10.0 LAND, SOILS AND GEOLOGY

10.1 Introduction

The Lands, Soils and Geology Chapter of this EIAR has been prepared by Emma Daly (BEng MSc CEng MIEI) of DBFL Consulting Engineers. Emma Daly is a Chartered Professional Engineer with over 10 years' experience in the design and construction of civil engineering projects. Projects have included works associated with the commercial, industrial, energy, residential and public infrastructure sectors.

Ross Griffin (BE PGradDip CEng MIEI) of DBFL Consulting Engineers also contributed to this chapter. Ross Griffin is a Chartered Professional Engineer with over 20 years' experience in the design and construction of structural engineering projects. Projects have included structures associated with the residential, commercial, retail, industrial, telecommunications and public sectors.

This chapter of the EIAR comprises of an assessment of the likely impact of the proposed development on the soils and the geological environment as well as identifying proposed mitigation measures to minimise any impacts. Refer to Chapter 3 (Description of Development) for a detailed site and development description. This chapter should be read in conjunction with Chapter 8 (Water & Hydrology), Chapter 9 (Landscape and Visual Impact Assessment), Chapter 12 (Material Assets – Traffic & Transport) and Chapter 16 (Material Assets – Built Services).

The development will principally consist of: the demolition of c. 4,847.5 sq. m of existing structures on site including Milltown Park House (880 sq. m), Milltown Park House Rear Extension (2,031 sq. m), the Finlay Wing (622 sq. m), the Archive (1,240 sq. m) and the Link Building between Tabor House and Milltown Park House Rear Extension to the front of the Chapel (74.5 sq. m); the refurbishment and reuse of Tabor House (1,575 sq. m) and the Chapel (768 sq. m) and the provision of a single storey glass entrance lobby to the front and side of the Chapel (52 sq. m); and the provision of 562 No. residential units comprising 6 No. three-bed courtyard houses and 556 No. apartment units (70 No. studios, 176 No. one-bed units, 267 No. two-bed units and 43 No. three-bed units).

The development also includes the provision of: cultural/community space within Tabor House (4 No. storeys including lower ground floor level) and the Chapel (2 No. storeys including lower ground floor level and mezzanine level) (1,698 sq. m) with associated outdoor space (248 sq. m); a café/restaurant (179 sq. m) and a creche (375 sq. m) within Block F with associated outdoor creche play area; ancillary residents' amenities and facilities (324 sq. m) within Blocks B & C; and a single storey bin store and substation adjacent to Block F (101 sq. m).

The proposed development will also include the following associated engineering infrastructure:

- Provision of surface water drainage, foul drainage and water supply infrastructure and connections.

- Construction of a surface water outfall which exits the site along its south-eastern boundary, continues along Milltown Road, through the junction of Milltown Road / Sandford Road prior to discharging to the existing public surface water drainage

network in Eglinton Road. The surface water outfall extends approximately 300m from the developable site boundary to the outfall location.

- Provision of a new vehicle access off Milltown Road (principal vehicle access to the proposed development facilitating access to the basement carpark, the forecourt area adjacent to Tabor House and the courtyard houses along the western boundary). This new site access shall be a priority junction and serves pedestrians and cyclists.

- The existing entrance on Sandford Road will be retained and upgraded. It facilitates pedestrian and cycle access as well as limited vehicle access (deliveries, taxis and emergency vehicles) to the area adjacent to Block A1. The on-site cycle facilities tie-in to the existing active travel infrastructure along Sandford Road and Belmont Avenue (no access from Sandford Road to Belmont Avenue except for cyclists), which forms part of the Sandyford Clonskeagh to Charlemont Pedestrian and Cyclist Improvement Scheme. As part of the same active travel scheme, it is proposed to upgrade the pedestrian facilities adjacent to the Sandford Road entrance from a pedestrian-only crossing to a Toucan crossing.

- Provision of additional access point for pedestrians adjacent to the junction of Sandford Road / Milltown Road and pedestrian/cyclist connections through the site.

10.2 Methodology

An assessment of the likely impact of the proposed development on soils and the geological environment included the following activities and has been informed by the EPA *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*, 2022.

- Ground Investigation Study – Ground Investigation Report prepared by GII, Project No. 9338-12-19, Issue Date 29 October 2020.

- Environmental Assessment – Environmental Assessment Report prepared by GII, Project No. 9338-12-19, Issue Date 22 June 2020.

- Review of information available on the Geological Survey of Ireland (GSI) online mapping service.

