APPENDIX 8-1

PEAT STABILITY RISK ASSESSMENT (FT 2026)

FEHILY TIMONEY

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

GEOTECHNICAL & PEAT STABILITY REPORT

CAHERMURPHY WEST WIND FARM

Prepared for: **MKO Ltd**

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GEOTECHNICAL & PEAT STABILITY ASSESSMENT REPORT
CAHERMURPHY WEST WIND FARM

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Abstract: Fehily Timoney and Company (FT) were engaged by McCarthy Keville O'Sullivan (MKO) to undertake a geotechnical assessment of the Proposed Cahermurphy West Wind Farm site with respect to peat stability. As part of the geotechnical assessment of the Proposed Development, FT completed walkover surveys at the site and scope ground investigation works. The findings of the geotechnical and peat stability assessment showed that the site has an acceptable margin of safety and is suitable for the Proposed Development.

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1. NON-TECHNICAL SUMMARY

Fehily Timoney and Company (FT) were engaged by MKO (on behalf of Cahermurphy Wind DAC) to undertake a geotechnical and peat stability assessment of the proposed Cahermurphy West Wind Farm site, located in Co. Clare. In accordance with planning guidelines compiled by the Department of the Environment, Heritage and Local Government (Wind Energy Development Guidelines, DoEHLG, 2006), where peat >0.5m thickness is present on a proposed wind farm development, a peat stability assessment is required.

A walkover survey including intrusive peat depth probing, ground investigation, desk study, stability analysis and risk assessment was carried out to assess the susceptibility of the site to peat failure following the principles in Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (2nd Edition, Scottish Government, 2017).

The findings, which involved a stability analysis of 227 locations, show that the site has an acceptable margin of safety and is suitable for the Proposed Wind Farm. Based on the findings, mitigation measures will be implemented for construction work in peat lands to ensure that all works adhere to an acceptable standard of safety.

The Proposed Wind Farm comprises 8 no. wind turbines and associated infrastructure. A detailed description of the Proposed Project is included in Chapter 4 of the EIAR.

The site is undulating with drainage channels running typically north to southwest and west to east. The land use within the Proposed Wind Farm comprises commercial forestry and areas of open peatland.

Slope inclinations at the infrastructure locations range from 1 to 10 degrees. The relatively flat topography/nature of the terrain on site reflects the low risk of peat failure. Ground conditions comprised mainly of blanket peat overlying cohesive glacial deposits, overlying bedrock.

Between August 2019 and November 2025, 583 no. peat depth readings were taken within the Proposed Wind Farm. Peat depth recorded during the site walkovers and from the ground investigation ranged from 0.1 to 6.1m with an average peat depth of 0.7m. 91% of the probes recorded peat depths of less than 2.0m with 97% of peat depth probes recorded peat depths of less than 3.0m. A number of localised readings recorded peat depths from 3.0 to 6.1m. The deepest peat area was recorded within the Proposed Hen Harrier Enhancement Lands, where no permanent development is proposed.

Ground investigation, in the form of trial pits (36 no.) and boreholes (2 no.), were carried out by Irish Drilling Ltd under the supervision of FT during 2019 and 2024 to confirm the ground conditions at various locations across the Site, including at the borrow pit locations.

The purpose of the stability analysis was to determine the stability i.e. Factor of Safety (FoS), of the peat slopes. The FoS provides a direct measure of the degree of stability of a peat slope. A FoS of less than 1.0 indicates that a slope is unstable; a FoS of greater than 1.0 indicates a stable slope. However, taking a precautionary approach, an acceptable FoS for slopes is generally taken as a minimum of 1.4. The stability analysis for this project, which analysed the turbine locations, access roads and substation, resulted in FoS above the minimum acceptable value of 1.4 and hence the site has a satisfactory margin of safety.

From the stability analysis for both the undrained and drained conditions, which analysed the turbine locations and other proposed infrastructure locations, the calculated values were above the minimum acceptable FoS of 1.4.

The risk assessment uses the results of the stability analysis in combination with qualitative factors, such as the presence of mechanically cut peat, quaking peat, bog pools, sub peat water flow, slope characteristics and numerous other factors, which cannot be reasonably included in a stability calculation but nevertheless may affect the occurrence of peat instability, to assess the risk of peat failure at the site. The results of the risk assessment are given in Appendix B. A construction buffer zone plan based on qualitative factors identified during the site walkover is included as Drawing P23-230-0600-0002 at the end of the report text.

In summary, the Proposed Development site has an acceptable margin of safety and is considered to be at **low** risk of peat failure taking into account the proposed mitigation measures and construction controls set out in this report and is suitable for the Proposed Wind Farm.

2. INTRODUCTION

2.1 Fehily Timoney and Company

Fehily Timoney and Company (FT) is an Irish engineering, environmental science and planning consultancy with offices in Cork, Dublin and Carlow. The practice was established in 1990 and currently has about 100 members of staff, including engineers, scientists, planners and technical support staff. FT deliver projects in Ireland and internationally in our core competency areas of Waste Management, Environment and Energy, Civils Infrastructure, Planning and GIS and Data Management.

FT have been involved in over 100 wind farm developments in both Ireland and the UK at various stages of development i.e., preliminary feasibility, planning, design, construction, and operational stage and have established themselves as one of the leading engineering consultancies in peat stability assessment, geohazard mapping in peat land areas, investigation of peat failures and site assessment of peat.

This Report was written by Ian Higgins (FT Principal Geotechnical Engineer, MSc. Geotechnical Engineering) and Alan Whelan (FT Project Engineer, BEng. Civil Engineering). Ian is a Technical Director with Fehily Timoney and has 25 years' experience in geotechnical engineering. Alan is a Senior Project Engineer with Fehily Timoney and has four years' experience in geotechnical engineering.

2.2 Project Description

FT was engaged in December 2023 by McCarthy Keville O'Sullivan (MKO) to undertake a geotechnical & peat stability assessment of the Proposed Cahermurphy West Wind Farm.

The Proposed Wind Farm site is located in County Clare, approximately 4.3km northwest of the village of Kilmihil and 25km southwest of Ennis.

The Proposed Wind Farm site comprises predominantly commercial forestry underlain by blanket peat. The surrounding landscape is undulating with land-use comprising forestry, agricultural pastures and blanket peatland.

The Proposed Wind Farm will comprise 8 no. wind turbines and associated hardstanding areas, 1 no. electricity substation, 2 no. borrow pits, 6 no. peat placement areas, temporary construction compounds, upgrade of existing roads, construction of new site access roads, underground cabling connecting to the existing Moneypoint substation, road widening and accommodation works along the turbine delivery route, 1 no. permanent meteorological mast, site drainage and all associated work as described in Chapter 4 of the EIAR.

2.3 Peat Stability Assessment Methodology

FT undertook the assessment following the principles in Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (2nd Edition, Scottish Government, 2017(). The Peat Landslide Hazard and Risk Assessment Guide (PLHRAG) is used in this report as it provides best practice methods to identify, mitigate and manage peat slide hazards and associated risks in respect of consent applications for electricity generation projects.

The aforementioned best practice guide was produced following peat failures in the Shetland Islands, Scotland in September 2003 but more pertinently following the peat failure in October 2003, during the construction of a wind farm at Derrybrien, County Galway, Ireland.

This peat stability assessment has been undertaken taking into account peat failures that have occurred on upland peatland sites (such as recent failures at Shass Mountain (2020), Co. Leitrim and Meenbog (2020), Co. Donegal). The lessons learned from both peat slide events have been incorporated into the design of this project and the construction methodologies to be implemented. The Meenbog failure, which occurred during wind farm construction works, involved the presence of a large area of deep, soft peat, the presence of poorly maintained forestry drainage, and the presence of a break in slope along the downslope margin of the area of deep peat, all of which were considered contributary factors to the failure which occurred as a floating road was under construction.

Given the site topography and the generally shallow nature and higher strength of the peat, the site conditions at Cahermurphy West are not considered to be similar to Meenbog, nor is it considered likely that a similar failure to Meenbog could occur at Cahermurphy West.

It is important that the existing site drainage is maintained during construction to avoid a similar failure to that on Shass Mountain, which occurred following heavy rainfall, and this is referenced in the Risk Assessments for the turbines/access roads. However, the Shass Mountain failure occurred in an area containing a deep peat layer (4-5m in depth), and the peat depths across the Cahermurphy West site are typically less than 1.0m around the infrastructure of the Proposed Wind Farm, meaning that this type of failure is highly unlikely. It is also noted that there have been numerous wind farms successfully constructed on blanket bog sites over the past 15 years without any issues relating to peat failure, such as Galway Wind Park and Arderroo Wind Farm (both Co. Galway) and Slievecallan Wind Farm (Co. Clare).

A constraints study was initially undertaken by the Environmental, Hydrogeological and Ecological members of the design team to determine the developable area on the Site, prior to the site reconnaissance by engineering geologists/geotechnical engineers from FT. The extent and depth of ground investigation and peat stability analysis by FT have been undertaken in accordance with guidance within Eurocode 7 and PLHRAG (2nd Edition, Scottish Government, 2017) to investigate peat slopes that have the potential to impact on the Proposed Wind Farm, as applicable. Sufficient peat depth data has been recorded during the site walkovers to enable the characterisation of the peat depth across the Proposed Wind Farm site, with additional detail at infrastructure locations. The peat stability assessment is undertaken to identify peat slopes at risk from the Proposed Wind Farm, and to identify peat slopes that may pose a risk to the Proposed Wind Farm.

The geotechnical and peat stability assessment at the site included the following activities:

(1) Desk study involving the review of publicly available soils and geology maps, records of historical peat failures, aerial photography.

(2) Site reconnaissance including shear strength and peat depth measurements undertaken following a multidisciplinary constraints study (by the design team) to determine the proposed construction envelope within the site i.e. the area within the overall site where development is possible following multidisciplinary review and assessment of constraints (refer to Chapter 3 of the EIAR).

(3) Peat stability assessment of the peat slopes on Site using a deterministic and qualitative approach.

(4) Peat contour depth plan – compiled based on the peat depth probes carried out across the Site by FT (2019 and 2024) and MKO (2019, 2024 and 2025).

(5) Factor of safety plan – compiled for the short-term critical condition (undrained) for 227 no. FoS points analysed along the proposed infrastructure envelope on Site.

(6) Construction buffer zone plan – identifies areas with an elevated or higher construction risk where mitigation/control measures will need to be implemented during construction to minimise the potential risks and ensure they are kept within an acceptable range.

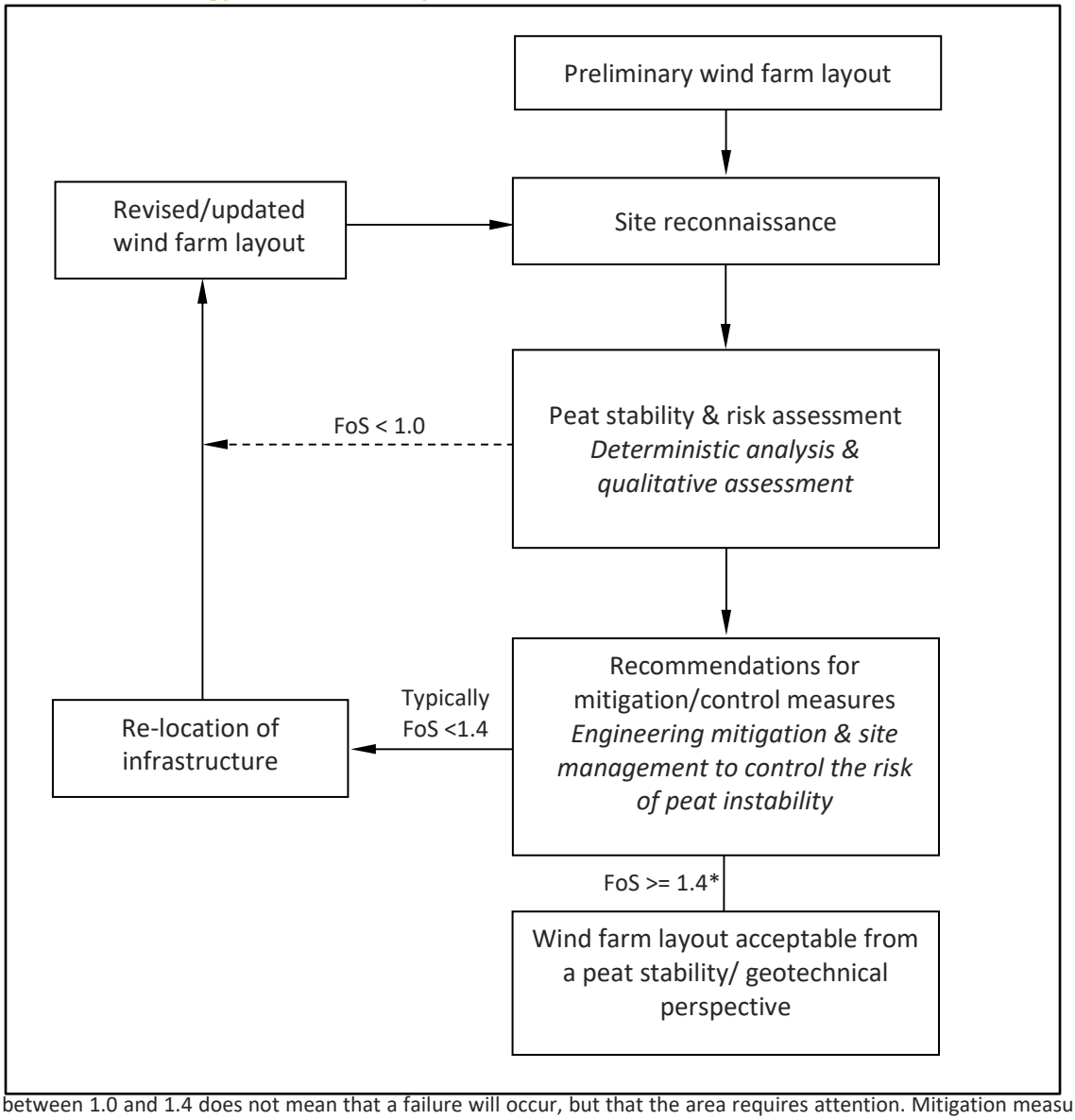
(7) A peat stability risk register was compiled to assess the potential design/construction risks at the infrastructure locations and determine adequate mitigation/control measures for each location to minimise the potential risks and ensure they are kept within an acceptable range, where necessary.

(8) Review of ground investigation (trial pits and boreholes) carried out at the site by Irish Drilling Ltd (IDL) in 2019 and 2024 (two separate phases, see Section 5 for details).

(9) Commentary of founding details for other infrastructure elements such as access roads, crane hardstands, substation & construction compound platforms and met mast foundation.

A flow diagram showing the general methodology for the peat stability assessment is shown in Figure 2.1. The methodology illustrates the optimisation of the wind farm layout based on the findings from the site reconnaissance and stability analysis and subsequent feedback.

Figure 2.1: Methodology for Peat Stability Assessment



*An FoS of between 1.0 and 1.4 does not mean that a failure will occur, but that the area requires attention. Mitigation measures can be provided for areas with an FoS of between 1.0 and 1.4 to reduce the risk of failure.

As for all construction projects, a detailed engineering construction design must be carried out by the appointed construction stage designer prior to any construction work commencing on the Site. This must take account of the consented project details and any conditions imposed by that consent. This must include a confirmatory peat stability assessment to account for any changes in the environment which may have occurred in the time leading up to the commencement of construction.

2.4 Peat Failure Definition

Peat failure in this report refers to a significant mass movement of a body of peat that would have an adverse impact on a proposed wind farm development or the surrounding environment. Peat failure excludes localised movement of peat that would occur below an access road, creep movement or erosion type events.

The potential for peat failure at this Site is examined with respect to wind farm construction and associated activity.

2.5 Main Approaches to Assessing Peat Stability

The main approaches for assessing peat stability for wind farm developments include the following:

(1) Geomorphological

(2) Qualitative (judgement)

(3) Index/Probabilistic (probability)

(4) Deterministic (factor of safety)

Approaches (1) to (3) listed above are considered subjective and do not provide a definitive indication of stability; in addition, a high level of judgement/experience is required which makes it difficult to relate the findings to real conditions. FT apply a more objective approach, the deterministic approach (as discussed in Section 2.6).

As part of FT's deterministic approach, a qualitative risk assessment is also carried out taking into account qualitative factors, which cannot necessarily be quantified, such as the presence of mechanically cut peat, quaking peat, bog pools, sub peat water flow, slope characteristics and numerous other factors. The qualitative factors used in the risk assessment are compiled based on FT's experience of assessments and construction in peat land sites and peat failures throughout Ireland and the UK. FT have been involved with in excess of 100 wind farm developments across Ireland and the UK at various stages of development, from preliminary feasibility stage through planning and from scheme development at tender design and detailed design stage, through to the construction and operational stages. This approach follows the guidelines for geotechnical risk management as given in Clayton (2001), as referenced in the best practice for Peat Landslide Hazard and Risk Assessment Guide (2nd Edition, 2017), and takes into account the approach of MacCulloch (2005).

The risk assessment uses the results of the deterministic approach in combination with qualitative factors, which cannot be reasonably included in a stability calculation but nevertheless may affect the occurrence of peat instability to assess the risk of instability on a peat land site.

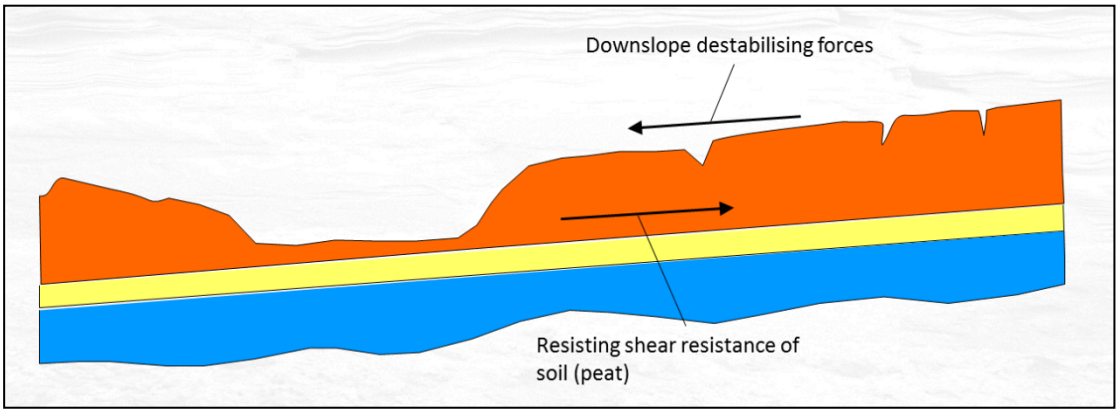
2.6 Peat Stability Assessment – Deterministic Approach

The peat stability assessment is carried out across a wide area of peatland to determine the stability of peat slopes and to identify areas of peatland that are suitable for development; this allows the layout of infrastructure on a particular wind farm site to be optimised. The assessment provides a numerical value (factor of safety) of the stability of individual parcels of peatland. The findings of the assessment differentiate between areas of stable and unstable peat, and areas of marginal stability where restrictions may apply. This allows for the identification of the most suitable locations for turbines, access roads and infrastructure.

A deterministic assessment requires geotechnical information and site characteristics which are obtained from desk study and site walkover, e.g. properties of peat/soil/rock, slope geometry, depth of peat, underlying strata, groundwater, etc. An adverse combination of the factors listed above could potentially result in instability. Using the information above, a factor of safety is calculated for the stability of individual parcels of peatland on a site (as discussed in Section 7).

The factor of safety is a measure of the stability of a particular slope. For any slope, the degree of stability depends on the balance of forces between the weight of the soil/peat working downslope (destabilising force) and the inherent strength of the peat/soil (shear resistance) to resist the downslope weight, see Figure 2.2.

