

10. Land and Soils

10.1 Introduction

This section describes the scope of works and methods to be applied in the identification and assessment of soils, geology and hydrogeology impacts associated with the proposed development. A high level overview of the baseline conditions is included, together with the proposed methodology and a scope of work likely to be required to undertake a detailed assessment of the impact of the proposed development on soils, geology and hydrogeology as part of the EIA.

10.1.1 Policy & Plan Context

The EU Water Framework Directive (2000/60/EC) established a framework for the protection of both surface and ground waters. Transposing legislation (S.I. 297 of 2009, European Communities Environmental Objective (Surface Water) Regulations 2009 as amended and SI 9 of 2010 European Communities Environmental Objective (Groundwater) Regulations) outlines the water protection and water management measures required in Ireland to maintain high status of surface and groundwater, prevent any deterioration in existing water status and achieve at least 'good' status for all waters.

The assessment of soils, geology and hydrogeology will be conducted under the relevant legislation and guidance including:

- European Communities (Water Policy) Regulations (S.I. 722 of 2003);
- European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. 9 of 2010);
- Groundwater Directives (80/68/EEC) and (2006/118/EC);
- Water Framework Directive (2000/60/EEC);
- Institute of Geologists of Ireland (IGI), Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (2013);
- NRA, Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009);
- EPA, Towards Setting Guideline Values For The Protection of Groundwater in Ireland (2003); and
- Local authority planning guidance as applicable.

10.1.2 Study Area

This proposed development covers an extensive study area that extends from Parteen Basin on the River Shannon, directly south of Lough Derg in County Tipperary, through Tipperary and the midland counties of Offaly and Kildare, and terminating in the vicinity of Peamount Reservoir and environs in South County Dublin. The extent of the proposed development, particularly the c.170km treated water pipeline component, requires crossing a significant section of the country. The entirety of the study area will require sensitivity in the siting and design process due to the potential for proximity to a range of sensitive receptors.

10.2 Baseline Information

10.2.1 Desktop Study

Extensive work has been completed to date as part of the route selection process in order to assess proposed site options and routes against a range of environmental criteria including soils, geology and hydrogeology. This

was completed as part of the options appraisal which initially supported the Preliminary Options Assessment Report (POAR) and subsequently the Final Options Appraisal Report (FOAR) and assessed proposed sites and proposed pipeline corridors against a range of environmental criteria including soils, geology and hydrogeology. A desktop review of available soil, bedrock and groundwater data over the proposed development area has been undertaken and there have also been windshield site visits conducted in conjunction with the desktop study.

The following fourteen Soils, Geology and Hydrogeology sub-criteria have been studied as part of the site selection process:

- Aquifer Classification – importance of the groundwater resource to a given area;
- Vulnerability Classification – potential for groundwater contamination;
- Geological Survey of Ireland (GSI) Groundwater Protection Response matrix;
- Groundwater Supplies – identification of water supply springs and bored wells based on GSI, EPA, , County Council and National Federation of Ground Water Schemes (NFGWS) records;
- Groundwater Source Protection Areas and Zones of Contribution as per available GSI and EPA data;
- Potential to impact on Geological Heritage Sites / County Geological Sites;
- Potential to interact with contaminated land;
- Potential to sterilise mineral resources;
- Potential to encounter shallow bedrock during construction (interactions with other disciplines during construction – noise, dust, etc.);
- Potential impact on karst features;
- Potential to encounter soft ground;
- Soil types;
- Subsoil types; and
- Bedrock types and Depth to rock.

The assessment of the options was completed using relevant databases sourced from the bodies including the Geological Survey of Ireland (GSI), the Environmental Protection Agency (EPA) and local authority datasets and County Development Plans. Desk based data sources have included:

- 1:100,000 Scale Bedrock Mapping (Geological Survey of Ireland) & associated memoir;
- Karst Database (Geological Survey of Ireland);
- Quaternary Maps (Geological Survey of Ireland);
- Teagasc Subsoil Mapping (2004);
- Teagasc Soils Mapping (2007);
- Corine Land Cover datasets, (European Environment Agency, 2006);

- General Soil Map of Ireland (An Foras Talúntais, 2nd Edition, 1980);
- The Peatlands of Ireland (An Foras Talúntais, 1981);
- Directory of Active Quarries, Pits and Mines in Ireland (Geological Survey of Ireland, 3rd Edition, 2001);
- Planning Departments of Local Authorities (Section 261, Pits and Quarries Planning and Development Act 2000);
- State Mining and Prospecting Facilities (published twice annually by Exploration and Mining Division of DCENR);
- Historic Mine Sites – Inventory and Risk Classification (EPA & GSI);
- Proposed / Designated NHA Sites (National Parks and Wildlife Service);
- County Geological Sites (Local Authority Planning Office/Heritage Officers) – Figure 4 of the Alternative Sites Assessment (ASA) report contains this information;
- Mining Heritage Trust of Ireland (old mining sites);
- Office of Licensing and Guidance, Environmental Protection Agency (www.epa.ie);
- Local Authorities (Waste Management Section);
- Local Authorities (County Development Plans);
- Historical Maps (Ordnance Survey of Ireland / National Library of Ireland);
- National Landslide Database (Geological Survey of Ireland);
- Aerial Photographs (Geological Survey of Ireland / Ordnance Survey of Ireland);
- Atlas of Ireland (Royal Irish Academy);
- Exploration and Mining Division of the Department of Communications; and
- Energy and Natural Resources (www.mineralsireland.ie).

