

8 SOILS AND GEOLOGY

8.1 Introduction

This section is prepared for a development comprising the deposition of up to 75,000m³ of peat to the Srahmore Peat Deposition Site. The 75,000m³ of peat will be generated during the construction of the Corrib Gas Field On-shore Pipeline development. The Srahmore Peat Deposition Site has previously been successfully utilised for the deposition of approximately 448,000m³ of peat from the Bellanaboy Bridge Terminal Site. Significant information and experience has been gained during the original operation, which has been applied to this development proposal.

The information contained below is concerned with a description of the existing geological character of the Srahmore Peat Deposition site. This section also addresses the hydrogeological character of the site, as the groundwater environment is intrinsically linked to the geological material through which it flows.

The geological material existing within the site has been generated by the deposition of detritus over millions of years. The development of the blanket bog peat in north Maigh Eo (Mayo) is considered to be recent in the geological timescale, having occurred in the last 4,500 years. Its formation is concurrent with human activity, as demonstrated by the identification of Neolithic field systems at Céide. The formation of blanket bog, which is the dominant landscape character in the region, occurred due to a significant change in climatic conditions approximately 4,500 year ago, bringing about wetter conditions and creating an ideal environment for peat formation.

The geological material underlying the blanket bog, both the Quaternary glacial mineral soil and the bedrock, are concealed. The nature, extent and complexity of the geological material, from the surface downwards through the mineral subsoil to the bedrock, is detailed below based on available published information and site specific investigation data.

The hydrogeological environment, in terms of the hydraulic characteristics of the bedrock and the subsoil, are also discussed, as such details are intrinsically linked to the geological environment.

8.2 Study Methodology

This report has been prepared using the recommendations set out in the Environmental Protection Agency (EPA) document ‘Guidelines on Information to be contained in Environmental Impact Statements’ (2002). The guidelines and recommendations of the Institute of Geologist of Ireland (IGI) publication ‘Geology in Environmental Impact Statements – A Guide’ (2002) was also taken into account in the preparation of this section.

This section describes the geological material existing within the site, from the surface downward, through the mineral subsoil to the bedrock. The composition and the extent of these deposits are discussed. Groundwater and the hydrogeological setting of the site are also discussed in this section, as the nature of the geological material existing and the hydraulic characteristics of the various materials through which the groundwater flows.

In the preparation of this section the following protocol was used in order to assess the regional and site specific context and character of the site:

1. The site was assessed using regional geological publications and maps;
2. All available information was collected from the Geological Survey of Ireland;
3. A site investigation programme was designed and undertaken within the site, that included topographic surveys, trial pitting of soils/subsoils, drilling into subsoils/bedrock, laboratory and field testing of the various materials and sampling; and
4. Preparation of this geological report was undertaken following the collation of all available information.

The available geological information provided in this section is considered sufficiently detailed to adequately characterise the geological setting of the site. The information included in this section is considered to meet the data requirements suggested in the IGI publication ‘Geology in Environmental Impact Statements - A Guide’.

All projects and developments that require an EIS are of a scale or nature that they have the potential to have an impact on the environment. In this section the potential impact on the geological environment resulting from the importation and deposition of up to 75,000m³ of peat is assessed and mitigation measures provided to reduce such impacts. Based on the mitigation measures provided, the significance of the predicted impact on the geological environment is determined. A programme of monitoring is provided to demonstrate that development is not impacting the surrounding geological environment.

8.3 Receiving Environment

8.3.1 Topography and Topographic Landform

The topographic landform of this region of Northwest County Mayo is dominated by expansive tracts of land that are relatively flat, however the relief is broken by dramatic upland terrains (Nephin Beg and Owenduff area).

Large tracts of blanket bog terrain have been worked on an industrial scale by Bord na Móna in northwest Maigh Eo (Mayo), to provide a material feed to the Bellacorick Power Station. Although the extraction of peat in this region has now ceased, the previous industrial activity has had a significant impact on the topographic landform and has resulted in exposure of cut-over peat surfaces throughout the site.

8.3.2 Soil

Reference to the General Soil Map of Ireland (published by National Soil Survey, An Foras Talúntais in 1980 at a scale of 1:575,000) indicates that the entire site is underlain by low level blanket bog. The Soil Map of West Mayo (published by the National Soil Survey, An Fóras Talúntais in 1974 at a scale of 1:126,720) indicate that the peat material is part of the Bellacorick-Glenamoy soil series of blanket bog.

Blanket bog is so called because its development is mostly independent of basins or topographical features where water collects; rather it simply covers the landscape like a blanket. In Ireland the distribution of blanket bogs is confined to the western extremities of the country and upland areas, where precipitation is high (greater than 1,200mm annually) and evaporation is low. Blanket bogs are maintained by rainfall and thus have a low nutrient content. The pH of a blanket bog lies between 3.5 and 4.2.