Ground Investigations for the proposed development were carried out by Ground Investigations Ireland (GII) between January and June 2020 and included the following scope of work:

- 11 No. Trial Pits.
- 3 No. Infiltration Tests.
- 14 No. Window Samples.
- 13 No. Dynamic Probes.
- 16 No. Cable Percussion Boreholes (5 No. Rotary Cores).
- 9 No. Plate Bearing Tests.
- 1 No. TRL probes to determine CBR Value.
- 7 No. Groundwater monitoring wells.

Refer to Appendix 10.1 Ground Investigation Reports (GII, Project No. 9338-12-19, Issue Date 29 October 2020).

Refer to Appendix 10.2 Environmental Assessment Report (GII, Project No. 9338-12-19, Issue Date 22 June 2020).

10.3 Receiving Environment

10.3.1 Soils

Ground conditions at the site, as observed during Ground Investigations, are summarised as follows:

- Topsoil was encountered in the majority of test locations, typically at depths between 0.2 and 0.4m BGL (with a maximum depth of 0.7m BGL encountered in TP05).

- Made ground deposits encountered beneath topsoil/surfacing at some locations at depths between 0.5 and 1.0m BGL. These deposits were described generally as brown slightly sandy, slightly gravelly CLAY with occasional cobbles or grey sandy angular Gravel. In some locations the made ground contained occasional fragments of brick.

- Cohesive deposits were encountered beneath topsoil and made ground noted above and consisted of brown slightly sandy slightly gravelly CLAY with occasional cobbles overlying a stiff or very stiff dark grey/black slightly sandy slightly gravelly CLAY with occasional cobbles. The strength of the cohesive deposits typically increased with depth (noted as very stiff at 2.2m BGL in the majority of exploratory holes with some extending to 2.6m BGL before very stiff deposits were encountered).

- Granular deposits were encountered in BH16 within the cohesive deposits and were typically grey brown slightly clayey sandy sub angular sub rounded fine to coarse GRAVEL with occasional cobbles.

- The rotary core boreholes recovered weak to strong grey/dark grey fines to medium grained LIMESTONE with calcite veining. Residual weather mudstone also found in some locations. Depths to rock varies from 9.0m to 18.45m BGL.

At the time of the initial site investigations, groundwater was observed at 4 of 16 No. borehole locations at depths typically ranging from 2.5m to 3.0m BGL. Standpipes were installed at 7 No. borehole locations to determine the equilibrium groundwater level over time. Ground water measurements taken in June 2020 and October 2020 indicated ground water depths of 1.0m to 7.5m BGL.

Infiltration tests were carried out at 3 No. locations. Test results indicate that soils are impermeable with no infiltration recorded (typical of the cohesive material observed during site investigations).

Ground Investigations Ireland's Environmental Assessment Report (refer to Appendix 10.2) notes that material sampled across the site is free of contamination and can be classified as non-hazardous.

Review of GSI's online mapping service (Quaternary Sediments) identify surficial geology in the vicinity of the site as "*Till derived from limestones*" which is consistent with the findings of Ground Investigations Ireland's Site Investigation Report.

10.3.2 Geology

Review of GSI's online mapping service generally describes bedrock geology in the vicinity of the site as "*Dark limestone & shale (Lucan Formation)*". Refer to Figure 10.1 below.

GSI have classified the site's groundwater vulnerability as "Low" and have classified underlying aquifers as "Locally Important". Refer to Chapter 11 of this EIAR (Hydrology) for further comment regarding Hydrogeology.

