

Chapter 7:

Land and Soils

7.0 LAND AND SOILS

7.1 INTRODUCTION

This chapter of the EIAR assesses and evaluates the impact of the proposed development on the sites soils and lands during the construction and operational phases of the proposed development. It also identifies the characteristics, predicted potential impacts, mitigation measures and residual impacts arising from the proposed development.

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7.2 STUDY METHODOLOGY

7.2.1 Assessment Methodology

The methodology followed for this section is in accordance with the EPA *Guidelines on the Information to be contained in Environmental Impact Assessment Reports (Draft) 2017* and *Advice Notes for Preparing Environmental Impact Statements (Draft) 2015*. Information on the surrounding lands and soils was assembled from the following sources:

- Geological Survey of Ireland (GSI) interactive mapping;
- Site Investigation carried out by Ground Investigations Ireland in May/June 2019 comprising 21 No. Trial Pits, 1 No. Cable Percussion Borehole, 13 No. Rotary Core Boreholes, installation of 1 No. Groundwater Monitoring Well. Refer to “Mill Road Ground Investigation Report” by Ground Investigations Ireland, dated September 2019;
- Site Investigation carried out by Ground Investigations Ireland in December 2017 comprising 6 No. Surface Water Soakaways. Refer to “Mill Marsh Road, Co. Meath Ground Investigation Report” by Ground Investigations Ireland, dated 31st January 2018;
- Environmental Protection Agency (EPA) interactive mapping;
- Teagasc soil and sub-soil data;
- Ordnance Survey Ireland (OSI) mapping;
- Topographical Survey;
- Site Inspection / walkover.

7.3 EXISTING RECEIVING ENVIRONMENT (BASELINE SITUATION)

7.3.1 Site Description, Topography, Land Use

The subject site is situated to the southwest of Drogheda Town, to the east of the Dublin-Belfast railway line. The subject site is within the “Mill Road / Marsh Road Urban Design Framework Plan 2017” extents and is included in lands that have been identified for development in the “Local Area Plan for the Southern Environs of Drogheda 2009-2015”. It is bounded to the south by “Mill Road / Marsh Road Framework Plan Lands” including a site with planning permission for a commercial office development (Meath County Council Planning Reference LB180620). The site is bounded to the west by the Dublin-Belfast railway line, to the north by greenfield agricultural lands (also within the “Mill Road / Marsh Road Framework Plan Lands”) and to the east by Mill Road and a primary school, Gaelscoil “An Bhradain Feasa”.

The lands are currently predominately greenfield agricultural lands. The site slopes from south-west to north-west and north-east. There is an existing ditch system which forms the north eastern boundary of the site and continues in an easterly direction towards Mill Road. There is also a ditch system in lands immediately west of Colpe Road and continuing in an easterly direction where it crosses under the route of the link street and is culverted under Mill Road before continuing eastwards in an open channel arrangement.

7.3.2 Soils

Review of information available on the GSI's and EPA online mapping services (Subsoils and Bedrock Maps), the subsoil appears to be sandstone and shale till with matrix of Irish Sea Basin origin (Figure 7.1) overlying viséan limestone and calcareous shale bedrock. This is confirmed by site investigations of the subject site which summarise the existing ground conditions as follows: topsoil to circa 700mm below ground level, overlying a firm brown sandy gravelly clay with occasional cobbles generally overlying a firm or firm to stiff grey/brown sandy gravelly clay with occasional cobbles and boulders. The secondary and gravel constituents varied across the site and with depth, with granular lenses occasionally present in the glacial mix matrix.

Granular deposits were encountered generally at the base of the cohesive deposits and were typically described as greyish brown clayey sandy subangular to sub-rounded fine to coarse gravel with many subangular to sub-rounded cobbles and occasional boulders or grey/brown clayey very gravelly fine to coarse sand with many subangular to rounded cobbles and occasional boulders. The secondary sand/gravel and clay constituents varied across the site and with depth while occasional or frequent cobble and boulder content also present.

The results of the soakaway testing indicate that the ground is not suitable for the disposal of surface water to the ground, with all six soakaway tests failing, which corresponds to the impermeable clay found throughout the site.