On virgin blanket bogs there is a thin layer of highly decomposed peat, which acts as an impermeable barrier for infiltrating water and creates waterlogged conditions favourable for peat production. The peat in a blanket bog is generally consistent throughout the soil profile. The peat is derived from plant remains, mainly grasses, sedges and heathers. Blanket bog peat is generally very dense and highly decomposed, which results in a very slow downward movement of water through the soil profile. In its natural state, undrained blanket bog is composed of 85-95% water.

Based on visual assessment of the proposed site, the peat material has not been completely exhausted within the subject site. Peat still occurs at the base of each production field.

As part of the site characterisation, the thickness of the remaining peat material within the site was assessed. Bord na Móna undertook a peat depth survey of the Srahmore Peat Deposition site in 1998, using a 'Hiller Borer' sampler, which is a hollow stem sampler.

This sampler was pushed into the peat material and the hollow stem was used to indicate when mineral subsoil had been encountered. The results of the 1998 survey were adjusted to account for the extraction programme undertaken in the intervening period and the elevation was reduced.

With respect to Area 5, the peat thickness is estimated as varying from 0.34m to 0.7m in the zone where it was proposed to construct the existing reception hardstand. The peat thickness is greatest to the north of Area 5, immediately adjacent to the R313 (up to 6m), where no peat extraction has been undertaken.

With respect to Area 6, the Hiller Borer survey indicates that between 0.1m and 2.16m of peat overlies the mineral subsoil in the low fields.

As part of the site investigation programme and in order to verify the correction of the Hiller Borer results, 14 No. trial pits were excavated within the proposed site. The trial pit information was also valuable in that it allowed an opportunity to examine the nature and extent of the peat material. The trial pit logs are included in Appendix 8.1, Book 3 and the locations where the trial pits were excavated are shown on Figure 8.1.

A total of six of the trial pits were excavated within Area 5. Five of these trial pits (TP1, TP8 and TP9, TP13 & TP14) were undertaken in areas not assessed as part of the Hiller Borer Survey. These trial pits encountered very thin peat cover to the southwest of Area 5 (TP8 and TP9), with between 0.2m and 0.4m cover of peat encountered, whereas 2.4m of peat cover was encountered to the northwest of Area 5 (TP1). The other trial pit (TP2) was excavated in the area of the proposed reception hardstand. The depth of peat encountered in this trial pit (0.65m) coincides exactly with the thickness of peat recorded from the Hiller Borer survey.

Five trial pits were excavated in Area 6. The information recorded from the trial pits (TP3, TP4, TP5, TP6 and TP7) coincides closely with the thickness of peat recorded from the Hiller Borer survey, with between 0.84m (TP7) and 1.8m (TP3) of peat recorded overlying mineral subsoil. In general, the thickness of peat is at a minimum to the west of Area 6 and appears to thicken to the south.