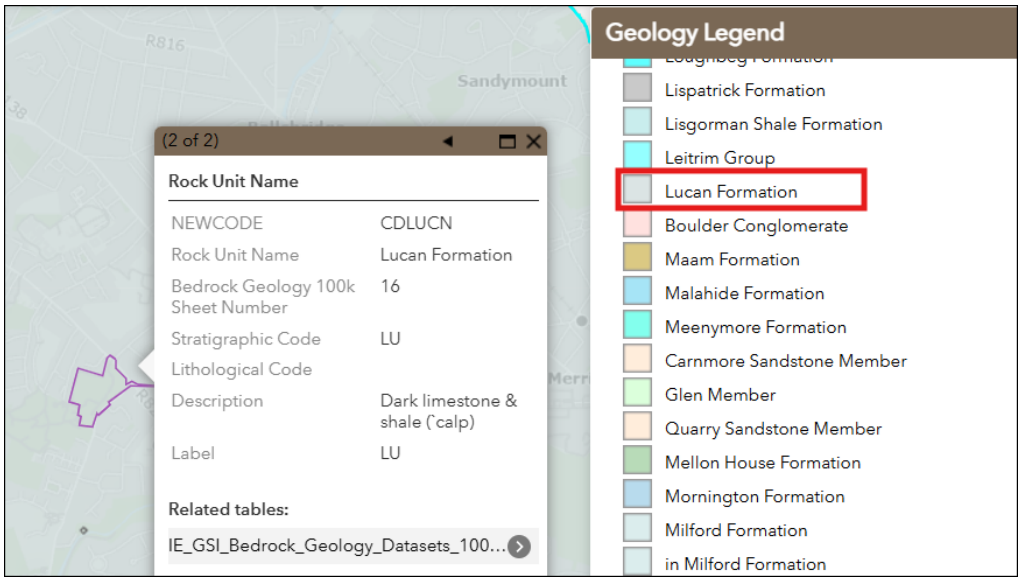

Figure 10.1: Extract from GSI Online Mapping Service – Bedrock Geology (red line boundary indicative)

(Source: Geological Survey Ireland online mapping service, 2025)

10.4 Characteristics of Proposed Development

Site development works will include stripping of the 0.2m to 0.4m thick topsoil layer. It is expected that a portion (approximately 40%) of the stripped topsoil will be reused on site (incorporated into landscaping of open spaces) with remaining topsoil reused on another site as a by-product in accordance with Regulation 27 of the European Communities (Waste Directive) Regulations (2011) or disposed of at a licenced waste receiving facility (subject to the approval of the facility operator in accordance with their facility permit or licence). Refer to Section 10.5.1.1 below.

Excavation of subsoil layers will be required in order to allow road construction, foundation excavation, basement excavation for underground carpark, drainage and utility installation and provision of underground attenuation of surface water.

In general, the designed road levels and finished floor levels follow the natural topography of the site, therefore, minimising the need for cut / fill operations to enable development.

Underlying subsoil layers generally comprise of slightly sandy slightly gravelly CLAY with occasional cobbles or sandy angular gravel. Due to the proposed site layout (basement construction with ground floor levels and external pavement levels designed to follow the natural topography of the site), there is limited potential for reuse of excavated material as non-structural fill. As such, nearby sites requiring clean fill material will be contacted to investigate reuse opportunities. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Regulation 27 of the EC (Waste Directive) Regulations (2011). Should reuse opportunities be unavailable, excavated materials will be removed from site to a licenced waste receiving facility (subject to the approval of the facility operator in accordance with their facility permit or licence). Also refer to Section 10.5.1.2 below.

Importation of fill will be required beneath buildings and roadways (structural fill). Further information regarding importation of fill is included in Section 10.5.1.3 below. This material will be sourced from quarries that have all required licences and planning permissions.

10.5 Identification of Potential Impacts

10.5.1 Construction Phase

10.5.1.1 Stripping of Topsoil

Removal of the existing topsoil layer will be required within proposed building footprints and within areas required to enable site access and permeability (e.g. roads and footpaths). As noted previously, approximately 40% of stripped topsoil will be reused on site (incorporated into landscaping) with remaining topsoil reused on another site as a by-product in accordance with Regulation 27 of the EC (Waste Directive) Regulations (2011) or disposed of at a licenced waste receiving facility (subject to the approval of the facility operator in accordance with their facility permit or licence).

Ground Investigations Ireland Environmental Report (Appendix 10.2) notes that "*the site is free of contamination*" and that waste classification testing indicate that "*material sampled across the site can be classified as non-hazardous*". This report also notes that the material sampled is suitable from an environmental impact perspective for removal from site as a byproduct in line with Regulation 27 of the European Communities (Waste Directive) Regulations 2011.

Stripping of topsoil will result in exposure of the underlying subsoil layers to the effects of weather and construction traffic and may result in subsoil erosion.

This impact without mitigation is considered to have a negative / significant / short-term effect.

	Volume (m^3)
Topsoil strip (100mm to 300mm)	12,550
Topsoil reuse (landscape of gardens, open space etc.)	5,675
Removal of topsoil from site	6,875

Table 10.1 Preliminary Estimated topsoil volumes (+/- 10%)

10.5.1.2 Excavation of Subsoil Layers

Excavation of existing subsoil layers will be required in order to allow road construction, foundation excavation, basement excavation for underground carpark, drainage and utility installation and provision of underground attenuation of surface water. Underlying subsoil layers generally comprise of slightly sandy slightly gravelly CLAY with occasional cobbles or sandy angular gravel.

Due to the proposed site layout (basement construction with ground floor levels and external pavement levels designed to follow the natural topography of the site), there is limited potential for reuse of excavated material as non-structural fill.