Figure 2.2: Peat Slope Showing Balance of Forces to Maintain Stability



The factor of safety provides a direct measure of the degree of stability of a slope and is the ratio of the shear resistance over the downslope destabilising force. Provided the available shear resistance is greater than the downslope destabilising force then the factor of safety will be greater than 1.0 and the slope will remain stable. If the factor of safety is less than 1.0 the slope is unstable and liable to fail. The acceptable factor of safety for assessment purposes is between 1.3 and 1.4 (BS6031, 1981). A FoS of 1.4 is taken as indicative of sufficient stability within this report, which would be deemed a conservative approach.

2.7 Applicability of the Factor of Safety (Deterministic) Approach for Peat Slopes

The factor of safety approach is a standard engineering approach in assessing slopes which is applied to many engineering materials, such as peat, soil, rock, etc.

The factor of safety approach is included in the Peat Landslide Hazard and Risk Assessments Best Practice Guide for Proposed Electricity Generation Developments (2nd Edition, Scottish Government, 2017); see Section 5.3.1 of the guide. This guide provides best practice methods to identify, mitigate and manage peat slide hazards and associated risks in respect of consent applications for electricity generation projects.

Furthermore, the best practice guide notes that the results from the factor of safety approach 'has provided the most informative results' with respect to analysing peat stability (Section 5.3.1 of the guide).

The factor of safety approach in this report includes undrained (short-term stability) and drained (long-term stability) analyses. The undrained condition is the critical condition for the development. The purpose of the drained analysis is to identify the relative susceptibility of rainfall-induced failures at the site.

Notwithstanding the above, the stability analysis used by FT in this report also includes qualitative factors to determine the potential for peat stability i.e. the analysis used does not solely rely on the factor of safety approach.

The deterministic analysis is considered an acceptable engineering design approach. This concurs with the best practice guide referenced above.

2.8 Assessment of Intense Rainfall and Extreme Dry Events on the Peat Slope

The deterministic approach carried out by FT examines intense rainfall and extreme dry events. The deterministic approach includes an undrained (short-term stability) and drained (long-term stability) analysis to assess the factor of safety for the peat slopes against a peat failure.

The drained loading condition applies in the long-term. This condition examines the effect of the change in groundwater level as a result of rainfall on the existing stability of the natural peat slopes. For the drained analysis the level of the water table above the failure surface is required to calculate the factor of safety for the peat slope.

In order to represent varying water levels within the peat slopes, a sensitivity analysis is carried out which assesses varying water level in the peat slopes i.e. water levels ranging from 0 to 100% of the peat depth is conducted, where 0% equates to the peat been completely dry and 100% equates to the peat being fully saturated.

By carrying out such a sensitivity analysis with varying water level in the peat slopes, the effects of intense rainfall and extreme dry events are considered and analysed. The results of which are presented in Section 7 of this report.

3. DESK STUDY

3.1 Desk Study

The main relevant sources of interest with respect to the Proposed Wind Farm site include:

- Geological plans and Geological Survey of Ireland database
- Ordnance survey plans
- Literature review of peat failures

The Geological Survey of Ireland online dataset viewer (GSI, 2025) and geological plans (GSI, 1999) for the Proposed Wind Farm site were used to verify the soil and bedrock conditions.

The Ordnance Survey plans were reviewed to determine if any notable features or areas of particular interest (from a geotechnical point of view) are present on the Proposed Wind Farm site.

The desk study also includes a review of both published literature and GSI online dataset viewer (GSI, 2025) on peat failures/landslides in the vicinity of the Proposed Wind Farm site. There are no limitations associated with the desk study information.

3.2 Soils, Subsoil & Bedrock

A review of the Geological Survey of Ireland online database and published documents from the GSI, namely Sheet 17 Geology of the Shannon Estuary was carried out.

A review of the GSI subsoils maps indicate that the Site is mainly overlain by blanket peat, with localised areas of till derived from Sandstone and Shale and localised areas of bedrock outcrop or subcrop.

In relation to bedrock, the Proposed Wind Farm site is underlain by 3 different formations. Predominantly the Site is underlain by Gull Island Formation, which is described as grey siltstone and sandstone grey siltstones, with up to 20% sandstones at the base of the succession, decreasing towards the top. The sandstones are usually graded and exhibit flute casts at their base and ripple marks at the top. The south extent of the site is underlain by Central Clare Group, which is described as mudstones overlain by laminated to massive grey siltstones followed by thick layer of sandstone. Throughout the Site there is a Goniatite marine band ranging across the site location, described as a structural feature.

There are no fault-lines recorded within the bedrock within the site boundary.

No geological heritage sites are noted within the site development. The closest feature is approximately 9km northwest of the proposed site location. The feature is described as coastal section – foreshore exposure, consists of well-bedded sandstones, siltstones and mudstones of the Upper Carboniferous (Namurian) Central Clare Group.

The landslide susceptibility of the Proposed Wind Farm site was classified by the GSI (2025) as ranging from “low” to “moderately high” susceptibility, which is expected given the terrain present. This assessment is provided by the GSI as **guide** to the relative susceptibility of an area. The GSI mapping should not be treated as *“Hazard”* maps which show the potential to cause damage by frequency/probability or intensity or *“Risk”* maps which shows loss potential.

3.3 Previous Failures

There are no recorded peat failures within the Proposed Wind Farm site recorded on the GSI database (GSI, 2025). The nearest recorded slope failure is located approximately 25km southeast of the Proposed Wind Farm. The failure recorded occurred in Ballyhahill, Co. Limerick (undated). The slope failure in this area was an embankment landslide, the mechanism is undefined. An additional slope failure occurred approximately 29km northwest of the Proposed Wind Farm. The failure recorded occurred in Doonnagore, Co. Clare (undated). The slope failure in this area was an embankment landslide, the mechanism is undefined.

4. FINDINGS OF SITE RECONNAISSANCE

4.1 Site Reconnaissance

As part of the assessment of potential peat failure at the Proposed Wind Farm site, FT carried out a site reconnaissance in conjunction with the desk study review described in Section 3. This comprised walkover inspections of the Proposed Wind Farm site with recording of salient geomorphological features with respect to the wind farm development which included peat depth and preliminary assessment of peat strength. General photographs of the Proposed Wind Farm site are included at the end of the main text.

The following salient geomorphological features were considered:

- Active, incipient or relict instability (where present) within the peat deposits
- Presence of shallow valley or drainage line
- Wet areas
- Any change in vegetation
- Peat depth
- Slope inclination and break in slope

The survey covered the proposed locations for the turbine bases and associated infrastructure.

The method adopted for carrying out the site reconnaissance relied on experienced practitioners carrying out a visual assessment of the site supplemented with measurement of slope inclinations.

4.2 Findings of Site Reconnaissance

The site reconnaissance comprised a walkover inspection by FT engineers of the Proposed Wind Farm site from the 7th to the 8th August 2019 and the 30th to the 31st July 2024. Weather conditions for the site visits were mixed. Additional peat probing was undertaken by MKO during November 2025 for the offsite Proposed Hen Harrier Enhancement areas.

The findings from the site walkover have been used to optimise the layout of the infrastructure on site.

The main findings of the site walkover of the Proposed Wind Farm site are as follows:

(1) The Site is mainly covered in a layer of peat and has an undulating terrain. Peat depths vary across the Site depending on mainly topography. Generally deeper peat was encountered in the flatter areas of the Site with thinner peat on the surrounding slopes. Mature forestry, young forestry, and open peatland are present across the Site (see Appendix A).

(2) A total of 583 no. peat depth probes were carried out across the Site by both FT and MKO. Peat depths recorded across the site ranged from 0.0 to 6.1m with an average depth of 0.7m (Drawing P23-230-0600-0001). Approximately 91% of peat depth probes recorded peat depths of less than 2.0m. A number of localised readings (around 3%) were recorded where peat depths were between 3.0 and 6.1m. The deepest peat area within the Proposed Wind Farm is in the southwest of the site (west of T07), where no development is proposed. A deep area of peat (6.1m) was also recorded in the easternmost of the Proposed Hen Harrier Enhancement Lands.

(3) The peat depths recorded at the turbine locations varied from 0.7 to 2.0m with an average depth of 1.0m.

(4) With respect to the new proposed access roads, peat depths are typically less than 1.0m (average 0.55m) with localised depths of up to 3.3m recorded at a stream crossing to the north of T07.

(5) The Proposed Wind Farm will comprise both the upgrade of existing internal forestry roads and the construction of new proposed access roads. The construction of new proposed access roads will be carried out using an excavate and replace construction technique which involves the removal and replacement of peat or soft ground where encountered, and replacement with granular fill.

(6) Slope angles at the turbine locations ranged from 2 to 7 degrees. These slope angle readings were obtained using a combination of readings taken during the site reconnaissance by FT using handheld equipment, such as the Silva Clino Master which has an accuracy of +/- 0.25 degrees and from contour survey plans for the site.

(7) The slope angle quoted typically reflects the slope within the footprint of each infrastructure location.

(8) No evidence of past failures or any significant signs of peat instability were noted on the Site at the time of the site walkovers.

(9) A summary of the site walkover findings for the wind farm are as follows:

(a) The Site is typically covered in a layer of peat with undulating terrain and widespread mature and young forestry. Peat depths recorded across the site ranged from 0.0 to 6.1m with an average depth of 0.7m, representing relatively shallow peat deposits across the majority of the site. The deepest peat within the Proposed Wind Farm site was recorded to the west of T07 in an area where no development is proposed. A deep area of peat (6.1m) was also recorded in the easternmost of the Proposed Hen Harrier Enhancement Lands.

(b) A construction buffer zone plan has been produced for the Site (Drawing P23-230-0600-0600-0002). This shows areas on the site where no development will be carried out and areas with an elevated or higher construction risk. The above identified buffer areas are based on qualitative factors identified during the walkover survey e.g. relatively deep peat, quaking peat, mechanically cut peat, recent peat landslide, etc.

(c) The results of the peat depth probing, shear strength testing of the peat and qualitative factors identified on Site have been used in the stability and risk assessments, see Sections 6, 7 and 8 of this report for details.

(d) Based on the findings from the walkover survey, the Proposed Wind Farm is considered to have a **low** risk of peat failure.

5. GROUND INVESTIGATION

Ground investigations were carried out at the Proposed Wind Farm site by Irish Drilling Limited (IDL) under the supervision of FT in September 2019, with further ground investigation undertaken during January and September 2024. Ground investigations in the form of trial pits were carried out on the following dates:

- 18th and 19th September 2019
- 3rd to the 9th January 2024
- 30th September 2024

Two number rotary cored boreholes were undertaken at the borrow pit locations on the 3rd and 4th January 2024.

The ground investigation by IDL comprised 14 no. trial pits (2019), 17 no. trial pits (January 2024) and 5 no. trial pits (September 2024) with associated laboratory testing. The trial pits were carried out at turbine locations and along access roads to provide details of ground and groundwater conditions below the surface peat layer, to confirm the suitability of the overburden as a bearing stratum for the access roads and hardstands, and to confirm the suitability of the rock within the borrow pits for reuse in the construction of the Proposed Wind Farm.

The laboratory testing included the following:

- Classification testing for overburden material
- Rock strength testing (UCS and PLI)

The trial pits logs, photographs and associated laboratory testing are included within Appendix E and F of this report. A ground investigation location plan is included as drawing P23-230-0600-0003 in this report.

5.1 Summary of Ground Conditions

The ground conditions at the site can be typically categorised into the following deposits:

Peat – Typically described as soft plastic black amorphous peat. Peat thicknesses from the trial pits ranged from 0.1 to 2.7m.

Glacial Till – Typically described as firm to stiff, slightly sandy gravelly Silt/Clay with occasional to frequent cobbles and locally occasional boulders. Cobbles and boulders were typically noted as angular and sub-rounded and rounded. The thickness of the layer varies across the site depending on topography and depth to bedrock.

Also recorded was a silty sandy Gravel with cobbles, considered to be a granular glacial deposit.

Bedrock – Probable weathered bedrock was encountered in 25 of the 36 nos. trial pits, with the trial pits all refusing in this layer. The weathered bedrock was described as angular gravel and cobbles of shale/siltstone. Bedrock recovered from the rotary cored boreholes is described as weak to strong thinly bedded grey and dark grey Siltstone, and extremely strong thinly bedded greenish grey Sandstone.

Groundwater was noted during the excavation of nine of the trial pits. Groundwater was recorded at a depth of between 0.4 and 4.5m bgl, with flow ranging from slow to rapid.

5.2 Summary of Laboratory Tests

Laboratory testing comprising moisture content, Atterberg limit tests and particle size distribution (PSD) testing was undertaken on samples from the trial pits. Based on the results of the particle size distribution (PSD) tests, the descriptions on the final trial pit logs have been updated. Testing comprising uniaxial compressive strength (UCS) and point load index (PLI) was undertaken on rock samples from the rotary core boreholes.

Atterberg limit tests carried out on the samples classify the material as Clay of low plasticity, or non-plastic (Silt).

5.3 Summary of Geotechnical Parameters

Table 5-1 contains characteristic geotechnical parameters for the main material types likely to be encountered on the Proposed Wind Farm site. Where direct measurement of parameters has not been carried out, established correlations with measured properties have been used to derive values. Characteristic values are defined as a cautious estimate of the value affecting the occurrence of limit state based on clause 2.4.5.2 from Eurocode 7. Values have been derived from both laboratory testing and in-situ (shear vane) measurements. Rock strength testing indicates that the rock within the borrow pits will be suitable for reuse in the construction of the Proposed Wind Farm. Trial pit descriptions and the results of laboratory testing show that the glacial till material present below the peat will be a suitable bearing stratum for both the access roads and the crane hardstands.

Table 5-1: Summary of Geotechnical Parameters

Material Type/Strata	Unit Weight	Geotechnical Parameters		
		Undrained Parameters	Drained Parameters	
	γ (kN/m^3)	c_u (kPa)	ϕ' (°)[4]	c' (kPa)
Peat	10.5	6 [3]	25	4
Glacial Till	19	75	30	0
Weathered Bedrock	21	-	36	-
Intact Bedrock	21	-	36	250

Notes
Note (1) The above parameters are indicative only and have been derived based on experience and from a review of the ground investigation carried out at the site.
Note (2) Where direct measurement of parameters has not been carried out, established correlations with measured properties have been used to derive values.
Note (3) A lower bound undrained shear strength, c_u for the peat of 6kPa was selected. The lowest recorded value on the Cahermurphy West wind farm site was 8kPa, which was only recorded in one location in an area of deep peat, hence a value of 6kPa is a conservative value.
Note (4) ϕ' (°) – internal angle of shearing resistance.

6. PEAT DEPTHS, STRENGTH & SLOPE AT PROPOSED INFRASTRUCTURE LOCATIONS

As part of the site walkover, peat depth, in-situ peat strength and slope angles were recorded at various locations across the site.

6.1 Peat Depth

Peat depth probes were carried out at proposed turbine locations and along access roads and other main infrastructure elements. At turbine locations 5 probes were carried out around the turbine location, and an average peat depth was calculated.

6.2 Peat Strength

The strength testing was carried out in-situ using a Geonor H-60 Hand-Field Vane Tester. From FT's experience hand vanes give indicative results for in-situ strength of peat and would be considered best practice for the field assessment of peat strength.

6.3 Slope Angle

The slope angles at each of the main infrastructure locations were obtained using a combination of readings taken during the site reconnaissance by FT using handheld equipment, such as the Silva Clino Master and from contour survey plans for site.

The slope angle quoted typically reflects the slope within the footprint of each infrastructure location. It should be noted that slope angles derived from contour survey plans would be considered approximate, as such surveys are dependent on the density of survey data and do not always reflect local variations in ground topography. Slope angles recorded during the site reconnaissance by FT using handheld equipment would generally be deemed more accurate and representative of local topography.

6.4 Summary of Findings

Based on the peat depths recorded across the site by FT and MKO, the peat varied in depth from 0.0 to 6.1m with an average depth of 0.7m. All peat depth probes carried out on site have been utilised to produce a peat depth contour plan for the site (Drawings P23-230-0600-0001 and 0012).

A summary of the peat depths at the proposed infrastructure locations is given in Table 6.1. The data presented in Table 6.1 is used in the peat stability assessment of the site.

Table 6.1: Peat Depth & Slope Angle at Proposed Infrastructure Locations

Turbine	Easting	Northing	Peat Depth Range (m) (1)	Average Peat Depth (m)	Slope Angle (°) (2)
T01	507772	669761	0.1-0.9	0.5	2
T02	508411	669739	0.0-0.7	0.25	4
T03	507788	669301	0.1-0.9	0.45	2
T04	508308	669151	0.1-2.2	1.1	4
T05	508887	669573	0.2-0.5	0.35	4
T06	509055	669148	1.3-1.8	1.6	2
T07	508309	668624	0.0-1.5	0.7	3
T08	508942	668587	0.1-1.0	0.4	8
Substation	509454	668887	0.1-0.15	0.1	2
Met Mast	508187	668428	0.5-0.6	0.55	7
Construction Compound	509404	669338	0.4-0.6	0.5	4
Borrow Pit 1	508654	669584	0.2-0.5	0.35	5
Borrow Pit 2	509090	668755	0-0.9	0.45	6

Note (1) Based on probe results from the site walkovers. The range of peat depths for the infrastructure locations are typically based on a 10m grid carried out around the infrastructure element, where accessible.

Note (2) The slope angles at each of the main infrastructure locations were obtained using a combination of readings taken during the site reconnaissance by FT using handheld equipment, such as the Silva Clino Master (which has an accuracy of +/- 0.25 degrees) and from contour survey plans for site. The slope angle quoted typically reflects the slope within the footprint of each infrastructure location.

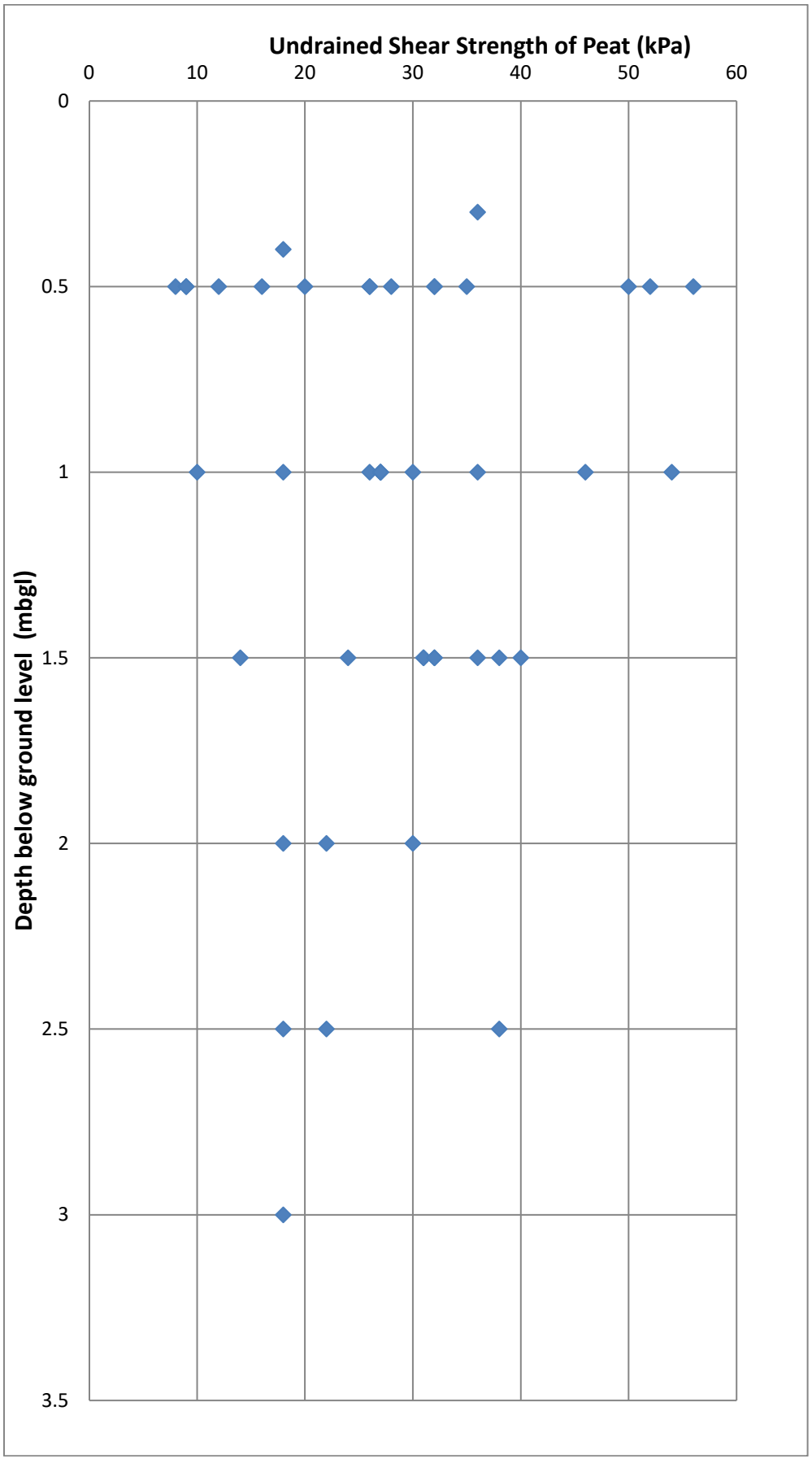
Note (3) The data presented in the Table above is used in the peat stability assessment of the site.