Results of the environmental laboratory testing are included in the "Mill Road Ground Investigation Report" by Ground Investigations Ireland, dated September 2019. The results of the "Waste Acceptance Criteria" Test Suite are presented with the individual parameter limits for "Inert" "Non-Hazardous" and "Hazardous" as outlined in the European Council Directive 1999 131/EC Article 16 Annex II, "Criteria and procedures for the acceptance of waste at landfills". The results are all below the inert limits, all spoil disposed of off-site should be sent to a suitably licenced facility.

7.3.3 Geology

The boreholes confirmed the bedrock as weak to medium strong dark grey fine-grained fossiliferous limestone interbedded with weak black fine-grained laminated mudstone. This is typical of the Mornington Formation, which is noted in the geological mapping of the proposed site. The depth to rock varies from 2m below ground level at the north west area of the site, to circa 10m below ground level at the south eastern side of the site, however in general rock was found at depths of between 2m and 5m below ground level.

GSI bedrock mapping for the area confirms the site investigations results and identifies the bedrock geology underlying the site and immediate vicinity as "Viséan limestone & calcareous shale" (Figure 7.2).

A desktop study did not identify any formal designated protection or conservation areas, karst features, geological heritage areas, geo-hazards, or mines / mineral extract in the immediate area. Irish Cement Quarry and Roadstone Quarry are located approximately 7km west of the site.

The GSI (Geological Survey of Ireland) have classified the groundwater vulnerability in the area of the site as low and have classified underlying aquifers in the area of the subject site as "locally important". Locally important aquifers are defined as bedrock which is generally moderately productive. Refer to Chapter 8.0 Water: Hydrogeology & Hydrology for further information regarding Hydrogeology.

7.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

The proposed development comprises 357 residential units (169 no. houses, 52 no. duplex units, and 136 no. apartments), a childcare facility and associated infrastructure including a link street and a surface water outfall pipe on a site area of circa 13ha. The application is under consideration through the SHD (Strategic Housing Development) planning process, with An Bord Pleanála. This application also seeks to amend a link street

approved under Meath County Council Planning Reference LB180620 (commercial development and link street through the “Mill Road / Marsh Road Framework Plan lands”).

It is anticipated that the main construction activities impacting soils and geology will comprise the following:

- Removal of topsoil and subsoil to allow road construction, foundation excavation, services installation.
- It is estimated that approximately 30,000cumecs of cut and 50,000cumecs of fill (generally comprising normal stone material used in the construction of roads, footpaths and buildings) will be required across the development. The standard stone fill material used will be primarily sourced from the cut material on site.
- Construction of the main access routes into the development.
- Installation of main underground services and utilities to serve the site.
- Construction of the surface water storage systems (underground and overground).
- Construction of the foul pumping station.
- Construction of linear park and public open space areas.

7.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

7.5.1 Construction Impacts

Potential impacts of the proposed development during the construction include the following:

- Approximately 15,000 cumecs (approximately 0.2m depth of topsoil across the site) of topsoil shall be excavated from the existing ground level in order to form a building platform for the new houses and associated roads infrastructure. This will result in the exposure of the subsoil to various elements including weather and construction traffic. Therefore, the impact may be characterised as a likely, short term, slight, adverse impact on the natural strength of the subsoil and subsequently resulting in deeper foundations being required.
- Rutting and deterioration of the topsoil layer and any exposed subsoil layers or bedrock by earthworks plant and construction traffic. As such, the impact may be characterised as likely, short term, moderate, adverse impact on subsoil, the consequence of which will be erosion and generation of sediment laden runoff.
- Earthworks are required in the open space areas to accommodate underground and overground surface water storage systems and detention basins and other SuDS features. This landscaping activity will likely have a moderate, positive, permanent, impact on the soil and ground profile.
- During the construction period, large machinery and associated fuel and fuel storage will be present on site. As a result, accidental spills and leaks (e.g. storage of oils and fuels on site), use of cement and concrete during construction works are inevitable during the construction phase. Therefore, the unlikely impact may be characterised as a likely, short term, moderate, slight impact on subsoil and ground water.
- Approximately 50,000cumecs of fill (generally comprising normal stone used in the construction of roads, footpaths and buildings) will be required across the development, with some of this material originating from cut material on site. Therefore, the likely impact may be characterised as, permanent, slight impact on subsoil and ground water.