As such, nearby sites requiring clean fill material will be contacted to investigate reuse opportunities. If any of the material is to be reused on another site as by-product (and not as a waste), this will be done in accordance with Regulation 27 of the EC (Waste Directive) Regulations (2011). Should reuse opportunities be unavailable, excavated material will be removed from site to a licenced waste receiving facility (subject to the approval of the facility operator in accordance with their facility permit or licence).

Ground Investigations Ireland Environmental Report (Appendix 10.2) notes that "*the site is free of contamination*" and that waste classification testing indicate that "*material sampled across the site can be classified as non-hazardous*". This report also notes that the material sampled is suitable from an environmental impact perspective for removal from site as a byproduct in line with Regulation 27 of the European Communities (Waste Directive) Regulations 2011.

This impact without mitigation is considered to have a negative / significant / short-term effect.

For the purpose of assessing excavation volumes, and aligning with foundation options described in the Basement Impact Assessment, the following options have been assessed:

- Option 1 (Standard Pad & Strip Foundations to All Blocks including Basement),
- Option 2 (Pads & Strips to All Blocks except Bored Piles to Block D & F), and
- Option 3 (Pads & Strips to All Blocks except Ground Improvement to Block E).

Refer to Tables 10.2, 10.3 and 10.4.

Table 10.2 Excavation of Subsoil / Removal of Excavated Material (+/- 10%) Foundation Option 1 (Standard Pad & Strip Foundations to All Blocks including Basement)

	Volume (m^3)
Cut (excavation of subsoil layers as described in 10.5.1.2 above)	54,000
Removal of excavated material from site	54,000

Table 10.3 Excavation of Subsoil / Removal of Excavated Material (+/- 10%) Foundation Option 2 (Pads & Strips to All Blocks except Bored Piles to Block D & F)

	Volume (m^3)
Cut (excavation of subsoil layers as described in 5.5.1.2 above)	52,000
Removal of excavated material from site	52,000

Table 10.4 ***Excavation of Subsoil / Removal of Excavated Material (+/- 10%) Foundation Option 3 (Pads & Strips to All Blocks incl. Basement except Ground Improvement to Block E)***

	Volume (m^3)
Cut (excavation of subsoil layers as described in 5.5.1.2 above)	54,000
Removal of excavated material from site	53,000

Table 10.5 Quantum of Soil Removal (+/- 10%)

	Removal of Topsoil from Site (m^3) See Table 10.1	Removal of Excavated Material from Site (m^3) See Table 10.2 & 10.3	Total Quantum of Soil Removal (m^3)
Foundation Option 1	7,000	54,000	61,000
Foundation Option 2	7,000	52,000	59,000
Foundation Option 3	7,000	53,000	60,000

Foundation Design & Construction

The selection of the current foundation proposal of standard strip and pad footings is based on results of the site investigations, the structural modelling, loading calculations and site constraints. If during excavation of the foundations and basement unexpected ground conditions arise that vary from the site investigations results, it may be necessary to amend the indicative foundation solutions proposed at this juncture.

The standard strip and pad foundations and basement excavation/construction shall be executed as follows:

- Excavate to foundation/basement formation level forming slope batters as necessary;
- Cast the reinforced concrete pad and strip footings, rising walls and basement ground bearing slabs;
- Cast the basement to ground level reinforced concrete retaining walls, columns and lift, stair, shear walls;
- Cast the reinforced concrete ground slabs; and
- Backfill to ground level the surrounding slope batters using granular material as appropriate.

Whilst not required as a permanent foundation solution, the proximity of protected tree roots and existing structures to be retained (the Chapel Building and Tabor House) may necessitate some element of temporary sheet piling on site in discrete areas where the space for slope battering is not available. Steel sheet piles are driven into the ground using a piling hammer to facilitate vertical excavation on one side. The steel sheet piles are extracted and reused once the permanent works are complete and backfilled.

Other foundation solutions considered include augered bored piles which transfer large loads to the very stiff clay without need for bulk excavation. Piles are not required for the basement area which extends into the very stiff clay layer. Piling may prove a more appropriate foundation solution at construction stage than excavating and backfilling beneath the standalone Blocks D and F which must both be founded on the very stiff clay stratum. Considerations surrounding the installation of piles include noise, vibrations, disposal of pile uprisings and the use of very heavy plant on site which are mitigated by using quieter lower vibration augered piling rigs than driven pile alternatives, also limiting pile depths by design and using piling mats to support the large rigs.