In addition to probing, in-situ shear vane testing was carried out as part of the Site walkovers. Strength testing was carried out across the site to provide representative coverage of indicative peat strengths. The results of the vane testing with depth are presented in Figure 6.1.

The hand vane results indicate undrained shear strengths in the range 8 to 56kPa, with an average value of 28kPa. The strengths recorded would be typical of well drained peat as is present on the Proposed Wind Farm site. The lowest peat strength (8kPa) was recorded in an area of deep peat (4.5m) where no development is proposed and as such is not considered representative of the peat strength across the Proposed Wind Farm site.

Peat strength at sites of known peat failures (assuming undrained loading failure) are generally very low, for example the undrained shear strength at the Derrybrien failure (AGEC, 2004) as derived from back-analysis, was estimated at 2.5kPa. The recorded undrained strength at the Proposed Wind Farm site is significantly greater than the lower bound values for Derrybrien indicating that there is no close correlation to the peat conditions at the Derrybrien site.

Figure 6.1: Undrained Shear Strength (c_u) Profile for Peat with Depth



7. PEAT STABILITY ASSESSMENTS

The peat stability assessment includes an assessment of the stability of the natural peat slopes for individual parcels across the site including at the turbine locations and along the proposed access roads. The assessment also analyses the stability of the natural peat slopes with a surcharge loading of 10kPa, equivalent to placing 1m of stockpiled peat on the surface of the peat slope. The presence of peat was only indicated at isolated locations along the Proposed Grid Connection route (with a maximum depth of 0.5m during probing), and as the Proposed Grid Connection will primarily be constructed in the public road, with limited off-road section (of which no locations contain peat), no peat stability analysis was undertaken for this part of the Proposed Wind Farm.

7.1 Methodology for Peat Stability Assessment

Stability of a peat slope is dependent on several factors working in combination. The main factors that influence peat stability are slope angle, shear strength of peat, depth of peat, pore water pressure and loading conditions.

An adverse combination of factors could potentially result in peat sliding. An adverse condition of one of the above-mentioned factors alone is unlikely to result in peat failure. The infinite slope model (Skempton and DeLory, 1957) is used to combine these factors to determine a factor of safety for peat sliding. This model is based on a translational slide, which is a reasonable representation of the dominant mode of movement for peat failures.

To assess the factor of safety for a peat slide, an undrained (short-term stability) and drained (long-term stability) analysis has been undertaken to determine the stability of the peat slopes on site.

1. The undrained loading condition applies in the short-term during construction and until construction induced pore water pressures dissipate.

2. The drained loading condition applies in the long-term. The condition examines the effect of the change in groundwater level as a result of rainfall on the existing stability of the natural peat slopes.

Undrained shear strength values (c_u) for peat are used for the total stress analysis. Based on the findings of the 2003 Derrybrien failure and other failures in peat, undrained loading during construction was found to be the critical failure mechanism.

A drained analysis requires effective cohesion (c') and effective friction angle (ø') values for the calculations. These values can be difficult to obtain because of disturbance experienced when sampling peat and the difficulties in interpreting test results due to the excessive strain induced within the peat. To determine suitable drained strength values a review of published information on peat was carried out. Table 7.1 shows a summary of the published information on peat together with drained strength values.

From Table 7.1 the values for c' ranged from 1.1 to 8.74kPa and ø' ranged from 21.6 to 43°. The average c' and ø' values are 4.5kPa and 30° respectively. Based on the above, it was considered to adopt a conservative approach and to use design values below the averages. For design the following general drained strength values have been used for the site:

c' = 4kPa
$ø'$ = 25°

Table 7.1: List of Effective Cohesion and Friction Angle Values for Peat

Reference	Cohesion, c' (kPa)	Friction Angle, ø' (degs)	Testing Apparatus/ Comments
Hanrahan et al (1967)	5 to 7	36 to 43	From triaxial apparatus
Rowe and Mylleville (1996)	2.5	28	From simple shear apparatus
Landva (1980)	2 to 4	27.1 to 32.5	Mainly ring shear apparatus for normal stress greater than 13kPa
	5 to 6	-	At zero normal stress
Carling (1986)	6.5	0	-
Farrell and Hebib (1998)	0	38	From ring shear and shear box apparatus. Results are not considered representative.
	0.61	31	From direct simple shear (DSS) apparatus. Result considered too low therefore DSS not considered appropriate
Rowe, Maclean and Soderman (1984)	1.1	26	From simple shear apparatus
	3	27	From DSS apparatus
McGreever and Farrell (1988)	6	38	From triaxial apparatus using soil with 20% organic content
	6	31	From shear box apparatus using soil with 20% organic content
Hungr and Evans (1985)	3.3	-	Back-analysed from failure
Dykes and Kirk (2006)	3.2	30.4	Test within acrotelm
Dykes and Kirk (2006)	4	28.8	Test within catotelm
Warburton et al (2003)	5	23.9	Test in basal peat
Warburton et al (2003)	8.74	21.6	Test using fibrous peat
Hendry et al (2012)	0	31	Remoulded test specimen
Komatsu et al (2011)	8	34	Remoulded test specimen
Zwanenburg et al (2012)	2.3	32.3	From DSS apparatus
Den Haan & Grognet (2014)	-	37.4	From large DSS apparatus
O'Kelly & Zhang (2013)	0	28.9 to 30.3	Tests carried out on reconstituted, undisturbed and blended peat samples

7.2 Analysis to Determine Factor of Safety (Deterministic Approach)

The purpose of the analysis was to determine the Factor of Safety (FoS) of the peat slopes using infinite slope analysis. The analysis was carried out at the turbine locations, along the proposed access roads and at various locations across the site.

The FoS provides a direct measure of the degree of stability of the slope. A FoS of less than unity indicates that a slope is unstable, a FoS of greater than unity indicates a stable slope.

The previous code of practice for earthworks BS 6031:1981 (BSI, 1981), provided advice on design of earthworks slopes. It stated that for a first-time failure with a good standard of site investigation the design FoS should be between 1.3 and 1.4. A FoS of 1.4 is taken as indicative of sufficient stability within this report, which would be deemed a conservative approach.

As a general guide the FoS limits for peat slopes in this report are summarised in Table 7.2.

Table 7.2: Factor of Safety Limits for Slopes

Factor of Safety (FoS)	Degree of Stability
Less than 1.0	Unstable (red)
Between 1.0 and 1.4	Marginally stable (yellow)
1.4 or greater	Acceptable (green)

Eurocode 7 (EC7) (IS EN 1997-1:2005) now serves as the reference document and the basis for design geotechnical engineering works. The design philosophy used in EC7 applies partial factors to soil parameters, actions and resistances. Unlike the traditional approach, EC7 does not provide a direct measure of stability, since global Factors of Safety are not used.

As such, and in order to provide a direct measure of the level of safety on a site, EC7 partial factors have not been used in this stability assessment. The results are given in terms of FoS.

A lower bound undrained shear strength, c_u for the peat across the Site of 6kPa was selected for the assessment based on the c_u values recorded at the site. It should be noted that a c_u of 6kPa for the peat is considered a conservative value for the analysis and is not representative of all peat present across the Site. In reality the peat has a higher undrained strength.

The formula used to determine the factor of safety for the undrained condition in the peat (Bromhead, 1986) is as follows:

$$F = \frac{c_u}{\gamma z \sin\alpha \cos\alpha}$$

Where:

F = Factor of Safety

c_u = Undrained strength

γ = Bulk unit weight of material
z = Depth to failure plane assumed as depth of peat
α = Slope angle

The formula used to determine the factor of safety for the drained condition in the peat (Bromhead, 1986) is as follows:

$$F = \frac{c' + (\gamma z - \gamma_w h_w)\cos^2 \alpha \tan \phi'}{\gamma z \sin \alpha \cos \alpha}$$

Where:

F = Factor of Safety
c' = Effective cohesion
γ = Bulk unit weight of material
z = Depth to failure plane assumed as depth of peat
γ_w = Unit weight of water
h_w = Height of water table above failure plane
α = Slope angle
ϕ' = Effective friction angle

For the drained analysis the level of the water table above the failure surface is required to calculate the factor of safety for the slope. Since the water level in blanket peat can be variable and can be recharged by rainfall, it is not feasible to establish its precise location throughout the site. Therefore, a sensitivity analysis using water level ranging between 0% and 100% of the peat depth was conducted, where 0% equates to the peat being completely dry and 100% equates to the peat been fully saturated.

The following general assumptions were used in the analysis of peat slopes at each location:

(1) Peat depths are based on the maximum peat depth recorded at each location from the walkover surveys.

(2) The slope angles used in the peat stability assessment were obtained using a combination of readings taken during the site reconnaissance by FT using handheld equipment and from contour survey plans for site. It should be noted that slope angles derived from contour survey plans would be considered approximate, as such surveys are dependent on the density of survey data and do not always reflect local variations in ground topography.

(3) Slope angle at base of sliding assumed to be parallel to ground surface.

(4) A lower bound undrained shear strength, c_u for the peat of 6kPa was selected for the assessment. The lowest recorded value on the Proposed Wind Farm site during the site walkovers was 8kP, in an area of deep peat. It should be noted that a c_u of 6kPa for the peat is considered a conservative value for the analysis and is not representative of all peat present across the site. In reality, the peat has a significantly higher undrained strength as a result of the artificial drainage present across the site.

For the stability analysis two load conditions were examined, namely:

Condition (1): no surcharge loading
Condition (2): surcharge of 10 kPa, equivalent to 1m of stockpiled peat assumed as a worst case.

7.3 Results of Analysis

7.3.1 Undrained Analysis for the Peat

The results of the undrained analysis for the natural peat slopes are presented in Appendix C and the results of the undrained analysis for the most critical load case (load condition 2) are shown on drawings P23-230-0600-0004 and 0013. The undrained analysis for load condition 2 is considered the most critical load case as most peat failures occur in the short term upon loading of the peat surface. The peat and spoil management areas will store a maximum height of 1.2m of peat on top of the existing peat. The storage areas are located in clearfell areas, following the removal of the tree trunks and branches, however the tree stumps and roots are left in-situ, and as such this clearfelling is not considered to significantly reduce the peat strength or directly impact on the peat stability. Peat and spoil stored within the two borrow pits will be stored below ground level, and as such no instability is anticipated to be associated with the storage of peat in these areas.

The calculated FoS for load condition 1 is in excess of 1.40 for each of the locations (227 no. locations) analysed with a range of FoS of 2.16 to 343.84, indicating a low risk of peat instability.

The calculated FoS for load condition 2 is in excess of 1.40 for each of the locations (227 no. locations), analysed with a range of FoS of 1.72 to 31.26, indicating a low risk of peat instability.

The results from the main infrastructure locations, including along access roads and in areas of peat placement, are summarised in Table 7.3 to 7.5.

Table 7.3: Factor of Safety Results (Undrained Condition)

Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition	
			Condition (1)	Condition (2)
T01	507772	669761	**12.76**	**6.04**
T02	508411	669738	**7.02**	**2.34**
T03	507788	669300	**85.96**	**24.56**
T04	508308	669150	**7.68**	**3.64**
T05	508887	669572	**14.37**	**5.39**
T06	509055	669147	**9.56**	**6.14**
T07	508308	668623	**5.74**	**3.83**
T08	508942	668586	**4.35**	**2.18**
Substation	509454	668887	**28.86**	**4.81**
Met Mast	508187	668428	**10.88**	**3.11**
Construction Compound	509404	669338	**17.24**	**5.75**
Borrow Pit 1	508654	669584	**13.82**	**4.61**
Borrow Pit 2	509090	668755	**6.41**	**3.04**
HH Enhancement Area 1	509426	670490	**3.28**	**2.55**
HH Enhancement Area 2	511936	670350	**2.16**	**1.72**

Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition	
			Condition (1)	Condition (2)
HH Enhancement Area 3	513844	670929	3.25	1.89

Table 7.4: Factor of Safety Results along Access Roads (Undrained Condition)

Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition	
			Condition (1)	Condition (2)
Spur to T01	Varies		38.27	8.83
T01 to T02	Varies		35.09	3.19
Spur to T03	Varies		28.74	6.63
Spur to T04	Varies		10.88	3.11
T02 to T05	Varies		5.76	3.14
Spur to T05	Varies		4.31	2.87
Spur to T06	Varies		11.48	5.02
T07 to T08	Varies		4.35	7.84
Spur to Substation	Varies		19.24	4.44
Spine Road to T07	Varies		9.92	3.31

Table 7.5: Factor of Safety Results for Peat Storage Areas (Undrained Condition)

Location	Easting	Northing	Factor of Safety for Load Condition (2)
T01 storage area	507735	669771	6.04
T02 storage area	508401	669779	2.34
T03 storage area	507777	669265	24.56
T04 storage area	508260	669141	3.64
T06 storage area	509016	669189	6.14
T07 storage area	508307	668669	3.83

7.3.2 Drained Analysis for the Peat

The results of the drained analysis for the peat are presented in Appendix C. The results from the main infrastructure locations, including along access roads and in areas of peat placement, are summarised in Table 7.6 to 7.8. As stated previously, the drained loading condition examines the effect of rainfall and water on the existing stability of the natural peat slopes.

The calculated FoS for load condition 1 is in excess of 1.40 for each of the locations (227 no. locations) analysed with a range of FoS of 1.44to 229.23, indicating a low risk of peat instability.

The calculated FoS for load condition 2 is in excess of 1.40 for each of the locations (227 no. locations) analysed with a range of FoS of 2.48 to 45.13, indicating a low risk of peat instability.

Table 7.6: Factor of Safety Results (Drained Conditions)

Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition	
			Condition (1)	Condition (2)
T01	507772	669761	**8.50**	**8.71**
T02	508411	669738	**7.32**	**4.20**
T03	507788	669300	**84.02**	**43.09**
T04	508308	669150	**10.45**	**7.75**
T05	508887	669572	**16.25**	**10.26**
T06	509055	669147	**19.72**	**17.45**
T07	508308	668623	**12.72**	**11.45**
T08	508942	668586	**6.22**	**4.77**
Substation	509454	668887	**23.68**	**7.64**
Met Mast	508187	668428	**10.57**	**5.39**
Construction Compound	509404	669338	**18.16**	**10.50**
Borrow Pit 1	508654	669584	**14.54**	**8.40**
Borrow Pit 2	509090	668755	**8.71**	**6.46**
HH Enhancement Area 1	509426	670490	**2.19**	**3.68**
HH Enhancement Area 2	511936	670350	**1.44**	**2.48**
HH Enhancement Area 3	513844	670929	**2.16**	**2.70**

Table 7.7: Factor of Safety Results along Access roads (Drained Condition)

Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition	
			Condition (1)	Condition (2)
Spur to T01	Varies		**34.41**	**7.53**
T01 to T02	Varies		**23.39**	**4.53**
Spur to T03	Varies		**19.16**	**9.55**
Spur to T04	Varies		**13.02**	**7.84**
T02 to T05	Varies		**3.84**	**4.52**

Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition	
			Condition (1)	Condition (2)
Spur to T05	Varies		2.87	4.14
Spur to T06	Varies		18.67	7.08
T07 to T08	Varies		6.22	4.77
Spur to Substation	Varies		19.49	7.08
Spine Road to T07	Varies		6.61	4.74

Table 7.8: Factor of Safety Results Storage Areas (Drained Condition)

Location	Easting	Northing	Factor of Safety for Load Condition (2)
T01 storage area	507735	669771	8.71
T02 storage area	508401	669779	4.20
T03 storage area	507777	669265	43.09
T04 storage area	508260	669141	7.75
T06 storage area	509016	669189	17.45
T07 storage area	508307	668669	11.45

8. PEAT STABILITY RISK ASSESSMENT

A peat stability risk assessment was carried out for the infrastructure elements at the Proposed Wind Farm. This approach adheres to best practice guidance for geotechnical/peat stability risk assessments as given in PLHRA (2017) and MacCulloch (2005).

The risk assessment uses the results of the stability analysis (deterministic approach) in combination with qualitative factors, which cannot be reasonably included in a stability calculation but nevertheless may affect the occurrence of peat instability, to assess the risk for each infrastructure element.

For each of the main infrastructure elements, a risk rating (product of probability and impact) is calculated and rated as shown in Table 8.1. Where a subsection is rated 'Medium' or 'High', control measures are required to reduce the risk to at least a 'Low' risk rating. Where a subsection is rated 'Low' or 'Negligible', only routine control measures are required.

Table 8.1: Risk Rating Legend

17 to 25	High: avoid works in area or significant control measures required
11 to 16	Medium: notable control measures required
5 to 10	Low: only routine control measures required
1 to 4	Negligible: none or only routine control measures required

A full methodology for the peat stability risk assessment is given in Appendix D.

8.1 Summary of Risk Assessment Results

The results of the peat stability risk assessment for potential peat failure at the infrastructure elements is presented as a Geotechnical Risk Register in Appendix B and summarised in Table 8.2.

The risk rating for each infrastructure element at the Proposed Wind Farm is designated Negligible or Low following some mitigation/control measures being implemented.

Details of the required infrastructure specific mitigation/control measures can be found in the Geotechnical Risk Register for each infrastructure element (Appendix B) and the general (not notable) infrastructure specific control measures are summarised below.

- Use of experienced geotechnical staff for confirmatory site investigation and construction supervision.
- Maintain hydrology of area as far as possible by maintaining the flow of water in existing drains to prevent the build-up of water pressures in the peat, leading to the peat becoming "buoyant".
- Use of contractors with experience in working peat and trained operators to carry out the work.
- Avoid stacking of felled trees in deep peat (>2.0m) areas in Proposed Hen Harrier Enhancement Lands.