7.5.2 Operational Impacts

It is anticipated that the development will create additional impermeable surface areas. The only direct discharges to the ground during the operation of the development are the via the SuDS features and detention basins to accommodate surface water runoff from impermeable areas. This will result in a likely, slight, adverse, permanent impact on soils and geology.

The ground profile of the open spaces will be permanently altered due to the development of the surface water underground storage system and overground detention basins and the associated landscaping. This likely positive impact on soils and land will be permanent and moderate.

No significant long-term impact on the soil resulting from the proposed operational phase of the development is predicted. Once the development is completed, risks to the soil and geology will be from pollutants deriving from the use of the dwellings and/or from contaminated surface water run-off.

7.6 DO NOTHING IMPACT

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

7.7 AVOIDANCE, REMEDIAL AND MITIGATION MEASURES

7.7.1 Construction Phase

L&S CONST1: CONSTRUCTION MITIGATION

- Stripping of topsoil will be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the development.
- 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 on site so as not to necessitate double handling.
- Topsoil will be re-used where possible in proposed development in gardens and open space areas.
- The design of road levels and finished floor levels has been carried out to minimize cut/fill type earthworks operations.
- Disturbed subsoil layers will be stabilized as soon as practicable. Therefore, backfilling of service trenches, construction of road capping layers, construction of building foundations and completion of landscaping, will all be carried out promptly to minimise the duration that subsoil layers are exposed to the effects of weather.
- 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. sediment retention ponds, surface water inlet protection and earth bunding adjacent to open drainage ditches).
- Where feasible, excavated material will be reused as part of the site development works (e.g. for landscaping works and for backfill in trenches under non trafficked areas).
- Earthworks plant and vehicles delivering construction materials to site will be confined to predetermined haul routes around the site.
- 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 periods.
- 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 hardstanding area, remote from surface water inlets (when it is not possible to carry out such activities off-site).
- It is likely that bedrock will be exposed during construction works. Deep drainage works will be avoided where possible to reduce the possibility of impacting on bedrock. Should bedrock be encountered, the extent of exposed bedrock will be limited to the immediate vicinity of active work areas. Where bedrock is encountered it will be crushed, screened and tested for use within the designed works to reduce the volume of material required to leave site. This will also reduce the volume of material to be imported to the site.

7.7.2 Operational phase

L&S OPER1:

The only mitigating measures envisaged during the operational phase are to ensure regular maintenance of SUDS features and landscaped open space.

Ensuring appropriately designed, constructed and maintained site services will protect the soils and geology from future contamination arising from operation of the development.

7.8 PREDICTED IMPACT FOLLOWING MITIGATION

Where the mitigation measures outlined in Sections 7.7.1 & 7.7.2 have been implemented, the residual impact is considered to be imperceptible.

7.9 CUMULATIVE IMPACT

7.9.1 Construction phase & operational phase

Other existing and approved developments in the surrounding area have been reviewed and it is considered that there are no cumulative impacts arising from the construction or operational phases.

7.10 MONITORING

7.10.1 Monitoring measures – construction

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

- Adherence to the “*Construction Management Plan (CMP)*”. The developer will be responsible for ensuring adherence with the “*Construction Management Plan*”. If construction works are not in accordance with the plan, then the developer will ensure that this is remedied.
- Construction monitoring of the works (e.g. inspection of existing ground conditions on completion of cut to road sub-formation level in advance of placing capping material, stability of excavations etc.).
- Inspection of fuel / oil storage areas. If these are found to be sub-standard then the developer will ensure that they are made fit for purpose.
- Monitoring cleanliness of adjacent road network, implementation of dust suppression and provision of vehicle wheel wash facilities. If these measures are found to be inadequate and the adjacent road network is negatively impacted, the developer will ensure that this is remedied and will ensure that dust suppression measures are implemented more regularly and all vehicles exiting the site use vehicle wheel wash facilities provided.
- Monitoring of contractor’s stockpile management (e.g. protection of excavated material to be reused as fill; protection of soils from contamination for removal from site).
- Monitoring sediment control measures (sediment retention ponds, surface water inlet protection etc.). The developer is responsible for ensuring that these measures are fit for purpose. If they are found to be inadequate, then the development will ensure that they are made good and fully utilised.
- Soil removed during the construction phase will be monitored to maximise potential for re-use on site.
- The quantities of topsoil, subsoil and rock removed off site will be recorded.