Ground improvement techniques were also considered but are only appropriate for low rise lightly loaded structures such as the Block E houses. Ground improvement techniques considered include soil stabilisation. Currently the site investigation indicates a suitable bearing stratum is achievable by extending standard strip footings into the firm clays for the low-rise houses.

10.5.1.3 Imported Fill

Materials imported to site for use as fill will be natural stones sourced from locally available quarries or materials that have been approved as by-products by the EPA in accordance with the EPA's criteria for determining a material is a by-product, per the provisions of Regulation 27(1) of the European Communities (Waste Directive) Regulations, 2011.

Imported fill materials will be granular in nature and used in the construction of ground slab formations, basement backfill, road pavement foundations, drainage and utility bedding and surrounds.

Materials will be brought to site and placed in their final position in the shortest possible time. Any imported material will be kept separate from the indigenous arisings from the site. All excavation to accommodate imported material will be precisely coordinated to ensure no surplus material is brought to site beyond the engineering requirement.

This impact without mitigation is considered to have a negative / significant / short-term effect.

	Volume (m^3)
Imported Fill (granular material beneath road pavement, under floor slabs, for drainage and utility bedding / surrounds and construction phase haul routes)	16,500

Table 10.6 Imported Fill (+/-) 10%

10.5.1.4 Construction Traffic

Earthworks plant (e.g. dump trucks) and vehicles delivering construction materials to site (e.g. road aggregates, concrete deliveries etc.) have potential to cause rutting and deterioration of the topsoil layer and any exposed subsoil layers, resulting in erosion and generation of sediment laden runoff.

This issue can be particularly noticeable at site access points (resulting in deposition of mud and soil on the surrounding road network). Dust generation can also occur during extended dry weather periods as a result of construction traffic.

This impact without mitigation is considered to have a negative / significant / short-term effect.

10.5.1.5 Accidental Spills and Leaks

During the construction phase there is a risk of accidental pollution from the sources noted below. Accidental spills and leaks may result in contamination of the soils underlying the site.

- Storage of oils and fuels on site.
- Oils and fuels leaking from construction machinery.
- Spillage during refuelling and maintenance of construction machinery.
- Use of cement and concrete during construction works.

This impact without mitigation is considered to have a negative / significant / short-term effect.

10.5.1.6 Geological Environment

Due to the proposed site layout and levels (basement construction with ground floor levels and external pavement levels designed to follow the natural topography of the site), any excavations are expected to be relatively shallow (up to 5.0m from existing ground level) and are not expected to impact on the underlying geology (i.e. rotary core boreholes carried out as part of site investigations indicate depth to rock varying from 9.0m to 18.45m BGL).

This impact without mitigation is considered to have a neutral / non- significant / short-term effect.

10.5.1.7 Risks to Human Health

Risks to Human Health associated with works during the construction phase in relation to land and soils include:

- Work which puts persons at risk of burial under earthfall e.g. during basement excavation.
- Works that could undermine existing foundations.
- Contact with existing underground services e.g. gas leaks or electrocution.
- Access and egress from the site and interface with site staff and / or the public e.g. Risk of slips, trips and falls.
- Dust generation.
- Use of machinery and plant e.g. risk of injury to personnel and damage to plant and machinery due to improper use.

This impact without mitigation is considered to have a negative / significant / short-term effect.

10.5.2 Operational Phase

On completion of the construction phase, there will be no further impact on soils and the geological environment.

10.5.3 'Do Nothing' Scenario

There will be no impact on soils and the geological environment if the development does not proceed.

10.5.4 Cumulative Impacts

Given the scale of the proposed development and the capacity of the surrounding environment to accommodate developments of this nature, it is considered that the overall cumulative development in this area will have a moderate, long-term impact on the land, soils and geology of the area via the proposed structures, roads, infrastructure etc. on the subject site. However, with the detailed mitigation measures in place, as required under this EIAR and in the following section, the overall impact on land and soils will be permanent, not significant and have a neutral effect.

10.6 Ameliorative, Remedial or Reductive Measures

This section lists the proposed mitigation measures that will avoid, reduce, remedy or offset any effects.

10.6.1 Construction Phase

10.6.1.1 Stripping of Topsoil

Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development. As noted previously, approximately 40% of stripped topsoil will be reused on site (incorporated into landscaping) with remaining topsoil reused on another site as a by-product in accordance with Regulation 27 of the EC (Waste Directive) Regulations (2011) or disposed of at a licenced waste receiving facility (subject to the approval of the facility operator in accordance with their facility permit or licence).

At any given time, the extent of topsoil strip (and consequent exposure of subsoil) will be limited to the immediate vicinity of active work areas.