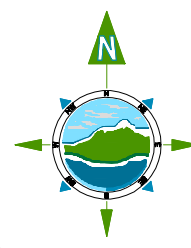
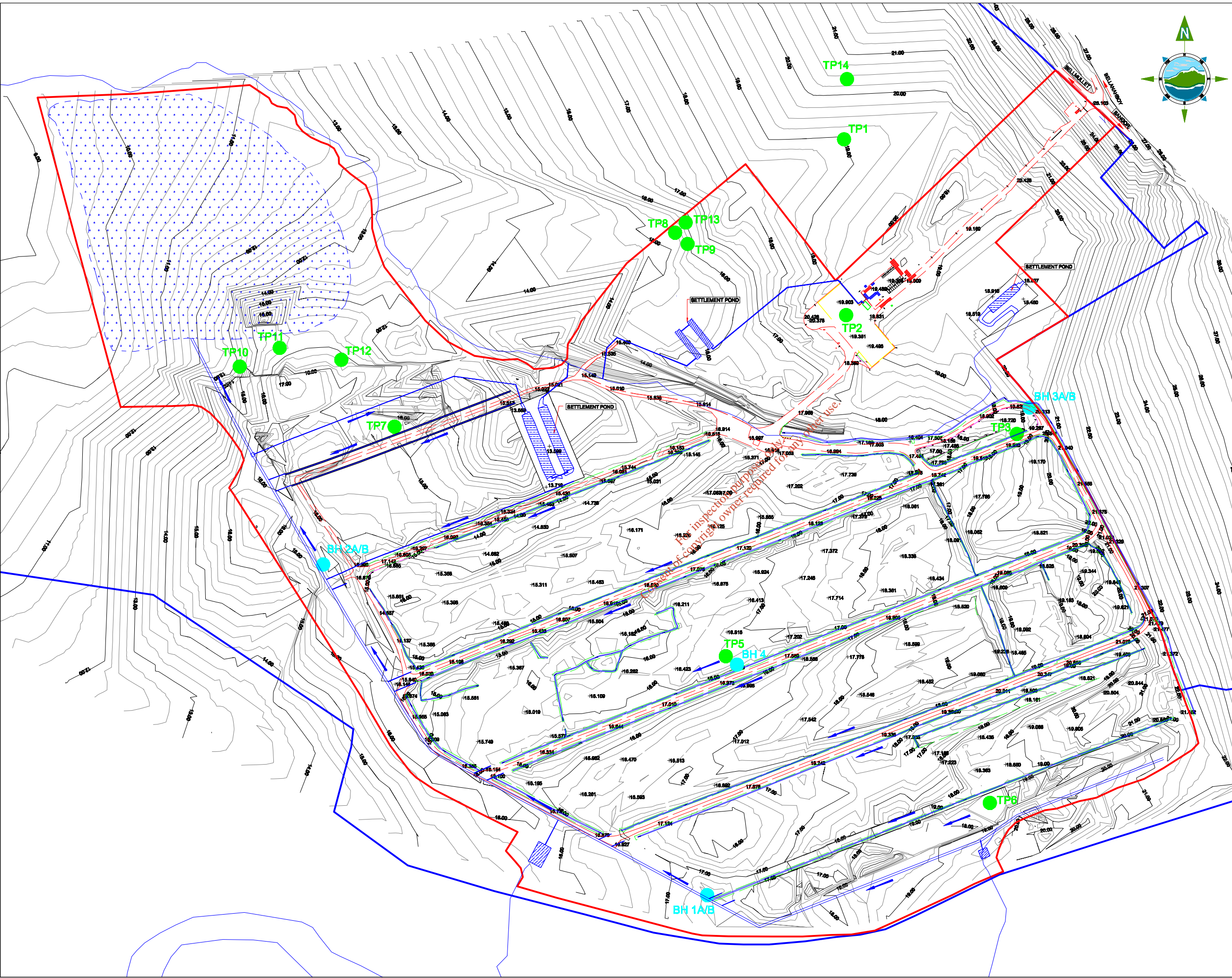
A further 3 No. trial pits were excavated in Area 7 (TP10, TP11 & TP12). The thickness of peat cover in this area was very thin, measured as varying from 0.1m to 0.3m thick.

The most recent activities to occur within the Srahmore Peat Deposition Site, involved the construction of a access road from the R313 and peat reception hardstand slab. Ancillary infrastructure was also imported and/or constructed to support the previous peat deposition activity. Approximately 448,000m³ of peat from the Bellanaboy Bridge Terminal Site was accepted to the Srahmore Peat Deposition site and deposited within Area 6 in 2005 and

2007.

The areas where peat infill has previous been undertaken are shown on Figure 8.2. The 448,000m³ of peat was infilled in Bays 2 (partially), Bay 3, Bay 4 and Bay 5 of Area 6. The deposited peat was handled, mounded and graded within each bay to achieve a maximum approximate height at the centre of each lowfield bay of approximately 2m. The grade from crest towards the margin toe was required to ensure rainwater was shed from the areas. The net result of the peat deposition has been to raise the topographic elevation in each lowfield where activity occurred.

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GENERAL LEGEND

LANDS UNDER CONTROL OF DEVELOPER	NEW ACCESS ROAD
CURRENT APPLICATION AREA	EXISTING MAJOR CONTOUR 40.00m
PUBLIC ROAD	DRAINAGE
EXISTING TEMPORARY BUILDING/STRUCTURE	PROPOSED TEMPORARY BUILDING/STRUCTURE
TOP OF BANK	FENCING
BOTTOM OF BANK	WALL
SETTLEMENT LAGOON	SPOT LEVEL #/#/#
INTERNAL ACCESS ROAD	AREAS FOR DEPOSITION
AREAS FILLED WITH PEAT 2009/2007	EXISTING TREE
TRIAL PIT LOCATION	BOREHOLE LOCATION

- NOTES**
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
 2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
 3. ENGINEER TO BE INFORMED BY THE CONTRACTOR OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
 4. ALL LEVELS SHOWN RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD
 5. OS 6" SHEET NO's: MAYO 18 & 26

Rev	Date	Description	By	Chk.
E	01-02-09	ISSUED FOR RE-SUBMISSION	VB	MC
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Applicant: Shell E&P Ireland Limited
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Operator: **BORD NA MÓNA**

Project: CORRIB ONSHORE PIPELINE DEVELOPMENT

Aspect: SRAHMORE PEAT DEPOSITION SITE

Site INVESTIGATION LOCATIONS (Survey 2008)

Scale @ A1: 1:5,000 @ A3

Prepared by: V. Bonney **Checked:** M. Nolan **Date:** Feb 2009

Project Director: S. Finlay

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Drawing No.: Figure 8.1 **Revision:** E