Table 8.2: Summary of Peat Stability Risk Register

Infrastructure	Pre-Control Measure Implementation Risk Rating	Pre-Control Measure Implementation Risk Rating Category	Notable Control Measures Required	Post-Control Measure Implementation Risk Rating	Post-Control Measure Implementation Risk Rating Category
T01	Negligible	1 to 4	No	Negligible	1 to 4
T02	Negligible	1 to 4	No	Negligible	1 to 4
T03	Negligible	1 to 4	No	Negligible	1 to 4
T04	Low	5 to 10	No	Low	5 to 10
T05	Negligible	1 to 4	No	Negligible	1 to 4
T06	Negligible	1 to 4	No	Negligible	1 to 4
T07	Negligible	1 to 4	No	Negligible	1 to 4
T08	Low	5 to 10	No	Low	5 to 10
Met Mast	Negligible	1 to 4	No	Negligible	1 to 4
Substation	Negligible	1 to 4	No	Negligible	1 to 4
Construction Compound	Negligible	1 to 4	No	Negligible	1 to 4
Borrow Pit 1	Negligible	1 to 4	No	Negligible	1 to 4
Borrow Pit 2	Negligible	1 to 4	No	Negligible	1 to 4
Spur to T01	Negligible	1 to 4	No	Negligible	1 to 4
T01 to T02	Negligible	1 to 4	No	Negligible	1 to 4
Spur to T03	Negligible	1 to 4	No	Negligible	1 to 4
Spur to T04	Low	5 to 10	No	Low	5 to 10
T02 to T05	Negligible	1 to 4	No	Negligible	1 to 4
Spur to T05	Negligible	1 to 4	No	Negligible	1 to 4
Spur to T06	Negligible	1 to 4	No	Negligible	1 to 4
T07 to T08	Negligible	1 to 4	No	Negligible	1 to 4
Spur to Substation	Low	5 to 10	No	Negligible	1 to 4
Spine Road to T07	Low	5 to 10	No	Negligible	1 to 4
HH Enhancement Lands 1	Low	5 to 10	No	Low	5 to 10
HH Enhancement Lands 2	Low	5 to 10	No	Low	5 to 10
HH Enhancement Lands 3	Negligible	1 to 4	No	Negligible	1 to 4

9. INDICATIVE FOUNDATION TYPE AND FOUNDATION DEPTH FOR TURBINES

9.1 Summary

Based on a review of the ground investigation information for site, an assessment of the likely foundation type and founding depths for each turbine location was carried out. A summary of this assessment is provided in Table 9-1.

Table 9-1: Summary of Proposed Turbine Foundation Type and Founding Depths

Turbine No.	Proposed Turbine Foundation Type	Relevant GI	Proposed founding depth (m bgl)	Ground Conditions
T01	Gravity foundation	TP02 (2019)	3.0	Silty Gravel with high cobble content to 3.3m bgl.
T02	Gravity foundation	TP04A (2024a) TP02 (2024b)	3.0	Stiff Silt over probable bedrock at 1.5m bgl.
T03	Gravity foundation	TP01A (2024a)	3.0	Firm Silt over probable bedrock at 0.9m bgl.
T04	Gravity foundation	TP01 (2024b)	3.0	Stiff Silt over Gravel at 2.0m bgl.
T05	Gravity foundation	TP06 (2019) TP15A (2024a)	3.0	Gravel over probable bedrock at 1.2m bgl.
T06	Gravity foundation	TP04 (2024b)	3.0	Peat and Silt over probable bedrock at 3.0m bgl
T07	Gravity foundation	TP07 (2019), TP11A (2024a)	3.0	Stiff gravelly Silt over probable bedrock at 2.8m bgl.
T08	Gravity foundation	TP16A (2024a)	3.0	Gravel over probable bedrock at 1.7m bgl.

Based on professional judgement it is likely that following the completion of confirmatory ground investigation prior to construction (boreholes with in-situ SPT testing in the overburden and follow-on rotary core through bedrock) the turbine locations will be deemed suitable for gravity type foundations as per Table 9-1. Such confirmatory ground investigation is for construction purposes and is not required to further assess the risk of peat failure.

For gravity type turbine foundations, where the depth of excavation exceeds the required founding depth for the proposed turbine base, up-fill material consisting of granular fill (6N) will be used to backfill the excavation to the required founding depth.

10. FOUNDING DETAILS FOR INFRASTRUCTURE ELEMENTS (EXCEPT TURBINES)

This section provides a summary of the founding details for various elements of the proposed infrastructure across the Proposed Wind Farm site. The detailed methodologies for the construction of these elements of the Proposed Wind Farm are included in Chapter 4 of the EIAR.

10.1 Access Roads

The access roads on Site will be constructed as excavate and replace (founded) type construction, which, given the ground conditions and type of terrain present, is deemed the most appropriate construction approach. Floating road construction will not be used as part of the Proposed Wind Farm.

The total length of new proposed access roads to be constructed on site is 5.5km (see Drawing P23-230-0600-0005 of the Peat and Spoil Management Plan – Appendix 8-2 of the EIAR).

The proposed make-up of the founded access roads is anticipated to be an average stone thickness of 750mm. The requirement for a layer of geotextile and geogrid and the necessary stone thickness will be confirmed at pre-construction stage.

See the Peat & Spoil Management Plan (FT, 2026) for the Proposed Wind Farm for further details on the proposed access roads on Site.

10.2 Crane Hardstands

The crane hardstands will be constructed using the founded technique (i.e. not floated technique).

Crane hardstands are constructed using compacted Class 1/6F material on a suitable sub-formation to achieve the required bearing resistance. The hardstands will be designed for the most critical loading combinations from the crane.

The hardstands will be founded on competent material underlying the peat deposits. The founding levels for the hardstands will be variable across the site and will be confirmed at pre-construction stage.

The make-up of the hardstands will include an average of 1000mm of granular stone fill with a layer of geotextile and/or geogrid, if deemed necessary by the Designer.

10.3 Substation Foundations & Platforms

The substation platform will be constructed using the founded technique (i.e. not floated technique). The substation foundations will comprise strip/raft foundations under the main footprint of the building with a basement/pit for cable connections.

Substation platforms are constructed using compacted Class 1/6F material on a suitable sub-formation to achieve the required bearing resistance.

The substation platform will be founded on competent material underlying the peat deposits.

Given the ground conditions present at the proposed substation, the foundations will be founded on firm glacial till or medium dense granular material. The founding depth for substation platforms is to be 0.5-1.0m.

The make-up of the substation platform will include an average of 1000mm of granular stone fill with a layer of geotextile and/or geogrid if deemed necessary by the Designer. At the underside of the substation foundations, a layer of structural up-fill (class 6N) will be required.

10.4 Construction Compound Platforms

The construction compound platforms will be constructed using the founded technique (i.e. not floated technique).

The construction compound platforms are constructed using compacted Class 1/6F material on a suitable sub-formation to achieve the required bearing resistance.

The construction compound platforms will be founded on material underlying the peat deposits.

Founding depth for construction compound platforms will require excavations from 0.5m to 1.0m bgl.

The typical make-up of the construction compound platform will include an average of 750mm of granular stone fill with possibly a layer of geotextile and/or geogrid.

10.5 Met Mast Foundations

The met mast foundation will comprise a gravity type foundation.

Given the ground conditions present at the proposed met mast, the foundation will be founded on glacial till, glacial granular material, or bedrock.

The founding depth for the met mast foundation will be 1.0 to 1.5m bgl. At the underside of the met mast foundation, a layer of structural up-fill (class 6N) will be required.

10.6 Peat Placement Areas

A number of peat storage/remediation locations were reviewed as part of the assessment of the Proposed Wind Farm. These are located within clear fell area around a number of the turbines (6 no.) in the Proposed Wind Farm. The placement of peat in these areas will be limited to a maximum of 1.2m in height, and the stability of these areas is covered under load condition 2 as reported in Section 7 of this report. These peat placement areas are located in areas of clearfell around turbines, where the tree trunks and branches will be removed, but the tree stumps and roots left in-situ. This clearfelling is not considered to significantly reduce the peat strength or significantly impact on the peat stability.

Additional discussion of the peat placement areas is provided in the Peat and Spoil Management Plan (FT, 2026) for the Proposed Wind Farm.

10.7 Proposed Hen Harrier Enhancement Lands

A number of Hen Harrier Enhancement Lands (3 no.) were reviewed as part of the assessment of the Proposed Wind Farm, due to felling and stump removal works potentially having an impact on the underlying peat stability. The parcels of the Hen Harrier Enhancement Lands subject to farmland management practices were not considered in this peat stability assessment as they will not be subject to any intrusive works, and instead undergo non-intrusive management practices such as grazing regimes. The forestry parcels are located to the east of the Proposed Wind Farm and described in more detail in Chapter 4 of the EIAR. Works in the forested area of the Hen Harrier Enhancement Lands will involve the permanent felling of trees and stump flipping to prevent regrowth. No drain blocking is proposed in these areas. A check of the factor of safety and a risk assessment of these areas has been undertaken and are summarised in Section 7 and 8 of this report. There are no peat stability concerns associated with the proposed works in these areas, providing the mitigation measures included in the risk assessment are implemented.

11. SUMMARY AND MEASURES

11.1 Summary

The following summary is given.

FT was engaged by MKO to undertake a geotechnical and peat stability assessment of the Proposed Wind Farm site.

The findings of the peat assessment showed that the site has an acceptable margin of safety and is suitable for the Proposed Wind Farm. The findings include recommendations and control measures for construction work in peat lands, all of which will be implemented in full to ensure that all works adhere to an acceptable standard of safety.

The site, which comprises undulating terrain consists predominantly of blanket peat, cutover peat and forestry.

Peat depth recorded during the site walkovers and from the ground investigation ranged from 0.1 to 6.1m with an average peat depth of 0.7m. 92% of the probes recorded peat depths of less than 2.0m with 97% of peat depth probes recorded peat depths of less than 3.0m. A number of localised readings recorded peat depths from 3.0 to 6.1m. The deeper peat areas were avoided when optimising the wind farm layout of the site.

Slope inclinations at the main infrastructure locations range from 2 to 7 degrees.

An analysis of peat sliding was carried out at the main infrastructure locations across the Proposed Wind Farm for both the undrained and drained conditions. The purpose of the analysis was to determine the Factor of Safety (FoS) of the peat slopes.

An undrained analysis was carried out, which applies in the short-term during construction. For the undrained condition, the calculated FoS for load conditions 1 and 2 for the locations analysed showed that all locations have an acceptable FoS of greater than 1.4, indicating a low risk of peat failure. The undrained analysis would be considered the most critical condition for the peat slopes.

A drained analysis was also carried out, which examined the effect of in particular, rainfall on the existing stability of the natural peat slopes on site. For the drained condition, the calculated FoS for load conditions (1) & (2) for the locations analysed, showed that all locations have an acceptable FoS of greater than 1.4.

The peat stability risk assessment at each infrastructure location, along access roads and for peat placement areas identified a number of mitigation/control measures to reduce the potential risk of peat failure. See Appendix B for details of the required mitigation/control measures for each infrastructure element.

In summary, the findings of the peat assessment showed that the Proposed Wind Farm has an acceptable margin of safety, is suitable for the proposed wind farm development and is considered to be at **low** risk of peat failure provided appropriate control measures, such as implementing and maintaining an appropriate drainage system are implemented. The findings include mitigation/control measures for construction work in peat lands, all of which will be implemented in full to ensure that all works adhere to an acceptable standard of safety.

11.2 Measures

The following measures will be implemented in full.

Notwithstanding that the Proposed Wind Farm site has an acceptable margin of safety a number of mitigation/control measures are prescribed to ensure that all works adhere to an acceptable standard of safety for work in peatlands. Mitigation/control measures identified for each of the infrastructure elements in the risk assessment will be implemented throughout design and construction works (Appendix B).

The proposed construction method for the majority of the new proposed access roads at the wind farm is excavate and replace type construction.

The measures prescribed in FT's report 'Peat & Spoil Management Plan – Cahermurphy West Wind Farm' (FT, 2026) will be implemented in full during the design and construction stage of the wind farm development.

To minimise the risk of construction activity causing potential peat instability the Construction Environmental Management Plan (CEMP) for the project (Appendix 2.1) will be implemented in full. This will ensure that best practice guidance regarding the management of peat stability will be inherent in the construction phase.

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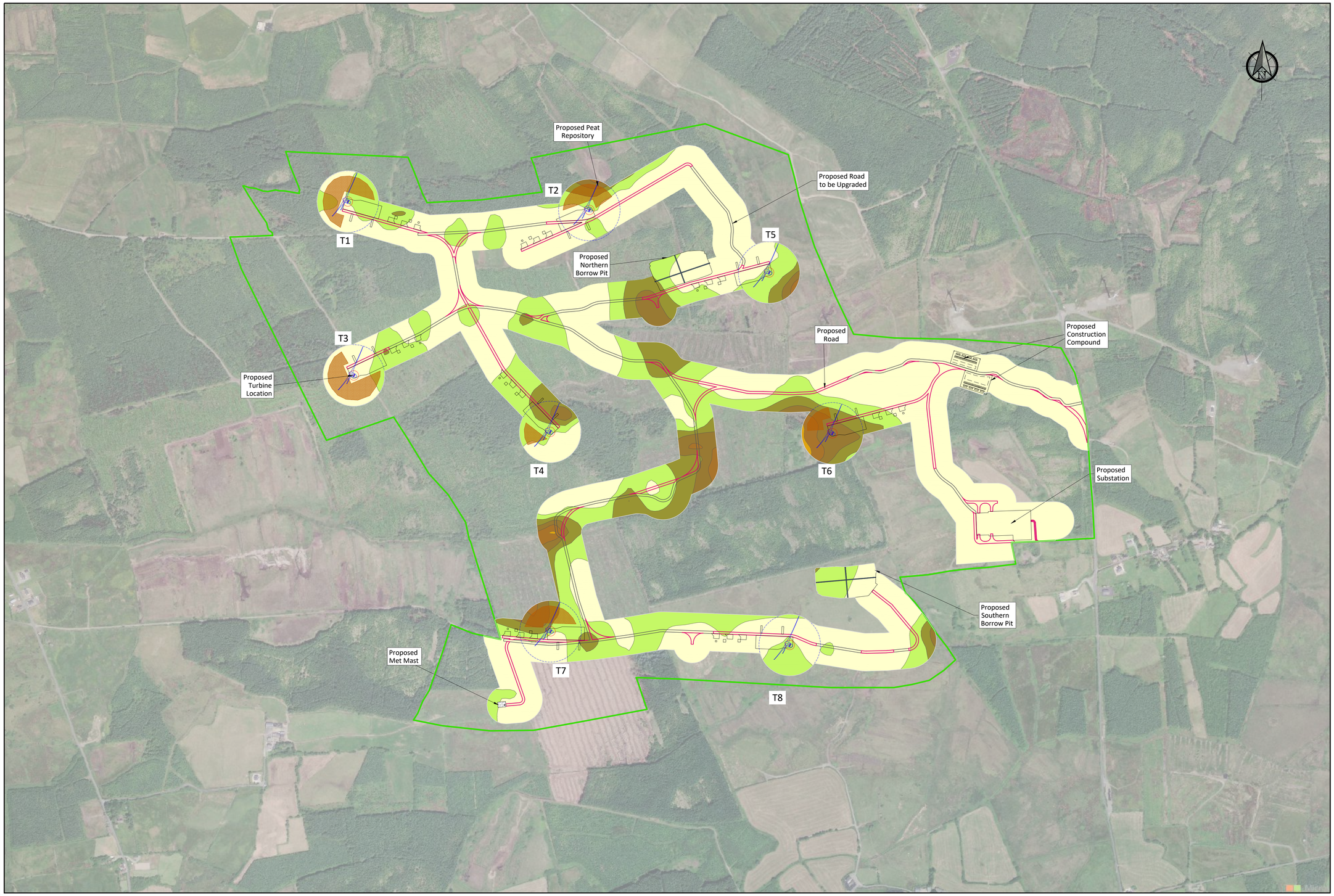
DRAWINGS



Legend:

EIAR Site Boundary

Peat Depth Legend:

- ≥ 0 < 0.5
- ≥ 0.5 < 1
- ≥ 1 < 1.5
- ≥ 1.5 < 2
- ≥ 2 < 2.5
- ≥ 2.5 < 3
- ≥ 3 < 3.5
- ≥ 3.5 < 4
- ≥ 4 ≤ 4.5
- ≥ 4.5 ≤ 5
- ≥ 5 ≤ 5.5
- ≥ 5.5 ≤ 6
- ≥ 6 ≤ 6.1

0m 50m 100m 150m 200m 250m 300m 350m 400m 450m 500m

Scale 1:5000

PLAN

Scale 1:5000

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Rev.	Description	App By	Date
P01	FOR INFORMATION	BDH	08.01.26
P02	FOR INFORMATION	BDH	12.02.26

PROJECT	CAHERMURPHY WEST
CLIENT	MKO
SHEET	PEAT DEPTH CONTOUR PLAN
Date	12.02.26
Project number	P23-230
Scale (@ A1)	1:5000
Drawn by	POR
Checked by	IH
Drawing Number	P23-230-0600-0001
Rev	P02

(Sheet set subset 0600)

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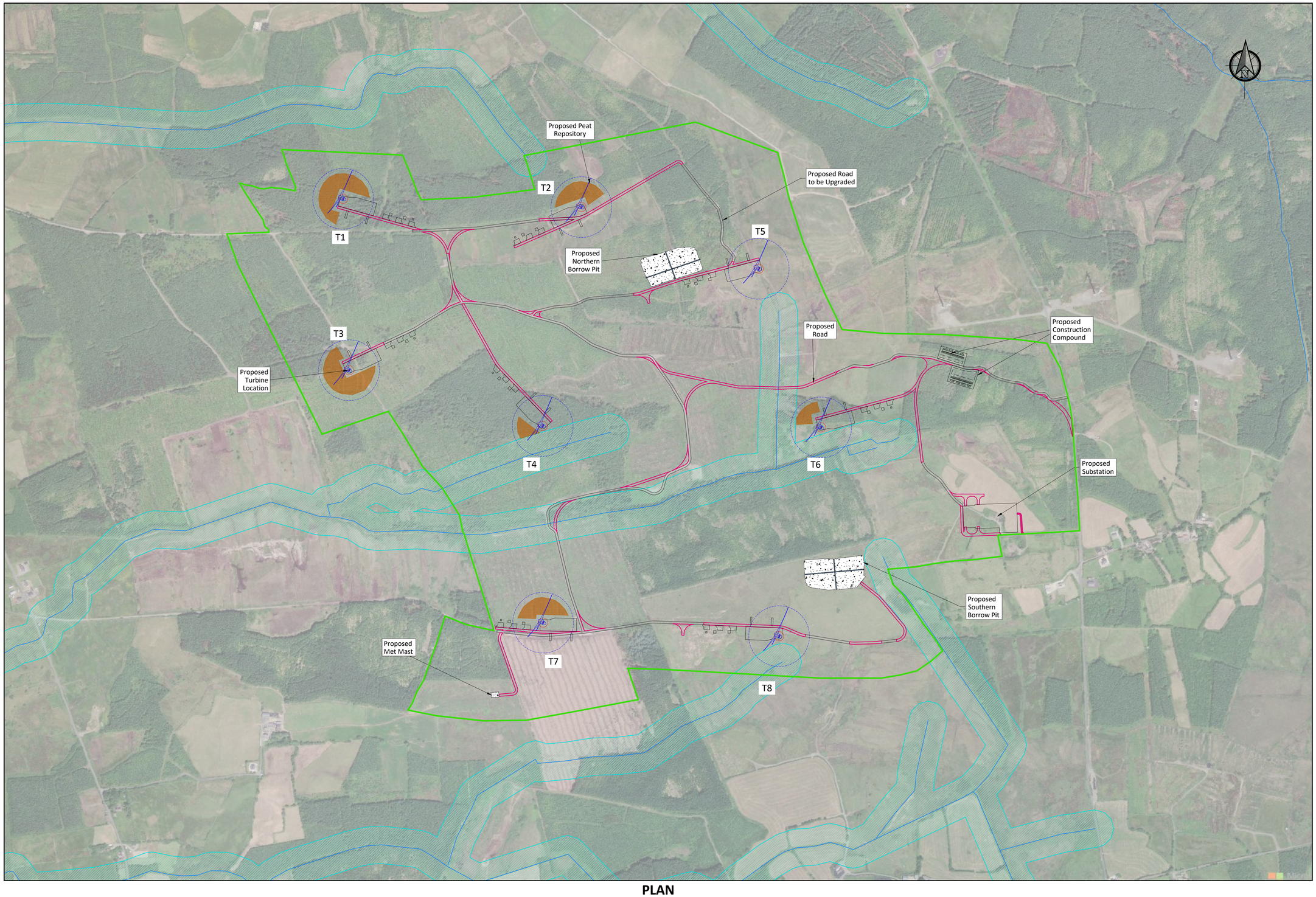
13 February 2026