Topsoil stockpiles will be protected for the duration of the works and not located in areas where sediment laden runoff may enter existing surface water drains. Topsoil stockpiles will also be located so as not to necessitate double handling.

This impact with mitigation is considered to be neutral / non-significant / short-term.

10.6.1.2 Excavation of Subsoil Layers

The need to excavate existing subsoil layers has been minimised as the proposed ground floor levels and external pavement levels have been designed to follow the natural topography of the site. The basement excavation has also been minimized in as far as the structural and functional constraints will allow.

Disturbed subsoil layers will be stabilized as soon as practicable (e.g. backfill of service trenches, construction of road capping layers, concrete blinding of the basement excavation, construction of building foundations and completion of landscaping). The duration that subsoil layers are exposed is to be minimised in order to mitigate against weather effects.

Similar to comments regarding stripped topsoil, stockpiles of excavated subsoil material will be protected for the duration of the works. Stockpiles of subsoil material will be located separately from topsoil stockpiles.

Measures will be implemented to capture and treat sediment laden surface water runoff (e.g. surface water inlet protection and earth bunding adjacent to open drainage ditches).

This impact with mitigation is considered to be neutral / non-significant / short-term.

10.6.1.3 Weather Conditions

Typical seasonal weather variations will also be taken account of when planning stripping of topsoil and excavations with an objective of minimising soil erosion and silt generation. The approach of extreme weather events will be monitored to inform near-term operational activities.

10.6.1.4 Water Pumped from Excavations

Rainwater pumped from excavations is to be directed to on-site settlement ponds. Groundwater pumped from excavations is to be directed to on-site settlement ponds. On-site settlement ponds are to include geotextile liners and riprapped inlets and outlets to prevent scour and erosion. Monitoring of same will be undertaken. Surface water discharge points during the construction phase will be agreed with Dublin City Council prior to commencing works on site.

10.6.1.5 Imported Fill

As noted in section 10.5.1.3 above, importation of fill to site will be required. Materials imported to site for use as fill will be natural stones sourced from locally available quarries or materials that have been approved as by-products by the EPA in accordance with the EPA's criteria for determining a material is a by-product, per the provisions of Regulation 27(1) of the European Communities (Waste Directive) Regulations, 2011.

No large or long-term stockpiles of fill material will be held on the site. At any time, the extent of fill material held on site will be limited to that needed in the immediate vicinity of the active work area.

Smaller stockpiles of fill, where required, will be suitably protected to ensure no sediment laden runoff enters existing surface water drains. Such stockpiles are to be located in order to avoid double handling.

This impact with mitigation is considered to be neutral / non-significant / short-term.

10.6.1.6 Construction Traffic

Earthworks and plant vehicles delivering construction materials to site will be confined to predetermined haul routes around the site and designated delivery areas. This mitigates the risk of rutting and deterioration of the topsoil layer and any exposed subsoil layers.

Vehicle wheel wash facilities will be installed in the vicinity of any site entrances and road sweeping implemented as necessary in order to maintain the road network in the immediate vicinity of the site.

Dust suppression measures (e.g. dampening down) will be implemented as necessary during dry weather periods.

This impact with mitigation is considered to be neutral / non-significant / short-term.

10.6.1.7 Accidental Spills and Leaks

In order to mitigate against spillages contaminating underlying soils, all oils, fuels, paints and other chemicals will be stored in a secure bunded hardstand area.

Refuelling and servicing of construction machinery will take place in a designated hardstand area (when not possible to carry out such activities off site).

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.

Concrete batching will take place off site when possible to minimise the risk of ground contamination on site during the concrete batching process.

This impact with mitigation is considered to be neutral / non-significant / short-term.

10.6.1.8 Geological Environment

A more detailed Ground Investigation will be undertaken prior to construction to verify the Preliminary Ground Investigations. No mitigation measures are proposed in relation to the geological environment.

10.6.1.9 Risks to Human Health

- Contractor / Project Supervisor Construction Stage (PSCS) to implement safe systems of construction including but not limited to battering the sides of trench excavations and installation of excavation shoring systems.

- Full precautions to be taken when working in vicinity of boundary structures for protection of same. Method and sequence of construction to be agreed with design team prior to commencement of work. Contractor's Temporary Works Designer to prepare Method Statement and Temporary Works Certificate to ensure stability of excavations and adjacent structures.

- Contractor to obtain utility company network plans and arrange observation as required.

- Contractor to locate and record all services on site prior to commencement of excavations.

- Contractor to prepare and implement a Construction Traffic Management Plan that will be agreed with the Design Team and local authority and which will ensure the safety of the public during construction (note, an outline Traffic Management Plan is included in the *Preliminary Construction Management Plan*).