On confirmation of site location and pipeline route, a further desktop review of all available data regarding the soils, geology and hydrogeology impacts over the study area will be undertaken and will be supplemented with any additional information to support the development of the EIS.

10.2.2 Future Survey Needs

In order to further confirm the information ascertained through the desktop studies and site visits already completed, detailed site walkovers of the pipeline route and above ground infrastructure sites will be undertaken once the sites have been confirmed as part of the Final Options Appraisal Report (FOAR). Preliminary ground investigations will also need to be undertaken to provide additional information on the ground conditions for the proposed development including the pipeline and proposed infrastructure locations. A groundwater well survey of all wells within the vicinity of the proposed development will be undertaken in order to gather information on the location of wells, yield and types of groundwater wells.

Consultation with landowners along the pipeline will include a well inventory to assess potential impacts on private supplies. Groundwater monitoring is proposed where the pipeline is located within 200m of a public

groundwater water supply or within a source protection zone. Groundwater monitoring and assessment is proposed near sensitive wetland areas. The proposed route has avoided by design a large number of designated sites and groundwater dependant terrestrial ecosystems.

10.2.3 Consultation

It is considered that consultation on the soils, geology and hydrology impact assessment will be undertaken with the following organisations:

- Geological Survey of Ireland;
- Environmental Protection Agency;
- An Taisce;
- National Federation of Group Water Schemes including relevant group water schemes;
- Peatlands Conservation Council, and
- The Local Authorities where infrastructure for the abstraction, water treatment plant, break pressure tank and termination point reservoir would be situated as well as the relevant Local Authorities along the proposed pipeline route.

Soil, Geology and Hydrology related comments arising during the consultation phases of the project will also be reviewed and considered within the EIS as relevant.

10.3 Potential Impacts

10.3.1 Potential Construction Phase Impacts

There are a number of potential impacts during the construction phase of the proposed development. These include:

- Loss of soil cover;
- Removal and storage of spoil/overburden;
- Soil erosion and compaction;
- Risk of encountering contaminated ground heretofore in unknown locations, specifically potential environmental impacts arising from the excavation, handling, on-site processing, transport and off-site disposal or recovery;
- Risk of contamination of existing soils by the construction activities such as accidental fuel spills;
- Risk of contamination to groundwater by construction activities, such as fuel spills, particularly in areas of extreme groundwater vulnerability overlying regionally important karstified aquifers; and
- Impacts on any features of geological or geomorphological interest and importance.

As part of the EIS, a soil specialist and geologist will advise on required mitigation measures during construction. The appointed contractor will be required to adhere to these mitigation measures and to ensure that residual effects on sensitive receptors are minimised.

10.3.2 Potential Operational Phase Impacts

The proposed development will potentially impact on the underlying soils, geology and hydrogeology through changes in surface water run-off into the soils over the operational life of the project. There is also the potential for irreversible loss of agricultural soils/land drainage and the contamination of soils and groundwater through accidental spillages of fuels or chemicals once the proposed development is operational.

Mitigation measures will be proposed in the EIS in order to minimise these potential operational impacts. Compliance with these recommended mitigation measures will be required to be fulfilled by the appointed contractor in order to ensure that residual effects on sensitive receptors are minimised.

10.4 Proposed Methodology & Assessment Scope

It is proposed that an assessment of soils, geology and hydrogeology will be carried out in accordance with the EPA's current EIS guidance documents tailored accordingly based on professional judgement and local circumstance.

In line with guidance the assessment will cover potential impacts on soils, geology and hydrogeology and will describe the existing conditions and the likely potential impacts associated with the construction and operation of the proposed development. The impact assessment process will involve:

- Assigning the receptor sensitivity;
- Identifying and characterising the magnitude and significance of any potential impacts;
- Incorporating measures to avoid and mitigate (reduce) these impacts; and
- Assessing the significance of any residual effects after mitigation.

The soils, geology and hydrogeology assessment to be carried out on the proposed development will include the following elements:

- Review of standards and legislation;
- Identification of soils, geology and hydrogeology issues relevant to the proposed development;
- Review of current soil, bedrock and groundwater conditions in the vicinity of the proposed development;
- Detailed review of all available, relevant site investigation data for works undertaken in the area of the proposed development;
- Assessment of potential impacts of construction activities on the soils, geology and hydrogeology in and around the proposed development;
- Assessment of potential impacts of operations on the soils, geology and hydrogeology in and around the proposed development; and
- Proposal of appropriate mitigation measures, as required.

The assessment will take account of sensitive receptors relevant to the proposed development, such as farmlands, through which the proposed development will pass, and homes and businesses which abstract groundwater. The complete list of sensitive receptors within the vicinity of the proposed development will become clear once the final site and route options are selected, thus informing the full study area for the EIS. A series of mitigation measures to minimise any foreseen impacts for both the construction phase and operational phase of the project will be proposed as required as part of the EIS.