Legend:

EIAR Site Boundary

Construction Buffer Zone Legend:

Watercourses / Lakes with 50m buffer

PLAN

Scale 1:5000

0m 50m 100m 150m 200m 250m 300m 350m 400m 450m 500m

Scale 1:5000

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Rev.	Description	App By	Date
P01	FOR INFORMATION	BDH	08.01.26
P02	FOR INFORMATION	BDH	12.02.26

PROJECT	CAHERMURPHY WEST
CLIENT	MKO
SHEET	CONSTRUCTION BUFFER ZONE PLAN
Date	12.02.26
Project number	P23-230
Scale (@ A1)	1:5000
Drawn by	POR
Checked by	IH
Drawing Number	P23-230-0600-0002
	(Sheet set subset 0600)
Rev	P02

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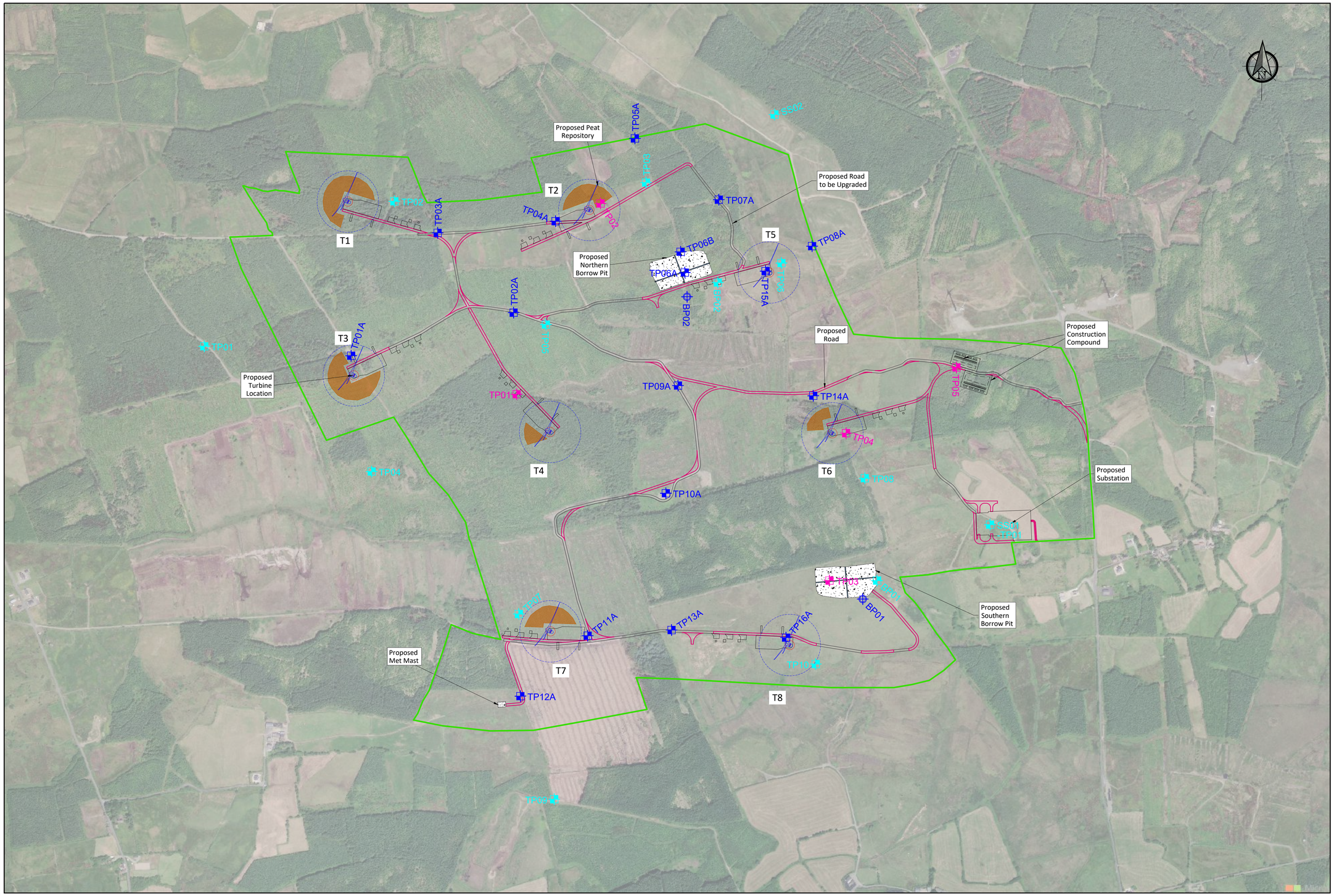
13 February 2026



PLAN

Scale 1:5000

Legend:

EIAR Site Boundary

Ground Investigation Legend:

- TP... Trial Pit Location - 2019 Ground Investigation
- TP... Trial Pit Location - 2024 Ground Investigation Part 1
- BP... Rotary Corehole Location - 2024 Ground Investigation Part 1
- TP... Trial Pit Location - 2024 Ground Investigation Part 2

0m 50m 100m 150m 200m 250m 300m 350m 400m 450m 500m

Scale 1:5000

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Rev.	Description	App By	Date
P01	FOR INFORMATION	BDH	08.01.26
P02	FOR INFORMATION	BDH	12.02.26

PROJECT: CAHERMURPHY WEST

CLIENT: MKO

SHEET: GROUND INVESTIGATION LOCATION PLAN

Date: 12.02.26

Drawn by: POR

Checked by: IH

Project number: P23-230

Scale (@ A1): 1:5000

Drawing Number: P23-230-0600-0003

(Sheet set subset 0600)

Rev: P02

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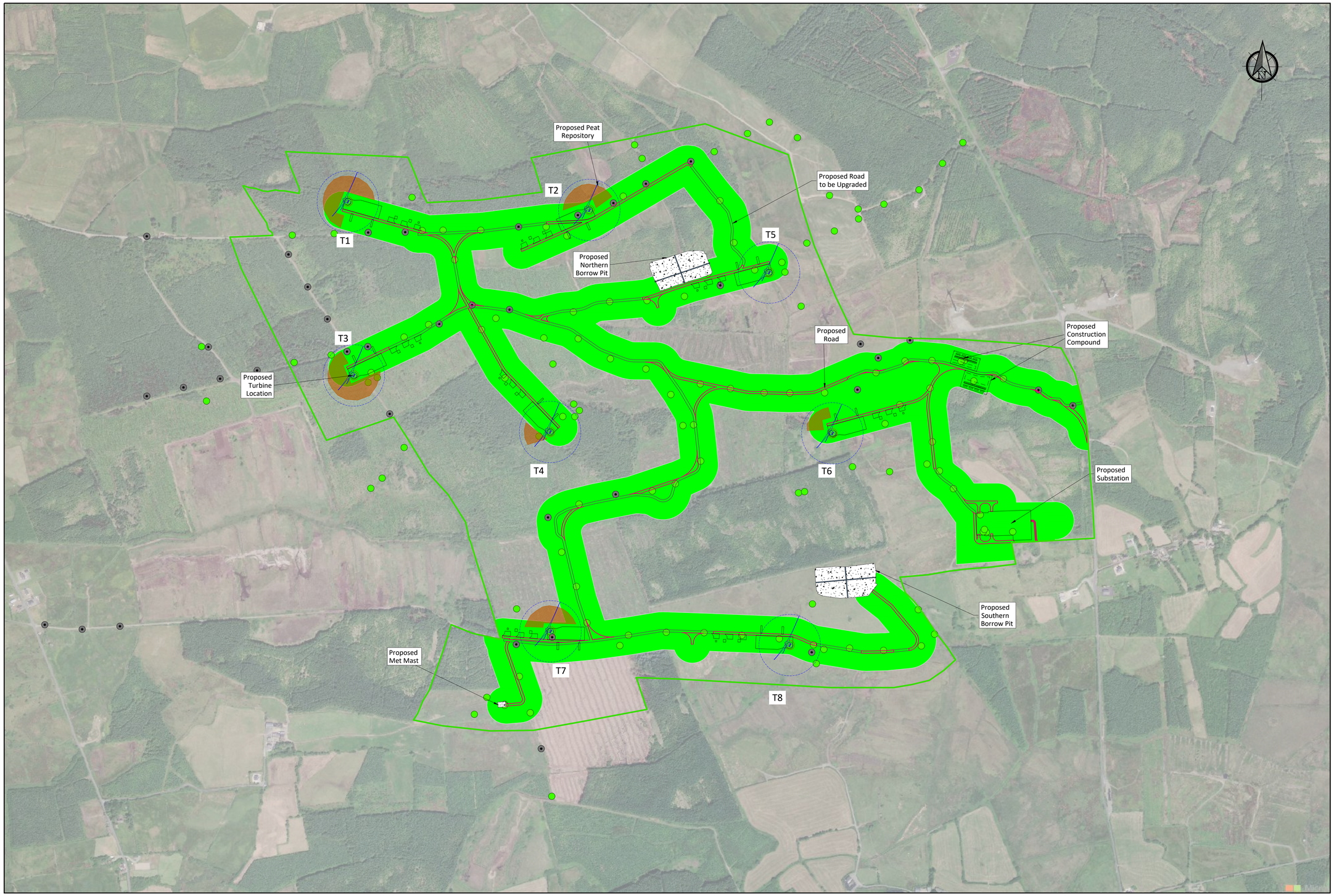
13 February 2026



Legend:

EIAR Site Boundary

Factor of Safety Legend:

0 < 1.0

≥ 1.0 < 1.3

≥ 1.3

Increasing Stability

No Peat Recorded At This Location

0m 50m 100m 150m 200m 250m 300m 350m 400m 450m 500m

Scale 1:5000

PLAN

Scale 1:5000

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Rev.	Description	App By	Date
P01	FOR INFORMATION	BDH	08.01.26
P02	FOR INFORMATION	BDH	12.02.26

PROJECT	CAHERMURPHY WEST
CLIENT	MKO
SHEET	FACTOR OF SAFETY PLAN – SHORT TERM CRITICAL CONDITION (UNDRAINED)
Date	12.02.26
Project number	P23-230
Scale (@ A1)	1:5000
Drawn by	POR
Checked by	IH
Drawing Number	P23-230-0600-0004
Rev	P02

(Sheet set subset 0600)

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13 February 2026

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APPENDIX A

Photos from Site Walkover

Photo 1: Existing track at construction compound

Photo 2: Existing track north of T05

Photo 3: Along access route to T04

Photo 4: Looking North along existing access road at T07

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DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

APPENDIX B

Peat Stability Risk Registers

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Turbine T01

Grid Reference (Eastings, Northings):	507772	669761
Distance to Watercourse (m)	> 150	
Min & Max Measured Peat Depth (m):	0.1-0.9	
Control Required:	No	

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 6.04 (u), 8.50 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Negligible	No		2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Turbine T01**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note

(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Turbine T02

Grid Reference (Eastings, Northings):	**508411**	**669738**
Distance to Watercourse (m)	**> 150**	
Min & Max Measured Peat Depth (m):	**0-0.7**	
Control Required:	**No**	

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 2.34 (u), 4.2 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Negligible	No		2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Turbine T02**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Turbine T03

Grid Reference (Eastings, Northings):	507788	669300
Distance to Watercourse (m)	> 150	
Min & Max Measured Peat Depth (m):	0.1-0.9	
Control Required:	No	

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 24.56 (u), 43.09 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Negligible	No		2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Turbine T03**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note

(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Turbine T04

Grid Reference (Eastings, Northings):	508308	669150
Distance to Watercourse (m)	50 - 100	
Min & Max Measured Peat Depth (m):	0.1-2.2	
Control Required:	No	

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 3.64 (u), 7.75(d)	1	3	3	Negligible	No	See Below	1	3	3	Negligible
2	Evidence of sub peat water flow	1	3	3	Negligible	No		1	3	3	Negligible
3	Evidence of surface water flow	2	3	6	Low	No		1	3	3	Negligible
4	Evidence of previous failures/slips	0	3	0	Not Applicable	No		0	3	0	Not Applicable
5	Type of vegetation	2	3	6	Low	No		2	3	6	Low
6	General slope characteristics upslope/downslope from infrastructure location	2	3	6	Low	No		2	3	6	Low
7	Evidence of very soft/soft clay at base of peat	0	3	0	Not Applicable	No		0	3	0	Not Applicable
8	Evidence of mechanically cut peat	0	3	0	Not Applicable	No		0	3	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	3	0	Not Applicable	No		0	3	0	Not Applicable
10	Evidence of bog pools	0	3	0	Not Applicable	No		0	3	0	Not Applicable
11	Other	0	3	0	Not Applicable	No		0	3	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Turbine T04**
i	Due to poor drainage and deeper peat this location would require additional construction measures such as: - detailed ground investigation to determine peat, mineral soil and bedrock condition and properties. - excavation side slopes to be supports or excavation face battered to shallow angle - potential for greater water inflow into excavation requiring remvoal of water using pumps - daily detailed inspection of excavation faces - increased exclusion zone around excavation to aviod accidental loading of crest of slope
ii	Maintain hydrology of area as far as possible;
iii	Use of experienced geotechnical staff for site investigation;
iv	Use of experienced contractors and trained operators to carry out the work;

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Turbine T05

Grid Reference (Eastings, Northings):	**508887**	**669572**
Distance to Watercourse (m)	**100 - 150**	
Min & Max Measured Peat Depth (m):	**0.2-0.5**	
Control Required:	**No**	

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 5.39 (u), 10.26 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Negligible	No		2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Turbine T05**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Turbine T06

Grid Reference (Eastings, Northings):	509055	669147
Distance to Watercourse (m)	50 - 100	
Min & Max Measured Peat Depth (m):	1.3-1.8	
Control Required:	No	

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 6.14 (u), 17.45 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Negligible	No		2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Turbine T06**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	**Turbine T07**

Grid Reference (Eastings, Northings):	**508308**	**668623**
Distance to Watercourse (m)	**> 150**	
Min & Max Measured Peat Depth (m):	**0-1.5**	
Control Required:	**No**	

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 3.83 (u), 11.45 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Negligible	No		1	1	1	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Turbine T07**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Turbine T08

Grid Reference (Eastings, Northings):	**508942**	**668586**
Distance to Watercourse (m)	**50 - 100**	
Min & Max Measured Peat Depth (m):	**0.1-1.0**	
Control Required:	**No**	

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 2.18 (u), 4.77 (d)	1	3	3	Negligible	No	See Below	1	3	3	Negligible
2	Evidence of sub peat water flow	1	3	3	Negligible	No		1	3	3	Negligible
3	Evidence of surface water flow	2	3	6	Low	No		2	3	6	Low
4	Evidence of previous failures/slips	0	3	0	Not Applicable	No		0	3	0	Not Applicable
5	Type of vegetation	1	3	3	Negligible	No		2	3	6	Low
6	General slope characteristics upslope/downslope from infrastructure location	2	3	6	Low	No		1	3	3	Negligible
7	Evidence of very soft/soft clay at base of peat	0	3	0	Not Applicable	No		0	3	0	Not Applicable
8	Evidence of mechanically cut peat	0	3	0	Not Applicable	No		0	3	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	3	0	Not Applicable	No		2	3	6	Low
10	Evidence of bog pools	0	3	0	Not Applicable	No		0	3	0	Not Applicable
11	Other	0	3	0	Not Applicable	No		0	3	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Turbine T08**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Substation

Grid Reference (Eastings, Northings):	508888	669971
Distance to Watercourse (m)	> 150	
Min & Max Measured Peat Depth (m):	0.15	
Control Required:	No	

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 4.81 (u), 7.64 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No		1	1	1	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Substation**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note

(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Const. Comp.

Grid Reference (Eastings, Northings):	
Distance to Watercourse (m)	**> 150**
Min & Max Measured Peat Depth (m):	**0.1-0.4**
Control Required:	**No**

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 5.75 (u), 10.5 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No		1	1	1	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Construction Compound**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	**Met. Mast**

Grid Reference (Eastings, Northings):	
Distance to Watercourse (m)	**> 150**
Min & Max Measured Peat Depth (m):	**0.7**
Control Required:	**No**

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 3.11 (u), 5.39 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No		1	1	1	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Met. Mast**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	**Borrow Pit 1**

Grid Reference (Eastings, Northings):	**508665**	**669584**
Distance to Watercourse (m)	**> 150**	
Min & Max Measured Peat Depth (m):	**0.2-0.5**	
Control Required:	**No**	

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 4.61 (u), 8.41 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No		1	1	1	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Borrow Pit 1**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note

(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Borrow Pit 2

Grid Reference (Eastings, Northings):	509090	668755
Distance to Watercourse (m)	> 150	
Min & Max Measured Peat Depth (m):	0-0.9	
Control Required:	No	

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 3.04 (u), 6.46 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No		1	1	1	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Borrow Pit 2**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note

(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Spur to T01

Grid Reference (Eastings, Northings):	**varies**
Distance to Watercourse (m)	**> 150**
Min & Max Measured Peat Depth (m):	**0.1-0.4**
Control Required:	**No**

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 5.25 (u), 7.53 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Negligible	No		2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Spur to T01**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note

(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	T01 to T02

Grid Reference (Eastings, Northings):	**varies**
Distance to Watercourse (m)	**> 150**
Min & Max Measured Peat Depth (m):	**0-0.4**
Control Required:	**No**

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 3.19 (u), 4.53 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Negligible	No		2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **T01 to T02**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note

(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Spur to T03

Grid Reference (Eastings, Northings):	**varies**
Distance to Watercourse (m)	**> 150**
Min & Max Measured Peat Depth (m):	**0-1.2**
Control Required:	**No**

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 6.63 (u), 9.55 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Negligible	No		2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Spur to T03**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note

(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Spur to T04

Grid Reference (Eastings, Northings):	**varies**
Distance to Watercourse (m)	**50 - 100**
Min & Max Measured Peat Depth (m):	**0.1-0.6**
Control Required:	**No**

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 3.11 (u), 7.84(d)	1	3	3	Negligible	No	See Below	1	3	3	Negligible
2	Evidence of sub peat water flow	1	3	3	Negligible	No		1	3	3	Negligible
3	Evidence of surface water flow	2	3	6	Low	No		1	3	3	Negligible
4	Evidence of previous failures/slips	0	3	0	Not Applicable	No		0	3	0	Not Applicable
5	Type of vegetation	2	3	6	Low	No		2	3	6	Low
6	General slope characteristics upslope/downslope from infrastructure location	2	3	6	Low	No		2	3	6	Low
7	Evidence of very soft/soft clay at base of peat	0	3	0	Not Applicable	No		0	3	0	Not Applicable
8	Evidence of mechanically cut peat	0	3	0	Not Applicable	No		0	3	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	3	0	Not Applicable	No		0	3	0	Not Applicable
10	Evidence of bog pools	0	3	0	Not Applicable	No		0	3	0	Not Applicable
11	Other	0	3	0	Not Applicable	No		0	3	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Spur to T04**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	T02 to T05