- Contractor must supervise vehicle movements to and from the site during construction in order to ensure that this traffic management plan is fully implemented. Plan to include deliveries to the site, staff parking, works outside the defined site such as utility connections.

- Public pedestrian routes to be established at site entrance as required.
- All personnel using machinery/plant to have undergone training on the use of said machinery/plant. Ongoing site supervision to be undertaken to ensure all use of machinery/plant is in accordance with the training undertaken.
- Contractor's employees to be provided with all required PPE in accordance with Safety, Health and Welfare at Work Act, 2005.
- Contractor to prepare a Dust Minimisation Plan with reference to the mitigation measures outlined in Chapter 12.0 (Air Quality and Climate).

This impact with mitigation is considered to be neutral / non-significant / short-term.

10.6.2 Operational Phase

On completion of the construction phase no further mitigation measures are proposed as there will be no further impact on soils and the geological environment.

10.6.2 'Do Nothing' Scenario

No mitigation measures are proposed in relation to soils and the geological environment if the development does not proceed.

10.7 Predicted Impact of the Proposed Development

This section will describe effects arising once mitigation measures are fully implemented.

10.7.1 Construction Phase

Implementation of the measures outlined in Section 10.6.1 will ensure that the potential impacts of the proposed development on land, soils and the geological environment will be remedied or minimised. The residual impact is considered to be neutral / non-significant / short-term.

10.7.2 Operational Phase

There are no predicted impacts arising from the operational phase.

10.7.3 'Do Nothing' Scenario

There are no predicted impacts should the proposed development not proceed.

10.8 Monitoring

10.8.1 Construction Phase

Proposed monitoring during the construction phase in relation to the soil and geological environment are as follows:

- Adherence to Construction and Environmental Management Plan (note, a *Preliminary Construction Management Plan* and *Construction and Environment Management Plan* are included with the planning application documents which must be adhered to).

- Construction monitoring of the works (e.g. inspection of existing ground conditions on completion of cut to road formation level in advance of placing capping material, stability of excavations etc.).

- Inspection of fuel / oil storage areas.

- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities.

- Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill, protection of soils for removal from site from contamination).

10.8.2 Operational Phase

No ongoing monitoring is proposed on completion of the construction phase / during the operational phase.

10.9 Reinstatement

Once the foundations and basement "box" are complete they are backfilled to ground level as necessary.

All temporary construction compounds and site entrances are to be removed upon completion of the construction phase. Such areas are to be reinstated in accordance with the landscape architects plan and engineer's drawings.

All construction waste and / or scrapped building materials are to be removed from site on completion of the construction phase.

Oil, fuel etc. storage areas are to be decommissioned on completion of the construction phase. Any remaining liquids are to be removed from site and disposed of at an appropriate licenced facility. Dublin City Council's Environmental Control Section is to be notified of the proposed destination for disposal of any liquid fuels.

10.10 Interactions and Potential Cumulative Impacts

10.10.1 Interactions

Chapter 6: Archaeology and Cultural Heritage

Archaeological monitoring may necessitate open excavations for a period in order to facilitate consultation with DHLGH, processing of licences and/or full excavation/preservation-by-record of archaeological features. This would result in exposure of the underlying subsoil layers to the effects of weather.

The impact of the interaction is considered to be short-term, not significant and neutral.

Chapter 8: Biodiversity

Removal of the existing topsoil layer will be required across the site as well as removal of some trees, hedgerows etc. Further details including any potential issues and mitigation measures are outlined in Chapter 8 Biodiversity. Harmful materials on site like plastics and different types of material dust can get into a water source and cause pollution. Measures must be in place to prevent this from occurring.

The impact of the interaction is considered to be short-term, imperceptible and neutral.

Chapter 11: Water and Hydrology

Stripping of topsoil will result in exposure of the underlying subsoil layers to the effects of weather and construction traffic and may result in subsoil erosion and generation of sediment laden surface water runoff.

Due to relatively high level of groundwater encountered in some boreholes there may be a need to dewater excavations during construction.

The impact of the interaction is considered to be short term, imperceptible and neutral.

Chapter 12: Air Quality and Climate

Dust generation can also occur during extended dry weather periods as a result of construction traffic.

The impact of the interaction is considered to be short-term, imperceptible and neutral.

Chapter 13: Noise and Vibration

Development of the site will result in a level of construction related noise and vibration.

The impact of the interaction is considered to be short-term, imperceptible and neutral.

