Interactions

Rock breaking will generate noise and excavations on site will give rise to dust. These items are addressed in the Air and Noise Chapter of the EIAR.

7.15 Difficulties Encountered

There were no difficulties encountered.

7.16 References

Geological Survey of Ireland 1:100,000 scale bedrock maps.

Google maps, 2019.

Ground Investigations Ireland Ltd, (Report Job Number: 7967-08-18).

Ordnance Survey of Ireland historical map. www.osi.ie

Subsoils datasets Teagasc (www.gis.teagasc.ie)

Site walkover visits.