Grid Reference (Eastings, Northings):	**varies**
Distance to Watercourse (m)	**> 150**
Min & Max Measured Peat Depth (m):	**0.1-0.3**
Control Required:	**No**

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 3.14 (u), 3.84 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Negligible	No		2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **T02 to T05**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note

(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	**Spur to T05**

Grid Reference (Eastings, Northings):	**varies**
Distance to Watercourse (m)	**> 150**
Min & Max Measured Peat Depth (m):	**0-2.0**
Control Required:	**No**

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 2.87 (u), 2.87 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Negligible	No		2	1	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Spur to T05**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note

(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	**Spur to T06**

Grid Reference (Eastings, Northings):	**varies**
Distance to Watercourse (m)	**50 - 100**
Min & Max Measured Peat Depth (m):	**0.1-1.3**
Control Required:	**No**

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 3.96 (u), 7.08 (d)	1	1	1	Negligible	No	See Below	1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Negligible	No		1	1	1	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Spur to T06**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	T07 to T08

Grid Reference (Eastings, Northings):	**varies**
Distance to Watercourse (m)	**100 - 150**
Min & Max Measured Peat Depth (m):	**0.1-1.0**
Control Required:	**No**

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 2.18 (u), 4.77 (d)	1	2	2	Negligible	No	See Below	1	2	2	Negligible
2	Evidence of sub peat water flow	1	2	2	Negligible	No		1	2	2	Negligible
3	Evidence of surface water flow	2	2	4	Negligible	No		2	2	4	Negligible
4	Evidence of previous failures/slips	0	2	0	Not Applicable	No		0	2	0	Not Applicable
5	Type of vegetation	1	2	2	Negligible	No		2	2	4	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	2	4	Negligible	No		1	2	2	Negligible
7	Evidence of very soft/soft clay at base of peat	0	2	0	Not Applicable	No		0	2	0	Not Applicable
8	Evidence of mechanically cut peat	0	2	0	Not Applicable	No		0	2	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	2	0	Not Applicable	No		2	2	4	Negligible
10	Evidence of bog pools	0	2	0	Not Applicable	No		0	2	0	Not Applicable
11	Other	0	2	0	Not Applicable	No		0	2	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **T07 to T08**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Spur to Substation

Grid Reference (Eastings, Northings):	**varies**
Distance to Watercourse (m)	**50 - 100**
Min & Max Measured Peat Depth (m):	**0.1-1.3**
Control Required:	**No**

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 4.44 (u), 7.08 (d)	1	3	3	Negligible	No	See Below	1	3	3	Negligible
2	Evidence of sub peat water flow	1	3	3	Negligible	No		1	3	3	Negligible
3	Evidence of surface water flow	2	3	6	Low	No		1	3	3	Negligible
4	Evidence of previous failures/slips	0	3	0	Not Applicable	No		0	3	0	Not Applicable
5	Type of vegetation	2	3	6	Low	No		1	3	3	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	3	6	Low	No		1	3	3	Negligible
7	Evidence of very soft/soft clay at base of peat	0	3	0	Not Applicable	No		0	3	0	Not Applicable
8	Evidence of mechanically cut peat	0	3	0	Not Applicable	No		0	3	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	3	0	Not Applicable	No		0	3	0	Not Applicable
10	Evidence of bog pools	0	3	0	Not Applicable	No		0	3	0	Not Applicable
11	Other	0	3	0	Not Applicable	No		0	3	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Spur to Subsation**
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Detailed ground investigation to determine peat, mineral soil and bedrock condition and properties.

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy Two Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Spine Road to T07

Grid Reference (Eastings, Northings):	**varies**
Distance to Watercourse (m)	**< 50**
Min & Max Measured Peat Depth (m):	**0-3.3**
Control Required:	**No**

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 3.31 (u), 4.74 (d)	1	4	4	Negligible	No	See Below	1	4	4	Negligible
2	Evidence of sub peat water flow	1	4	4	Negligible	No		1	4	4	Negligible
3	Evidence of surface water flow	1	4	4	Negligible	No		1	4	4	Negligible
4	Evidence of previous failures/slips	0	4	0	Not Applicable	No		0	4	0	Not Applicable
5	Type of vegetation	2	4	8	Low	No		1	4	4	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	2	4	8	Low	No		1	4	4	Negligible
7	Evidence of very soft/soft clay at base of peat	0	4	0	Not Applicable	No		0	4	0	Not Applicable
8	Evidence of mechanically cut peat	0	4	0	Not Applicable	No		0	4	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	4	0	Not Applicable	No		0	4	0	Not Applicable
10	Evidence of bog pools	0	4	0	Not Applicable	No		0	4	0	Not Applicable
11	Other	0	4	0	Not Applicable	No		0	4	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Construction for **Spine Road to T07**
i	Due to poor drainage and deeper peat at stream crossing would require additional construction measures such as: - detailed ground investigation to determine peat, mineral soil and bedrock condition and properties. - excavation side slopes to be supports or excavation face battered to shallow angle - potential for greater water inflow into excavation requiring remvoal of water using pumps - daily detailed inspection of excavation faces - increased exclusion zone around excavation to aviod accidental loading of crest of slope
ii	Maintain hydrology of area as far as possible;
iii	Use of experienced geotechnical staff for site investigation;
iv	Use of experienced contractors and trained operators to carry out the work;

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy West Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Enhancement Area 1

Grid Reference (Eastings, Northings):	**509426**	**670490**
Distance to Watercourse (m)	**< 50**	
Min & Max Measured Peat Depth (m):	**0.1-4.6**	
Control Required:	**No**	

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 2.55 (u), 2.19 (d)	1	4	4	Negligible	No	See Below	1	4	4	Negligible
2	Evidence of sub peat water flow	1	4	4	Negligible	No		1	4	4	Negligible
3	Evidence of surface water flow	2	4	8	Low	No		1	4	4	Negligible
4	Evidence of previous failures/slips	1	4	4	Negligible	No		1	4	4	Negligible
5	Type of vegetation	2	4	8	Low	No		2	4	8	Low
6	General slope characteristics upslope/downslope from infrastructure location	2	4	8	Low	No		2	4	8	Low
7	Evidence of very soft/soft clay at base of peat	0	4	0	Not Applicable	No		0	4	0	Not Applicable
8	Evidence of mechanically cut peat	0	4	0	Not Applicable	No		0	4	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	4	0	Not Applicable	No		0	4	0	Not Applicable
10	Evidence of bog pools	0	4	0	Not Applicable	No		0	4	0	Not Applicable
11	Other	0	4	0	Not Applicable	No		0	4	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Works for **Enhancement Area 1**
i	Use of experienced contractors and trained operators to carry out the work;
ii	Use of low ground pressure equipment
iii	No stacking of tree trunks in deep peat areas (>2m)
iv	Maintain existing hydrology

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy West Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Enhancement Area 2

Grid Reference (Eastings, Northings):	**511936**	**670350**
Distance to Watercourse (m)	**50 - 100**	
Min & Max Measured Peat Depth (m):	**0.1-5.3**	
Control Required:	**No**	

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 1.72 (u), 1.44 (d)	1	3	3	Negligible	No	See Below	1	3	3	Negligible
2	Evidence of sub peat water flow	1	3	3	Negligible	No		1	3	3	Negligible
3	Evidence of surface water flow	2	3	6	Low	No		2	3	6	Low
4	Evidence of previous failures/slips	1	3	3	Negligible	No		1	3	3	Negligible
5	Type of vegetation	2	3	6	Low	No		2	3	6	Low
6	General slope characteristics upslope/downslope from infrastructure location	3	3	9	Low	No		3	3	9	Low
7	Evidence of very soft/soft clay at base of peat	0	3	0	Not Applicable	No		0	3	0	Not Applicable
8	Evidence of mechanically cut peat	0	3	0	Not Applicable	No		0	3	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	3	0	Not Applicable	No		0	3	0	Not Applicable
10	Evidence of bog pools	0	3	0	Not Applicable	No		0	3	0	Not Applicable
11	Other	0	3	0	Not Applicable	No		0	3	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Works for **Enhancement Area 2**
i	Use of experienced contractors and trained operators to carry out the work;
ii	Use of low ground pressure equipment
iii	No stacking of tree trunks in deep peat areas (>2m)
iv	Maintain existing hydrology

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

Cahermurphy West Wind Farm - Peat Stability Risk Register (Rev 0)

Location:	Enhancement Area 3

Grid Reference (Eastings, Northings):	**513844**	**670929**
Distance to Watercourse (m)	**> 150**	
Min & Max Measured Peat Depth (m):	**0.1-6.1**	
Control Required:	**No**	

		Pre-Control Measure Implementation						Post-Control Measure Implementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob (Note 2)	Impact (Note 3)	Risk	Risk Rating
1	FOS = 1.89 (u), 2.70 (d)	1	1	1	Negligible	No		1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	1	1	1	Negligible	No		1	1	1	Negligible
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No	See Below	1	1	1	Negligible
7	Evidence of very soft/soft clay at base of peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
8	Evidence of mechanically cut peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
9	Evidence of quaking or buoyant peat	0	1	0	Not Applicable	No		0	1	0	Not Applicable
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

	Control Measures to be Implemented Prior to/and During Works for **Enhancement Area 3**
i	Use of experienced contractors and trained operators to carry out the work;
ii	Use of low ground pressure equipment
iii	No stacking of tree trunks in deep peat areas (>2m)
iv	Maintain existing hydrology

Note
(1) FOS abbreviations are: u: FOS for undrained analysis, d: FOS for drained analysis.
(2) Probability assessed as per Table A and B of Appendix E.
(3) Impact based on distance of infrastructure element to nearest watercourse.

FEHILY TIMONEY

DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

APPENDIX C

Calculated FOS for Peat Slopes on Site

Calculated FoS of Natural Peat Slopes for Cahermurphy West Wind Farm - Undrained Analysis

Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Peat Depth	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety for Load Condition	
			β (deg)	c_u (kPa)	γ (kN/m^3)	(m)	Condition (2)	Condition (1)	Condition (2)
T01	507772	669760	3	6	10	0.90	1.9	**12.76**	**6.04**
T02	508411	669738	10	6	10	0.50	1.5	**7.02**	**2.34**
T03	507788	669300	1	6	10	0.40	1.4	**85.96**	**24.56**
T04	508308	669151	5	6	10	0.90	1.9	**7.68**	**3.64**
T05	508887	669573	4	6	10	0.60	1.6	**14.37**	**5.39**
T06	509054	669147	2	6	10	1.80	2.8	**9.56**	**6.14**
T07	508308	668623	3	6	10	2.00	3.0	**5.74**	**3.83**
T08	508492	668586	8	6	10	1.00	2.0	**4.35**	**2.18**
Substation	509462	668885	6	6	10	0.20	1.2	**28.86**	**4.81**
Met mast	508187	668430	8	6	10	0.40	1.4	**10.88**	**3.11**
TCC	509404	669340	4	6	10	0.50	1.5	**17.24**	**5.75**
Borrow pit 1	508665	669584	5	6	10	0.50	1.5	**13.82**	**4.61**
Borrow pit 2	509090	668755	6	6	10	0.90	1.9	**6.41**	**3.04**
PP01	509691	669221	4	No peat encountered					
PP02	509600	669262	3	No peat encountered					
PP03	509507	669292	4	6	10	0.1	1.1	**86.22**	**7.84**
PP04	509429	669286	4	6	10	0.1	1.1	**86.22**	**7.84**
PP05	509395	669338	3	6	10	0.4	1.4	**28.70**	**8.20**
PP06	509318	669340	3	6	10	0.2	1.2	**57.40**	**9.57**
PP07	509313	669267	8	6	10	0.1	1.1	**43.54**	**3.96**
PP08	509233	669223	6	6	10	0.15	1.2	**38.48**	**5.02**
PP09	509057	669146	4	6	10	0.2	1.2	**43.11**	**7.19**
PP10	509319	669125	6	6	10	0.3	1.3	**19.24**	**4.44**
PP11	509338	669048	4	6	10	0.2	1.2	**43.11**	**7.19**
PP12	508055	669607	3	6	10	0.3	1.3	**38.27**	**8.83**
PP13	508794	669652	3	6	10	0.3	1.3	**38.27**	**8.83**
PP14	508126	669422	8	6	10	0.4	1.4	**10.88**	**3.11**
PP15	508187	668430	8	6	10	1.8	2.8	**2.42**	**1.55**
36	508188	669294	4	6	10	0.6	1.6	**14.37**	**5.39**
100	508757	669763	10	6	10	0.1	1.1	**35.09**	**3.19**
Historical Data									
T01	507772	669761	2	6	10	0.30	1.3	**57.34**	**13.23**
T02	508411	669738	4	6	10	0.70	1.7	**12.32**	**5.07**
T03	507788	669300	2	6	10	0.60	1.6	**28.67**	**10.75**
T04	508308	669150	4	6	10	2.20	3.2	**3.92**	**2.69**
T05	508887	669572	4	6	10	0.60	1.6	**14.37**	**5.39**
T06	509055	669147	2	6	10	1.70	2.7	**10.12**	**6.37**
T07	508308	668623	3	6	10	2.00	3.0	**5.74**	**3.83**
T08	508942	668586	8	6	10	1.00	2.0	**4.35**	**2.18**
Substation	509454	668887	2	6	10	0.15	1.2	**114.68**	**14.96**
Met mast	508187	668428	7	6	10	0.70	1.7	**7.09**	**2.92**
T1 (S/S)	507385	669377	3.0	6	10	0.30	1.3	**38.27**	**8.83**
T2 (S/S)	507942	669772	3.0	6	10	0.30	1.3	**38.27**	**8.83**
T3 (S/S)	508531	669911	3.0	6	10	0.50	1.5	**22.96**	**7.65**
T4 (S/S)	507833	669002	2.0	6	10	2.60	3.6	**6.62**	**4.78**
T5 (S/S)	508291	669400	4.0	6	10	0.25	1.3	**34.49**	**6.90**
T6 (S/S)	508921	669600	2.0	6	10	0.40	1.4	**43.01**	**12.29**
T7 (S/S)	508219	668683	4.0	6	10	1.70	2.7	**5.07**	**3.19**
T8 (S/S)	508965	668990	2.0	6	10	2.50	3.5	**6.88**	**4.92**
T9 (S/S)	508312	668187	2.0	6	10	0.70	1.7	**24.58**	**10.12**
T10 (S/S)	509012	668538	5.0	6	10	0.30	1.3	**23.04**	**5.32**
Substation 1	508888	669971	2.0	6	10	0.15	1.2	**114.68**	**14.96**
Substation 2	509457	668893	2.0	6	10	0.80	1.8	**21.50**	**9.56**
Construction Compound (S/S)	508164	669452	3.0	6	10	0.15	1.2	**76.53**	**9.98**
Met Mast (S/S)	508107	668404	7.0	6	10	0.70	1.7	**7.09**	**2.92**
Borrow Pit 1	507398	669233	5.0	6	10	0.15	1.2	**46.07**	**6.01**
Borrow Pit 2	508725	669570	6.0	6	10	0.30	1.3	**19.24**	**4.44**
S19	508551	669875	5.0	6	10	1.20	2.2	**5.76**	**3.14**
S22	507240	669669	2.0	No peat encountered					
S26	507403	669376	4.0	No peat encountered					
S30	507863	669029	2.0	6	10	2.50	3.5	**6.88**	**4.92**
S31	507921	669110	2.0	6	10	1.20	2.2	**14.34**	**7.82**
S32	507883	669199	2.0	No peat encountered					
S33	507826	669282	3.0	6	10	0.30	1.3	**38.27**	**8.83**
S34	507770	669364	5.0	No peat encountered					
S35	507718	669450	2.0	No peat encountered					
S36	507666	669535	5.0	No peat encountered					
S37	507615	669621	5.0	No peat encountered					
S38	507625	669672	1.0	6	10	0.10	1.1	**343.84**	**31.26**
S39	507736	669676	1.0	6	10	0.15	1.2	**229.23**	**29.90**
S40	507826	669679	2.0	No peat encountered					
S41	507924	669680	3.0	No peat encountered					
S42	508024	669685	6.0	6	10	0.10	1.1	**57.72**	**5.25**
S43	508124	669685	7.0	6	10	0.15	1.2	**33.07**	**4.31**
S44	508224	669694	6.0	No peat encountered					
S46	507240	669246	2.0	No peat encountered					
S47	507337	669269	4.0	No peat encountered					
S48	507434	669292	2.0	No peat encountered					
S49	507532	669314	2.0	No peat encountered					
S50	507630	669335	2.0	6	10	0.20	1.2	**86.01**	**14.34**
S51	507728	669355	1.0	6	10	0.30	1.3	**114.61**	**26.45**
S52	507825	669377	3.0	No peat encountered					
S53	507921	669402	4.0	6	10	0.30	1.3	**28.74**	**6.63**
S54	508014	669437	4.0	No peat encountered					
S55	508101	669487	4.0	No peat encountered					
S56	508200	669475	5.0	No peat encountered					
S57	506970	668641	2.0	No peat encountered					

Calculated FoS of Natural Peat Slopes for Cahermurphy West Wind Farm - Undrained Analysis

Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Peat Depth	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety for Load Condition	
			β (deg)	c_u (kPa)	γ (kN/m^3)	(m)	Condition (2)	Condition (1)	Condition (2)
S58	507069	668629	5.0	No peat encountered					
S59	507169	668637	5.0	No peat encountered					
S70	508218	668589	6.0	No peat encountered					
S71	508313	668608	3.0	No peat encountered					
S73	508284	668313	6.0	No peat encountered					
S74	508255	668408	9.0	6	10	0.15	1.2	**25.89**	**3.38**
S75	508226	668504	3.0	6	10	0.30	1.3	**38.27**	**8.83**
S76	509000	668568	5.0	No peat encountered					
S77	508914	668604	8.0	6	10	0.20	1.2	**21.77**	**3.63**
S78	508815	668613	3.0	6	10	0.10	1.1	**114.80**	**10.44**
S79	508715	668620	4.0	6	10	0.10	1.1	**86.22**	**7.84**
S80	508615	668621	2.0	6	10	0.40	1.4	**43.01**	**12.29**
S81	508515	668613	2.0	6	10	0.20	1.2	**86.01**	**14.34**
S84	508405	668646	7.0	6	10	0.30	1.3	**16.53**	**3.82**
S85	508377	668742	7.0	6	10	0.25	1.3	**19.84**	**3.97**
S86	508338	668833	7.0	6	10	0.50	1.5	**9.92**	**3.31**
S87	508302	668925	5.0	No peat encountered					
S88	508384	668960	4.0	6	10	0.40	1.4	**21.56**	**6.16**
S89	508481	668986	2.0	No peat encountered					
S90	508578	668995	2.0	6	10	0.20	1.2	**86.01**	**14.34**
S91	508639	669014	2.0	6	10	1.00	2.0	**17.20**	**8.60**
S92	508706	669074	4.0	6	10	0.50	1.5	**17.24**	**5.75**
S93	508687	669170	2.0	6	10	0.10	1.1	**172.03**	**15.64**
S94	508627	669250	3.0	6	10	0.50	1.5	**22.96**	**7.65**
S95	508561	669318	2.0	6	10	1.00	2.0	**17.20**	**8.60**
S96	508467	669345	1.0	6	10	0.15	1.2	**229.23**	**29.90**
S97	508382	669398	3.0	6	10	0.10	1.1	**114.80**	**10.44**
S98	508830	669941	4.0	6	10	0.30	1.3	**28.74**	**6.63**
S99	508742	669893	3.0	6	10	0.40	1.4	**28.70**	**8.20**
S101	508561	669808	5.0	No peat encountered					
S102	508475	669757	7.0	No peat encountered					
S103	508381	669725	10.0	No peat encountered					
S104	508352	669670	10.0	6	10	0.10	1.1	**35.09**	**3.19**
S105	508382	669575	10.0	No peat encountered					
S106	508369	669469	5.0	6	10	0.10	1.1	**69.11**	**6.28**
S107	508465	669496	2.0	6	10	0.45	1.5	**38.23**	**11.86**
S108	508564	669499	4.0	6	10	2.00	3.0	**4.31**	**2.87**
S109	508663	669510	5.0	6	10	0.50	1.5	**13.82**	**4.61**
S110	508758	669539	5.0	No peat encountered					
S111	508849	669580	3.0	6	10	0.30	1.3	**38.27**	**8.83**
S112	508929	669574	5.0	6	10	0.20	1.2	**34.55**	**5.76**
S113	508972	669484	2.0	6	10	1.70	2.7	**10.12**	**6.37**
S114	509035	669409	3.0	6	10	0.60	1.6	**19.13**	**7.18**
S115	509129	669384	3.0	No peat encountered					
S117	509532	668887	2.0	6	10	0.15	1.2	**114.68**	**14.96**
S118	509446	668932	3.0	6	10	0.10	1.1	**114.80**	**10.44**
S119	509375	669001	7.0	6	10	0.10	1.1	**49.60**	**4.51**
S120	509305	669066	5.0	6	10	0.10	1.1	**69.11**	**6.28**
S121	509206	669046	3.0	6	10	0.20	1.2	**57.40**	**9.57**
S122	509108	669059	4.0	6	10	0.20	1.2	**43.11**	**7.19**
S125	509121	669263	3.0	No peat encountered					
S126	509176	669347	5.0	No peat encountered					
S127	509260	669394	5.0	No peat encountered					
WP001	507834	669308	2.0	6	10	0.10	1.1	**172.03**	**15.64**
WP002	507850	669295	2.0	6	10	0.25	1.3	**68.81**	**13.76**
WP003	508659	669168	4.0	6	10	0.60	1.6	**14.37**	**5.39**
WP008	508680	669867	2.0	No peat encountered					
MKO (2025)									
MKO001	513818	670599	2.0	6	10	2.8	3.8	**6.14**	**4.53**
MKO003	513744	670591	4.0	6	10	1.5	2.5	**5.75**	**3.45**
MKO006	513626	670600	2.0	6	10	5.3	6.3	**3.25**	**2.73**
MKO010	513763	670969	6.0	6	10	0.1	1.1	**57.72**	**5.25**
MKO012	513839	671006	6.0	6	10	0.9	1.9	**6.41**	**3.04**
MKO014	513925	670965	7.0	6	10	0.8	1.8	**6.20**	**2.76**
MKO016	513946	671050	7.0	6	10	0.6	1.6	**8.27**	**3.10**
MKO018	513904	671089	8.0	6	10	0.4	1.4	**10.88**	**3.11**
MKO021	513857	670892	8.0	6	10	1.3	2.3	**3.35**	**1.89**
MKO024	513746	670680	2.0	6	10	3.2	4.2	**5.38**	**4.10**
MKO026	513723	670776	4.0	6	10	0.8	1.8	**10.78**	**4.79**
MKO030	513830	670635	2.0	6	10	6.1	7.1	**2.82**	**2.42**
MKO034	513762	670872	6.0	6	10	0.6	1.6	**9.62**	**3.61**
MKO038	511689	670339	1.0	6	10	5.3	6.3	**6.49**	**5.46**
MKO041	511778	670207	5.0	6	10	1.4	2.4	**4.94**	**2.88**
MKO045	511809	670294	7.0	6	10	1.1	2.1	**4.51**	**2.36**
MKO047	511833	670402	12.0	6	10	0.1	1.1	**29.50**	**2.68**
MKO051	511718	670480	4.0	6	10	0.3	1.3	**28.74**	**6.63**
MKO058	511926	670482	6.0	6	10	0.1	1.1	**57.72**	**5.25**
MKO061	512018	670552	7.0	6	10	0.4	1.4	**12.40**	**3.54**
MKO064	512111	670651	4.0	6	10	4.0	5.0	**2.16**	**1.72**
MKO067	512098	670461	7.0	6	10	1.0	2.0	**4.96**	**2.48**
MKO072	512173	670256	3.0	6	10	0.6	1.6	**19.13**	**7.18**
MKO074	512160	670138	3.0	6	10	0.4	1.4	**28.70**	**8.20**
MKO075	512139	670381	7.0	6	10	0.4	1.4	**12.40**	**3.54**
MKO081	511916	670233	16.0	6	10	0.2	1.2	**11.32**	**1.89**
MKO090	512026	670180	4.0	6	10	0.1	1.1	**86.22**	**7.84**
MKO094	511961	670371	6.0	6	10	0.4	1.4	**14.43**	**4.12**
MKO098	511992	670467	5.0	6	10	1.5	2.5	**4.61**	**2.76**
MKO103	509126	670684	2.0	6	10	1.6	2.6	**10.75**	**6.62**
MKO106	509166	670712	2.0	6	10	1.0	2.0	**17.20**	**8.60**

Calculated FoS of Natural Peat Slopes for Cahermurphy West Wind Farm - Undrained Analysis

Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Peat Depth	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety for Load Condition	
			β (deg)	c_u (kPa)	γ (kN/m^3)	(m)	Condition (2)	Condition (1)	Condition (2)
MKO108	509173	670647	5.0	6	10	0.2	1.2	**34.55**	**5.76**
MKO110	509203	670587	5.0	6	10	0.1	1.1	**69.11**	**6.28**
MKO112	509241	670643	5.0	6	10	0.1	1.1	**69.11**	**6.28**
MKO119	509279	670615	5.0	6	10	0.2	1.2	**34.55**	**5.76**
MKO122	509292	670687	3.0	6	10	3.5	4.5	**3.28**	**2.55**
MKO125	509400	670652	2.0	6	10	0.1	1.1	**172.03**	**15.64**
MKO127	509395	670630	3.0	6	10	0.1	1.1	**114.80**	**10.44**
MKO129	509327	670593	4.0	6	10	0.1	1.1	**86.22**	**7.84**
MKO132	509260	670529	6.0	6	10	0.1	1.1	**57.72**	**5.25**
MKO133	509383	670519	5.0	6	10	0.2	1.2	**34.55**	**5.76**
MKO137	509591	670484	5.0	6	10	0.1	1.1	**69.11**	**6.28**
MKO139	509617	670587	2.0	6	10	4.6	5.6	**3.74**	**3.07**
MKO143	509700	670363	6.0	6	10	0.5	1.5	**11.54**	**3.85**
MKO151	509487	670638	2.0	6	10	0.2	1.2	**86.01**	**14.34**
MKO153	509466	670564	4.0	6	10	0.1	1.1	**86.22**	**7.84**
MKO156	509389	670454	5.0	6	10	0.4	1.4	**19.74**	**5.12**
MKO158	509302	670476	4.0	6	10	0.2	1.2	**57.48**	**7.50**
MKO160	509614	670324	6.0	6	10	0.3	1.3	**19.24**	**4.44**
MKO162	509691	670474	4.0	6	10	0.5	1.5	**17.24**	**5.75**
MKO165	509529	670398	6.0	6	10	0.1	1.1	**57.72**	**5.25**
MKO172	509600	670393	6.0	6	10	0.4	1.4	**14.43**	**4.12**
MKO probes (2018-2019)									
MKO_23	508981	668993	0.4	6	10	2.25	3.3	**38.20**	**26.45**
MKO_28	509002	668696	3.3	6	10	0.90	1.9	**11.60**	**5.49**
MKO_31	509032	668576	7.3	6	10	0.80	1.8	**5.95**	**2.64**
P1-CM	509400	669917	5.0	6	10	1.10	2.1	**6.28**	**3.29**
P10-CM	509124	669715	10.0	6	10	0.30	1.3	**11.70**	**2.70**
P11-CM	509060	669683	5.0	6	10	0.50	1.5	**13.82**	**4.61**
P12-CM	508987	669651	5.0	6	10	0.80	1.8	**8.64**	**3.84**
P13-CM1	509005	668588	6.0	6	10	0.70	1.7	**8.25**	**3.40**
P14-CM	509100	668579	6.5	6	10	0.10	1.1	**53.34**	**4.85**
P15-CM	509190	668573	5.5	6	10	0.10	1.1	**62.89**	**5.72**
P16-CM	509290	668585	4.6	6	10	0.70	1.7	**10.72**	**4.42**
P17-CM	509325	668616	1.0	6	10	2.10	3.1	**16.37**	**11.09**
P18-CM	509282	668681	10.0	6	10	0.10	1.1	**35.09**	**3.19**
P2-CM	509346	669862	6.0	6	10	0.30	1.3	**19.24**	**4.44**
P3-CM	509284	669792	6.0	6	10	0.10	1.1	**57.72**	**5.25**
P4-CM	509191	669754	3.0	6	10	0.10	1.1	**114.80**	**10.44**
P5-CM	509123	669741	10.0	6	10	0.10	1.1	**35.09**	**3.19**
P6-CM	509047	669777	10.0	6	10	0.10	1.1	**35.09**	**3.19**
P9-CM	508962	669930	4.6	6	10	0.10	1.1	**75.06**	**6.82**
1	509247	669339	3.5	6	10	0.20	1.2	**49.23**	**8.21**
2	509170	669308	3.5	6	10	0.30	1.3	**32.82**	**7.57**
4	509034	669255	3.5	6	10	0.30	1.3	**32.82**	**7.57**
5	508942	669254	2.0	6	10	0.80	1.8	**21.50**	**9.56**
6	508874	669255	2.0	6	10	0.20	1.2	**86.01**	**14.34**
7	508785	669266	2.0	6	10	0.20	1.2	**86.01**	**14.34**
7a	508705	669278	2.0	6	10	0.40	1.4	**43.01**	**12.29**
11	509194	669173	3.0	6	10	1.00	2.0	**11.48**	**5.74**
22	508140	668449	7.0	6	10	0.70	1.7	**7.09**	**2.92**
43	507969	669684	6.0	6	10	0.40	1.4	**14.43**	**4.12**
48	508297	669694	10.0	6	10	0.40	1.4	**8.77**	**2.51**
50	508501	669775	7.0	6	10	0.40	1.4	**12.40**	**3.54**
64	507986	669435	4.0	6	10	0.80	1.8	**10.78**	**4.79**
							Minimum =	**2.16**	**1.72**
							Maximum =	**343.84**	**31.26**
							Average =	**42.12**	**7.21**

Notes:

(1) Assuming a bulk unit weight for peat of 10kN/m^3

(2) Assuming a surcharge equivalent to fill depth of 1m of peat i.e. 10kPa.

(3) Slope inclination (β) based on site readings and site contour plans.

(4) A lower bound undrained shear strength, cu for the peat of 8kPa was selected for the assessment. It should be noted that a cu of 8kPa for the peat is considered a conservative value for the analysis and is not representative of all peat present across the site. In reality the peat has a significantly higher undrained strength.

(5) Peat depths based on probes carried out by FT and MKO.

(6) For load conditions see report text.

Calculated FoS of Natural Peat Slopes for Cahermurphy West Wind Farm - Drained Analysis

Turbine No./Waypoint	Slope	Design c'	Bulk unit weight of Peat	Unit weight of Water	Depth of In situ Peat	Friction Angle	Surcharge Equivalent Placed Fill	Equivalent Total Depth of Peat (m)	Factor of Safety for Load Condition	
	α (deg)	c' (kPa)	γ (kN/m^3)	γ_w (kN/m^3)	(m)	ø' (deg)	Condition (2)	Condition (2)	Condition (1)	Condition (2)
									100% Water	100% Water
T01	3	4	10.0	10.0	0.90	25	1.0	1.9	**8.50**	**8.71**
T02	10	4	10.0	10.0	0.50	25	1.0	1.5	**7.32**	**4.20**
T03	1	4	10.0	10.0	0.40	25	1.0	1.4	**84.02**	**43.09**
T04	5	4	10.0	10.0	0.90	25	1.0	1.9	**10.45**	**7.75**
T05	4	4	10.0	10.0	0.60	25	1.0	1.6	**16.25**	**10.26**
T06	2	4	10.0	10.0	1.80	25	1.0	2.8	**19.72**	**17.45**
T07	3	4	10.0	10.0	2.00	25	1.0	3.0	**12.72**	**11.45**
T08	8	4	10.0	10.0	1.00	25	1.0	2.0	**6.22**	**4.77**
Substation	6	4	10.0	10.0	0.20	25	1.0	1.2	**23.68**	**7.64**
Met mast	8	4	10.0	10.0	0.40	25	1.0	1.4	**10.57**	**5.39**
TCC	4	4	10.0	10.0	0.50	25	1.0	1.5	**18.16**	**10.50**
Borrow Pit 1	5	4	10.0	10.0	0.50	25	1.0	1.5	**14.54**	**8.40**
Borrow Pit 2	6	4	10.0	10.0	0.90	25	1.0	1.9	**8.71**	**6.46**
PP01	4	4	10.0	10.0	No Peat Encountered					
PP02	3	4	10.0	10.0	No Peat Encountered					
PP03	4	4	10.0	10.0	0.1	25	1.0	1.1	**64.15**	**11.89**
PP04	4	4	10.0	10.0	0.1	25	1.0	1.1	**64.15**	**11.89**
PP05	3	4	10.0	10.0	0.4	25	1.0	1.4	**28.03**	**14.36**
PP06	3	4	10.0	10.0	0.2	25	1.0	1.2	**47.16**	**15.28**
PP07	8	4	10.0	10.0	0.1	25	1.0	1.1	**32.34**	**5.96**
PP08	6	4	10.0	10.0	0.15	25	1.0	1.2	**30.09**	**7.78**
PP09	4	4	10.0	10.0	0.2	25	1.0	1.2	**35.41**	**11.46**
PP10	6	4	10.0	10.0	0.3	25	1.0	1.3	**17.26**	**7.40**
PP11	4	4	10.0	10.0	0.2	25	1.0	1.2	**35.41**	**11.46**
PP12	3	4	10.0	10.0	0.3	25	1.0	1.3	**34.41**	**14.78**
PP13	3	4	10.0	10.0	0.3	25	1.0	1.3	**34.41**	**14.78**
PP14	8	4	10.0	10.0	0.4	25	1.0	1.4	**10.57**	**5.39**
PP15	8	4	10.0	10.0	1.8	25	1.0	2.8	**4.93**	**4.35**
36	4	4	10.0	10.0	0.6	25	1.0	1.6	**16.25**	**10.26**
100	10	4	10.0	10.0	0.1	25	1.0	1.1	**26.03**	**4.77**
Historical Data										
T1	3.0	4	10.0	10.0	0.30	25	1.0	1.3	**25.51**	**12.73**
T2	3.0	4	10.0	10.0	0.30	25	1.0	1.3	**25.51**	**12.73**
T3	3.0	4	10.0	10.0	0.50	25	1.0	1.5	**15.31**	**11.03**
T4	2.0	4	10.0	10.0	2.60	25	1.0	3.6	**4.41**	**6.89**
T5	4.0	4	10.0	10.0	0.25	25	1.0	1.3	**22.99**	**9.93**
T6	2.0	4	10.0	10.0	0.40	25	1.0	1.4	**28.67**	**17.73**
T7	4.0	4	10.0	10.0	1.70	25	1.0	2.7	**3.38**	**4.60**
T8	2.0	4	10.0	10.0	2.50	25	1.0	3.5	**4.59**	**7.09**
T9	2.0	4	10.0	10.0	0.70	25	1.0	1.7	**16.38**	**14.60**
T10	5.0	4	10.0	10.0	0.30	25	1.0	1.3	**15.36**	**7.64**
T1 (S/S)	3.0	4	10.0	10.0	0.30	25	1.0	1.3	**34.41**	**14.78**
T2 (S/S)	3.0	4	10.0	10.0	0.30	25	1.0	1.3	**34.41**	**14.78**
T3 (S/S)	3.0	4	10.0	10.0	0.50	25	1.0	1.5	**24.20**	**14.00**
T4 (S/S)	2.0	4	10.0	10.0	2.60	25	1.0	3.6	**17.76**	**16.54**
T5 (S/S)	4.0	4	10.0	10.0	0.25	25	1.0	1.3	**29.66**	**11.27**
T6 (S/S)	2.0	4	10.0	10.0	0.40	25	1.0	1.4	**42.02**	**21.55**
T7 (S/S)	4.0	4	10.0	10.0	1.70	25	1.0	2.7	**10.05**	**8.80**
T8 (S/S)	2.0	4	10.0	10.0	2.50	25	1.0	3.5	**17.94**	**16.63**
T9 (S/S)	2.0	4	10.0	10.0	0.70	25	1.0	1.7	**29.74**	**20.10**
T10 (S/S)	5.0	4	10.0	10.0	0.30	25	1.0	1.3	**20.69**	**8.87**
Substation 1	2.0	4	10.0	10.0	0.15	25	1.0	1.2	**76.46**	**21.58**
Substation 2	3.0	4	10.0	10.0	0.80	25	1.0	1.8	**9.57**	**9.20**
Construction Compound	3.0	4	10.0	10.0	0.15	25	1.0	1.2	**51.02**	**14.39**
Met Mast	7.0	4	10.0	10.0	0.70	25	1.0	1.7	**4.72**	**4.18**
Borrow Pit 1	4.0	4	10.0	10.0	0.15	25	1.0	1.2	**38.32**	**10.80**
Borrow Pit 2	5.0	4	10.0	10.0	0.15	25	1.0	1.2	**30.71**	**8.64**
S19	5.0	4	10.0	10.0	1.20	25	1.0	2.2	**3.84**	**4.52**
S22	2.0	4	10.0	10.0	No Peat Encountered					
S26	4.0	4	10.0	10.0	No Peat Encountered					
S30	2.0	4	10.0	10.0	2.50	25	1.0	3.5	**4.59**	**7.09**
S31	2.0	4	10.0	10.0	1.20	25	1.0	2.2	**9.56**	**11.28**
S32	2.0	4	10.0	10.0	No Peat Encountered					
S33	3.0	4	10.0	10.0	0.30	25	1.0	1.3	**25.51**	**12.73**
S34	5.0	4	10.0	10.0	No Peat Encountered					
S35	2.0	4	10.0	10.0	No Peat Encountered					
S36	5.0	4	10.0	10.0	No Peat Encountered					
S37	5.0	4	10.0	10.0	No Peat Encountered					
S38	1.0	4	10.0	10.0	0.10	25	1.0	1.1	**229.23**	**45.13**
S39	1.0	4	10.0	10.0	0.15	25	1.0	1.2	**152.82**	**43.16**
S40	2.0	4	10.0	10.0	No Peat Encountered					
S41	3.0	4	10.0	10.0	No Peat Encountered					
S42	6.0	4	10.0	10.0	0.10	25	1.0	1.1	**38.48**	**7.53**
S43	7.0	4	10.0	10.0	0.15	25	1.0	1.2	**22.05**	**6.18**
S44	6.0	4	10.0	10.0	No Peat Encountered					
S46	2.0	4	10.0	10.0	No Peat Encountered					
S47	4.0	4	10.0	10.0	No Peat Encountered					
S48	2.0	4	10.0	10.0	No Peat Encountered					
S49	2.0	4	10.0	10.0	No Peat Encountered					
S50	2.0	4	10.0	10.0	0.20	25	1.0	1.2	**57.34**	**20.68**
S51	1.0	4	10.0	10.0	0.30	25	1.0	1.3	**76.41**	**38.18**
S52	3.0	4	10.0	10.0	No Peat Encountered					
S53	4.0	4	10.0	10.0	0.30	25	1.0	1.3	**19.16**	**9.55**
S54	4.0	4	10.0	10.0	No Peat Encountered					
S55	4.0	4	10.0	10.0	No Peat Encountered					
S56	5.0	4	10.0	10.0	No Peat Encountered					
S57	2.0	4	10.0	10.0	No Peat Encountered					
S58	5.0	4	10.0	10.0	No Peat Encountered					