Chapter 14: Material Assets – Waste Management

Oil, fuel etc. storage areas are to be decommissioned on completion of the construction phase. Any remaining liquids are to be removed from site and disposed of at an appropriate licenced facility.

Topsoil not being reused on site and excavated subsoil materials may be reused on another site as by-product (and not as a waste), this will be done in accordance with Regulation 27 of the EC (Waste Directive) Regulations (2011). Should reuse opportunities be unavailable, such material will be removed from site to a licenced waste receiving facility (subject to the approval of the facility operator in accordance with their facility permit or licence).

The impact of the interaction is considered to be permanent, imperceptible and neutral.

Chapter 15: Transportation

Delivery of materials to site (e.g. aggregates for road construction, concrete for foundations, delivery of construction plant to site) and removal of excavated topsoil / subsoil will lead to potential impact on the surrounding road network.

The impact of the interaction is considered to be short-term, imperceptible and neutral.

Chapter 16: Material Assets – Site Services

Trench excavations to facilitate site service installation will result in exposure of subsoils to potential erosion.

The impact of the interaction is considered to be short-term, imperceptible and neutral.

10.10.2 Potential Cumulative Impacts

Other developments currently under construction and other committed development in the vicinity of the site have been considered and are likely to have similar impacts during the construction phase in relation to land, soils and geology.

Should the construction phase of any developments coincide with development of the site, potential cumulative impacts are not anticipated once similar ameliorative, remedial and reductive measures are implemented.

10.11 Difficulties Encountered

There were no difficulties encountered in compiling and assessing the data for this EIAR Chapter.

10.12 References

- Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022)
- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements. Institute of Geologists of Ireland (2013).
- Environmental Protection Agency (EPA) Map Viewer (https://gis.epa.ie/EPAMaps/)
- Geological Survey Ireland Maps.
- Dublin City Council Development Plan (2022 -2028)
- 190226-X-X-X-XXX-RP-DBFL-CE-0002 Infrastructure Design Report submitted by DBFL.

Table 10.6 Lands, Soils & Geology – Summary of Construction Phase Likely Significant Effects with and without out Mitigation / Monitoring

		Impact Without Mitigation					Mitigation Measures	Monitoring	Impact With Mitigation / Monitoring				
Likely Significant Effect	**Extent**	**Quality**	**Significance**	**Duration**	**Type**	**Probability**			**Quality**	**Significance**	**Duration**	**Type**	**Probability**
Stripping of topsoil	On-Site	Negative	Significant	Short-Term	Direct	Likely	Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development.	Monitor adherence to PCMP	Neutral	Not Significant	Short-Term	Direct	Un-Likely
Excavation of subsoil layers	On-Site	Negative	Significant	Short-Term	Direct	Likely	The need to excavate subsoil layers has been minimised as the proposed levels have been designed to follow the natural topography of the site	Monitoring of contractor's stockpile management (e.g. protection of excavated material to be reused as fill, protection of soils for removal from site from contamination)	Neutral	Not Significant	Short-Term	Direct	Un-Likely
Materials imported to site for use as fill	On-Site	Negative	Significant	Short-Term	Direct	Likely	Fill material will be natural stones sourced from locally available quarries or materials that	Monitor adherence to PCMP	Neutral	Not Significant	Short-Term	Direct	Un-Likely

							have been approved as by-products by the EPA						
Construction Traffic	On-Site	Negative	Significant	Short-Term	Direct	Likely	Earthworks plant and vehicles delivering construction materials to site will be confined to predetermined haul routes around the site and designated delivery areas. Vehicle wheel wash facilities will be installed in the vicinity of any site entrances and road sweeping implemented as necessary in order to maintain the road network in the immediate vicinity of the site.	Monitor contractors' compliance with PCMP. Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities.	Neutral	Not Significant	Short-Term	Direct	Un-Likely
Accidental Spills and Leaks	On-Site	Negative	Significant	Short-Term	Direct	Likely	Response procedure will be put in place to deal with any accidental pollution events. Refueling and servicing of construction machinery will	Monitor contractors' compliance with PCMP	Neutral	Not Significant	Short-Term	Direct	Un-Likely

							take place in a designated hardstand area (when not possible to carry out such activities off site).						
Impact on Geological Environment	On-Site	Neutral	Non-Significant	Short-Term	Direct	Unlikely	No mitigation proposed						
Risks to Human Health	On-Site	Negative	Significant	Short-Term	Direct	Likely	Contractor / Project Supervisor Construction Stage (PSCS) to implement safe systems of construction	Monitor contractors compliance with Health and Safety requirements	Neutral	Not Significant	Short-Term	Direct	Un-Likely