7.10.2 Monitoring measures – operational phase

Monitoring of the “taken in charge”, public open space areas by the Parks Department of Meath County Council will be on-going. They will ensure that the detention basins and other SuDS features such as swales are

adequately maintained. If they are found to be not adequately maintained, then they will be responsible for increasing the maintenance schedule.

7.11 REINSTATEMENT

Reinstatement of lands and soils through the development will be in accordance with the proposed plans, and will comprise finished surfaces such as road, footpaths, cyclepaths and buildings, landscaped open spaces and parks and gardens.

7.12 INTERACTIONS

There are interactions between land and soils, water and material assets and built asset (traffic).

- There are interactions between land and soils and water, with changes in depth and type of overburden over rock impacting the protection provided to aquifers. The likely impact will be permanent slight and adverse.
- There are interactions between land and soils and water, with some surface water conveyed and stored in SuDS features such as swales and detention basins and discharging to the ground where possible. The likely impact will be permanent slight and favourable.
- There are interactions between lands and soils and material assets, with the construction of drainage and utilities impacting the quantity of soil, subsoil and rock as these materials will be removed to facilitate construction. The likely impact will be permanent slight and adverse.
- There are interactions between lands and soils and material assets, with the delivery of normal stone fill under buildings and roads and footpaths resulting in additional construction vehicles on roads adjacent to the site. The likely impact will be temporary slight and adverse.
- There are interactions between water and material assets build services, with attenuated surface water runoff from the western portion of the site outfalling to the surface water drainage network and foul flows from the site discharging to the foul sewerage network. The likely impact will be permanent slight and adverse.
- There are interactions between water and material assets with potable water for the development supplied from surface water and ground water abstractions. The likely impact will be permanent slight and adverse.

7.13 DIFFICULTIES ENCOUNTERED IN COMPILING

There were no particular difficulties encountered in compiling this chapter.

7.14 REFERENCES

- Environmental Protection Agency, Maps, Available at <https://gis.epa.ie/EPAMaps/>, Accessed on 26th June 2019;
- Department of Communications, Climate Action and Environment, Geological Survey Ireland, Available at <http://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228>; Accessed on 26th June 2019;
- Ground Investigations Ireland, “Mill Road, Ground Investigation Report”, September 2019;
- Ground Investigations Ireland, “Mill Marsh Road Co. Meath, Ground Investigation Report”, January 2018
- J L Surveys Topographical Survey of Lands

FIGURES

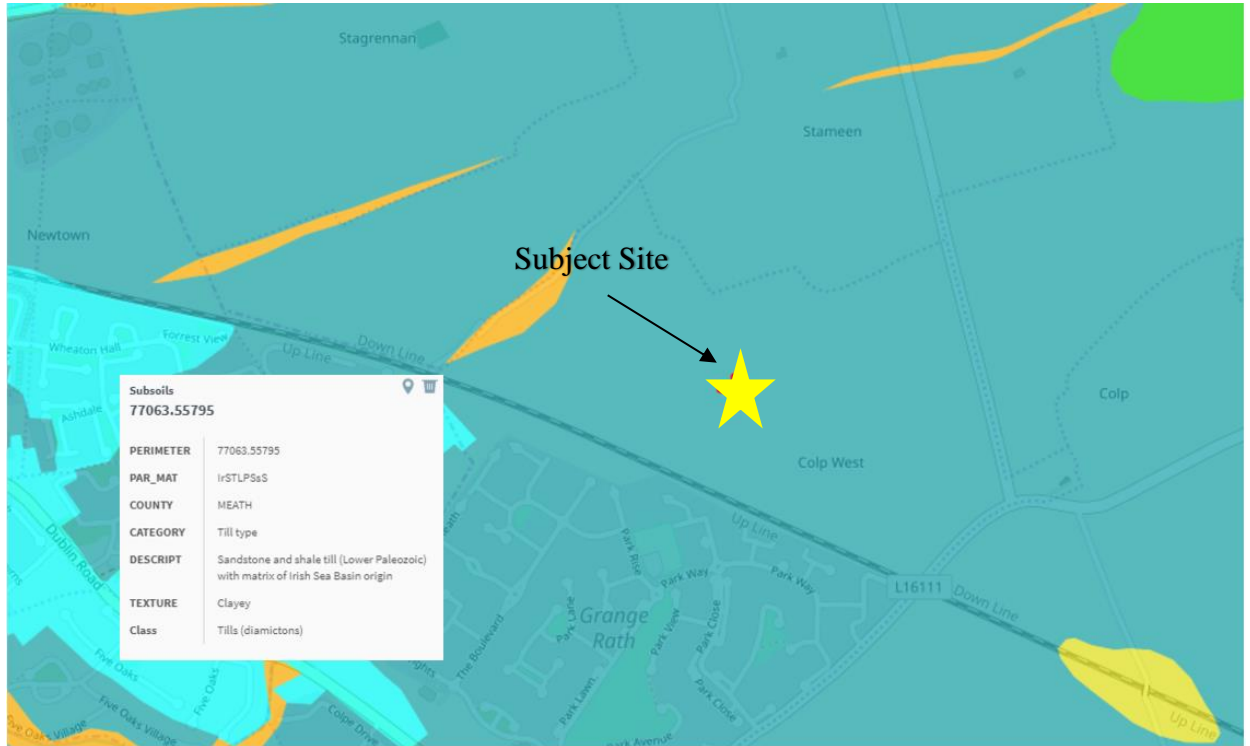


Figure 7.1: Subsoil mapping (Courtesy of EPA Maps)

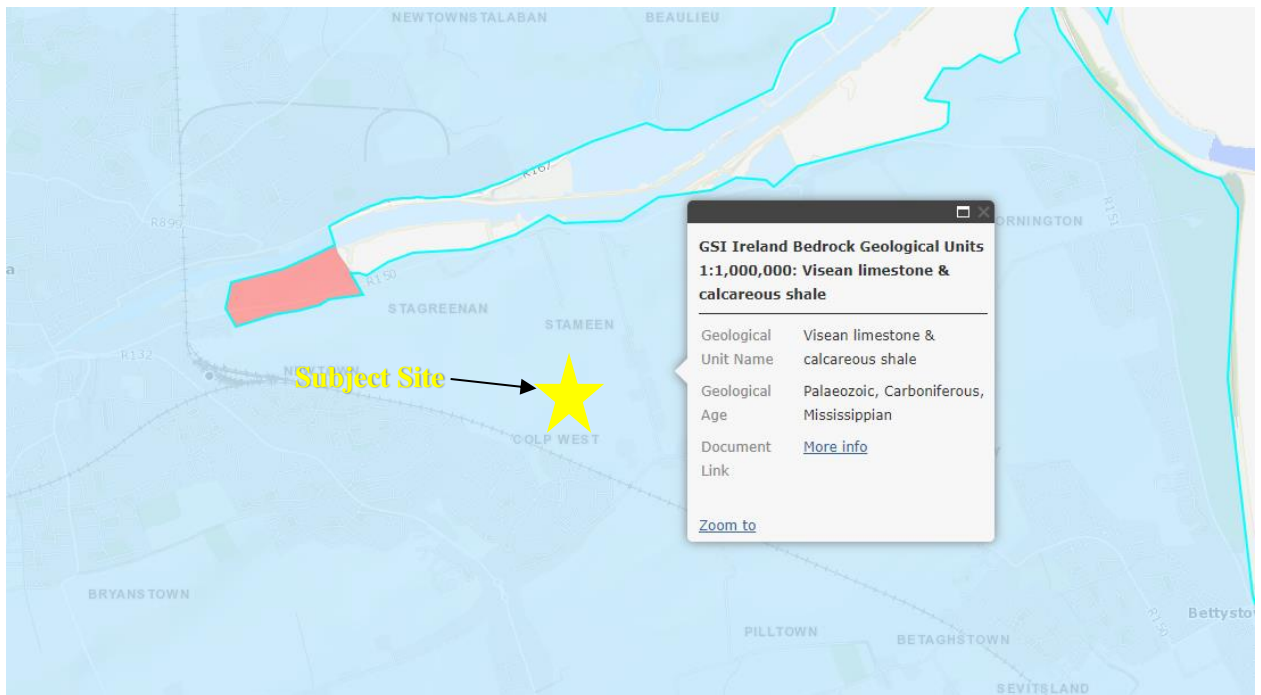


Figure 7.2: Bedrock Geological Unit (Courtesy of GSI)