Calculated FoS of Natural Peat Slopes for Cahermurphy West Wind Farm - Drained Analysis

Turbine No./Waypoint	Slope	Design c'	Bulk unit weight of Peat	Unit weight of Water	Depth of In situ Peat	Friction Angle	Surcharge Equivalent Placed Fill	Equivalent Total Depth of Peat (m)	Factor of Safety for Load Condition	
	α (deg)	c' (kPa)	γ (kN/m^3)	γ_w (kN/m^3)	(m)	ø' (deg)	Condition (2)	Condition (2)	Condition (1)	Condition (2)
									100% Water	100% Water
S59	5.0	4	10.0	10.0	No Peat Encountered					
S70	6.0	4	10.0	10.0	No Peat Encountered					
S71	3.0	4	10.0	10.0	No Peat Encountered					
S73	6.0	4	10.0	10.0	No Peat Encountered					
S74	9.0	4	10.0	10.0	0.15	25	1.0	1.2	**17.26**	**4.81**
S75	3.0	4	10.0	10.0	0.30	25	1.0	1.3	**25.51**	**12.73**
S76	5.0	4	10.0	10.0	No Peat Encountered					
S77	8.0	4	10.0	10.0	0.20	25	1.0	1.2	**14.51**	**5.18**
S78	3.0	4	10.0	10.0	0.10	25	1.0	1.1	**76.53**	**15.05**
S79	4.0	4	10.0	10.0	0.10	25	1.0	1.1	**57.48**	**11.29**
S80	2.0	4	10.0	10.0	0.40	25	1.0	1.4	**28.67**	**17.73**
S81	2.0	4	10.0	10.0	0.20	25	1.0	1.2	**57.34**	**20.68**
S84	7.0	4	10.0	10.0	0.30	25	1.0	1.3	**11.02**	**5.47**
S85	7.0	4	10.0	10.0	0.25	25	1.0	1.3	**13.23**	**5.68**
S86	7.0	4	10.0	10.0	0.50	25	1.0	1.5	**6.61**	**4.74**
S87	5.0	4	10.0	10.0	No Peat Encountered					
S88	4.0	4	10.0	10.0	0.40	25	1.0	1.4	**14.37**	**8.87**
S89	2.0	4	10.0	10.0	No Peat Encountered					
S90	2.0	4	10.0	10.0	0.20	25	1.0	1.2	**57.34**	**20.68**
S91	2.0	4	10.0	10.0	1.00	25	1.0	2.0	**11.47**	**12.41**
S92	4.0	4	10.0	10.0	0.50	25	1.0	1.5	**11.50**	**8.28**
S93	2.0	4	10.0	10.0	0.10	25	1.0	1.1	**114.68**	**22.57**
S94	3.0	4	10.0	10.0	0.50	25	1.0	1.5	**15.31**	**11.03**
S95	2.0	4	10.0	10.0	1.00	25	1.0	2.0	**11.47**	**12.41**
S96	1.0	4	10.0	10.0	0.15	25	1.0	1.2	**152.82**	**43.16**
S97	3.0	4	10.0	10.0	0.10	25	1.0	1.1	**76.53**	**15.05**
S98	4.0	4	10.0	10.0	0.30	25	1.0	1.3	**19.16**	**9.55**
S99	3.0	4	10.0	10.0	0.40	25	1.0	1.4	**19.13**	**11.82**
S101	5.0	4	10.0	10.0	No Peat Encountered					
S102	7.0	4	10.0	10.0	No Peat Encountered					
S103	10.0	4	10.0	10.0	No Peat Encountered					
S104	10.0	4	10.0	10.0	0.10	25	1.0	1.1	**23.39**	**4.53**
S105	10.0	4	10.0	10.0	No Peat Encountered					
S106	5.0	4	10.0	10.0	0.10	25	1.0	1.1	**46.07**	**9.03**
S107	2.0	4	10.0	10.0	0.45	25	1.0	1.5	**25.49**	**17.12**
S108	4.0	4	10.0	10.0	2.00	25	1.0	3.0	**2.87**	**4.14**
S109	5.0	4	10.0	10.0	0.50	25	1.0	1.5	**9.21**	**6.62**
S110	5.0	4	10.0	10.0	No Peat Encountered					
S111	3.0	4	10.0	10.0	0.30	25	1.0	1.3	**25.51**	**12.73**
S112	5.0	4	10.0	10.0	0.20	25	1.0	1.2	**23.04**	**8.28**
S113	2.0	4	10.0	10.0	1.70	25	1.0	2.7	**6.75**	**9.19**
S114	3.0	4	10.0	10.0	0.60	25	1.0	1.6	**12.76**	**10.34**
S115	3.0	4	10.0	10.0	No Peat Encountered					
S117	2.0	4	10.0	10.0	0.15	25	1.0	1.2	**76.46**	**21.58**
S118	3.0	4	10.0	10.0	0.10	25	1.0	1.1	**76.53**	**15.05**
S119	7.0	4	10.0	10.0	0.10	25	1.0	1.1	**33.07**	**6.46**
S120	5.0	4	10.0	10.0	0.10	25	1.0	1.1	**46.07**	**9.03**
S121	3.0	4	10.0	10.0	0.20	25	1.0	1.2	**38.27**	**13.79**
S122	4.0	4	10.0	10.0	0.20	25	1.0	1.2	**28.74**	**10.35**
S125	3.0	4	10.0	10.0	No Peat Encountered					
S126	5.0	4	10.0	10.0	No Peat Encountered					
S127	5.0	4	10.0	10.0	No Peat Encountered					
WP001	2.0	4	10.0	10.0	0.10	25	1.0	1.1	**114.68**	**22.57**
WP002	2.0	4	10.0	10.0	0.25	25	1.0	1.3	**45.87**	**19.86**
WP003	4.0	4	10.0	10.0	0.60	25	1.0	1.6	**9.58**	**7.76**
WP008	2.0	4	10.0	10.0	No Peat Encountered					
MKO (2025)										
MKO001	2.0	4	10.0	10.0	2.8	25	1.0	3.8	**4.10**	**6.53**
MKO003	4.0	4	10.0	10.0	1.5	25	1.0	2.5	**3.83**	**4.97**
MKO006	2.0	4	10.0	10.0	5.3	25	1.0	6.3	**2.16**	**3.94**
MKO010	6.0	4	10.0	10.0	0.1	25	1.0	1.1	**38.48**	**7.53**
MKO012	6.0	4	10.0	10.0	0.9	25	1.0	1.9	**4.28**	**4.36**
MKO014	7.0	4	10.0	10.0	0.8	25	1.0	1.8	**4.13**	**3.95**
MKO016	7.0	4	10.0	10.0	0.6	25	1.0	1.6	**5.51**	**4.44**
MKO018	8.0	4	10.0	10.0	0.4	25	1.0	1.4	**7.26**	**4.44**
MKO021	8.0	4	10.0	10.0	1.3	25	1.0	2.3	**2.23**	**2.70**
MKO024	2.0	4	10.0	10.0	3.2	25	1.0	4.2	**3.58**	**5.91**
MKO026	4.0	4	10.0	10.0	0.8	25	1.0	1.8	**7.19**	**6.90**
MKO030	2.0	4	10.0	10.0	6.1	25	1.0	7.1	**1.88**	**3.50**
MKO034	6.0	4	10.0	10.0	0.6	25	1.0	1.6	**6.41**	**5.18**
MKO038	1.0	4	10.0	10.0	5.3	25	1.0	6.3	**4.33**	**7.88**
MKO041	5.0	4	10.0	10.0	1.4	25	1.0	2.4	**3.29**	**4.14**
MKO045	7.0	4	10.0	10.0	1.1	25	1.0	2.1	**3.01**	**3.38**
MKO047	12.0	4	10.0	10.0	0.1	25	1.0	1.1	**19.67**	**3.78**
MKO051	4.0	4	10.0	10.0	0.3	25	1.0	1.3	**19.16**	**9.55**
MKO058	6.0	4	10.0	10.0	0.1	25	1.0	1.1	**38.48**	**7.53**
MKO061	7.0	4	10.0	10.0	0.4	25	1.0	1.4	**8.27**	**5.07**
MKO064	4.0	4	10.0	10.0	4.0	25	1.0	5.0	**1.44**	**2.48**
MKO067	7.0	4	10.0	10.0	1.0	25	1.0	2.0	**3.31**	**3.55**
MKO072	3.0	4	10.0	10.0	0.6	25	1.0	1.6	**12.76**	**10.34**
MKO074	3.0	4	10.0	10.0	0.4	25	1.0	1.4	**19.13**	**11.82**
MKO075	7.0	4	10.0	10.0	0.4	25	1.0	1.4	**8.27**	**5.07**
MKO081	16.0	4	10.0	10.0	0.2	25	1.0	1.2	**7.55**	**2.61**
MKO090	4.0	4	10.0	10.0	0.1	25	1.0	1.1	**57.48**	**11.29**
MKO094	6.0	4	10.0	10.0	0.4	25	1.0	1.4	**9.62**	**5.92**
MKO098	5.0	4	10.0	10.0	1.5	25	1.0	2.5	**3.07**	**3.97**
MKO103	2.0	4	10.0	10.0	1.6	25	1.0	2.6	**7.17**	**9.55**
MKO106	2.0	4	10.0	10.0	1.0	25	1.0	2.0	**11.47**	**12.41**
MKO108	5.0	4	10.0	10.0	0.2	25	1.0	1.2	**23.04**	**8.28**
MKO110	5.0	4	10.0	10.0	0.1	25	1.0	1.1	**46.07**	**9.03**
MKO112	5.0	4	10.0	10.0	0.1	25	1.0	1.1	**46.07**	**9.03**
MKO119	5.0	4	10.0	10.0	0.2	25	1.0	1.2	**23.04**	**8.28**

Calculated FoS of Natural Peat Slopes for Cahermurphy West Wind Farm - Drained Analysis

Turbine No./Waypoint	Slope	Design c'	Bulk unit weight of Peat	Unit weight of Water	Depth of In situ Peat	Friction Angle	Surcharge Equivalent Placed Fill	Equivalent Total Depth of Peat (m)	Factor of Safety for Load Condition	
	α (deg)	c' (kPa)	γ (kN/m^3)	γ_w (kN/m^3)	(m)	ø' (deg)	Condition (2)	Condition (2)	Condition (1)	Condition (2)
									100% Water	100% Water
MKO122	3.0	4	10.0	10.0	3.5	25	1.0	4.5	**2.19**	**3.68**
MKO125	2.0	4	10.0	10.0	0.1	25	1.0	1.1	**114.68**	**22.57**
MKO127	3.0	4	10.0	10.0	0.1	25	1.0	1.1	**76.53**	**15.05**
MKO129	4.0	4	10.0	10.0	0.1	25	1.0	1.1	**57.48**	**11.29**
MKO132	6.0	4	10.0	10.0	0.1	25	1.0	1.1	**38.48**	**7.53**
MKO133	5.0	4	10.0	10.0	0.2	25	1.0	1.2	**23.04**	**8.28**
MKO137	5.0	4	10.0	10.0	0.1	25	1.0	1.1	**46.07**	**9.03**
MKO139	2.0	4	10.0	10.0	4.6	25	1.0	5.6	**2.49**	**4.43**
MKO143	6.0	4	10.0	10.0	0.5	25	1.0	1.5	**7.70**	**5.52**
MKO151	2.0	4	10.0	10.0	0.2	25	1.0	1.2	**57.34**	**20.68**
MKO153	4.0	4	10.0	10.0	0.1	25	1.0	1.1	**57.48**	**11.29**
MKO156	5.0	4	10.0	10.0	0.4	25	1.0	1.4	**13.16**	**7.36**
MKO158	4.0	4	10.0	10.0	0.2	25	1.0	1.2	**38.32**	**10.80**
MKO160	6.0	4	10.0	10.0	0.3	25	1.0	1.3	**12.83**	**6.37**
MKO162	4.0	4	10.0	10.0	0.5	25	1.0	1.5	**11.50**	**8.28**
MKO165	6.0	4	10.0	10.0	0.1	25	1.0	1.1	**38.48**	**7.53**
MKO172	6.0	4	10.0	10.0	0.4	25	1.0	1.4	**9.62**	**5.92**
MKO_23	0.4	4	10.0	10.0	2.25	25	1.0	3.3	**25.47**	**38.18**
MKO_28	3.3	4	10.0	10.0	0.90	25	1.0	1.9	**7.73**	**7.92**
MKO_31	7.3	4	10.0	10.0	0.80	25	1.0	1.8	**3.97**	**3.79**
P1-CM	5.0	4	10.0	10.0	1.10	25	1.0	2.1	**4.19**	**4.73**
P10-CM	10.0	4	10.0	10.0	0.30	25	1.0	1.3	**7.80**	**3.83**
P11-CM	5.0	4	10.0	10.0	0.50	25	1.0	1.5	**9.21**	**6.62**
P12-CM	5.0	4	10.0	10.0	0.80	25	1.0	1.8	**5.76**	**5.52**
P13-CM1	6.0	4	10.0	10.0	0.70	25	1.0	1.7	**5.50**	**4.87**
P14-CM	6.5	4	10.0	10.0	0.10	25	1.0	1.1	**35.56**	**6.95**
P15-CM	5.5	4	10.0	10.0	0.10	25	1.0	1.1	**41.93**	**8.21**
P16-CM	4.6	4	10.0	10.0	0.70	25	1.0	1.7	**7.15**	**6.35**
P17-CM	1.0	4	10.0	10.0	2.10	25	1.0	3.1	**10.92**	**16.01**
P18-CM	10.0	4	10.0	10.0	0.10	25	1.0	1.1	**23.39**	**4.53**
P2-CM	6.0	4	10.0	10.0	0.30	25	1.0	1.3	**12.83**	**6.37**
P3-CM	6.0	4	10.0	10.0	0.10	25	1.0	1.1	**38.48**	**7.53**
P4-CM	3.0	4	10.0	10.0	0.10	25	1.0	1.1	**76.53**	**15.05**
P5-CM	10.0	4	10.0	10.0	0.10	25	1.0	1.1	**23.39**	**4.53**
P6-CM	10.0	4	10.0	10.0	0.10	25	1.0	1.1	**23.39**	**4.53**
P9-CM	4.6	4	10.0	10.0	0.10	25	1.0	1.1	**50.04**	**9.82**
1	3.5	4	10.0	10.0	0.20	25	1.0	1.2	**32.82**	**11.82**
2	3.5	4	10.0	10.0	0.30	25	1.0	1.3	**21.88**	**10.91**
4	3.5	4	10.0	10.0	0.30	25	1.0	1.3	**21.88**	**10.91**
5	2.0	4	10.0	10.0	0.80	25	1.0	1.8	**27.69**	**19.72**
6	2.0	4	10.0	10.0	0.20	25	1.0	1.2	**70.70**	**22.91**
7	2.0	4	10.0	10.0	0.20	25	1.0	1.2	**70.70**	**22.91**
7a	2.0	4	10.0	10.0	0.40	25	1.0	1.4	**42.02**	**21.55**
11	3.0	4	10.0	10.0	1.00	25	1.0	2.0	**16.55**	**12.72**
22	7.0	4	10.0	10.0	0.70	25	1.0	1.7	**8.52**	**5.74**
43	6.0	4	10.0	10.0	0.40	25	1.0	1.4	**14.06**	**7.19**
48	10.0	4	10.0	10.0	0.40	25	1.0	1.4	**8.49**	**4.32**
50	7.0	4	10.0	10.0	0.40	25	1.0	1.4	**12.06**	**6.16**
64	4.0	4	10.0	10.0	0.80	25	1.0	1.8	**13.85**	**9.86**
								Minimum =	**1.44**	**2.48**
								Maximum =	**229.23**	**45.13**
								Average =	**28.19**	**10.80**

Notes:

(1) Assuming a bulk unit weight of peat of 10 (kN/m^3)

(2) Assuming a surcharge equivalent to fill depth of 1.0m.

(3) Slope inclination (β) based on site readings and contour survey plans of site.

(4) FoS is based on slope inclination and shear test results obtained from published data.

(5) Peat depths based on probes carried out by FT and MKO.

(6) For load conditions see Report text.

(7) Minimum acceptable factor of safety required of 1.4 for first-time failures based on BS: 6031:1981 Code of practice for Earthworks.

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APPENDIX D

Methodology for Peat Stability Risk Assessment

Methodology for Peat Stability Risk Assessment

A peat stability risk assessment was carried out for each of the main infrastructure elements at the proposed wind farm development. This approach takes into account guidelines for geotechnical/peat stability risk assessments as given in PLHRAG (2017) and MacCulloch (2005). The degree of risk is determined as a Risk Rating (R), which is the product of probability (P) and impact (I). How these factors are determined and applied in the analysis is described below.

The main approaches for assessing peat stability include the following:

(a) Geomorphological

(b) Qualitative (judgement)

(c) Index/Probabilistic (probability)

(d) Deterministic (factor of safety)

Approaches (a) to (c) listed above would be considered subjective and do not provide a definitive indication of stability; in addition, a high level of judgement/experience is required which makes it difficult to relate the findings to real conditions. FT apply a more objective approach, the deterministic approach. As part of FT's deterministic approach, a qualitative risk assessment is also carried out taking into account qualitative factors, which cannot necessarily be quantified.

Probability

The likelihood of a peat failure occurring was assessed based on the results of both the quantitative results of stability calculations (deterministic approach using factors of safety) and the assessment of the severity of several qualitative factors which cannot be reasonably included in a stability calculation but nevertheless may affect the occurrence of peat instability.

The qualitative factors used in the risk assessment are outlined in Table A and have been compiled based on FT's experience of assessments and construction in peat land sites and peat failures throughout Ireland and the UK.

Table A: Qualitative Factors used to Assess Potential for Peat Failure

Qualitative Factor	Type of Feature/Indicator for each Qualitative Factor [1]	Explanation/Description of Qualitative Factor
Evidence of sub peat water flow	No	Based on site walkover observations. Sub peat water flow generally occurs in the form of natural piping at the base of peat. Where there is a constriction or blockage in natural pipes a build-up of water can occur at the base of the peat causing a reduction in effective stress at the base of the peat resulting in failure; this is particularly critical during periods of intense rainfall.
	Possibly	
	Probably	
	Yes	

Qualitative Factor	Type of Feature/Indicator for each Qualitative Factor [1]	Explanation/Description of Qualitative Factor
Evidence of surface water flow	Dry	Based on site walkover observations. The presence of surface water flow indicates if peat in an area is well drained or saturated and if any additional loading from the ponding of surface water onto the peat is likely.
	Localised/Flowing in drains	
	Ponded in drains	
	Springs/surface water	
Evidence of previous failures/slips	No	Based on site walkover observations. The presence of clustering of relict failures may indicate that particular pre-existing site conditions predispose a site to failure.
	In general area	
	On site	
	Within 500m of location	
Type of vegetation	Grass/Crops	Based on site walkover observations. The type of vegetation present indicates if peat in an area is well drained, saturated, etc. Vegetation that indicates wetter ground may also indicate softer underlying peat deposits.
	Improved Grass/Dry Heather	
	Wet Grassland/Juncus (Rushes)	
	Wetlands Sphagnum (Peat moss)	
General slope characteristics upslope/downslope from infrastructure location	Concave	Based on site walkover observations. Slope morphology in the area of the infrastructure location is an important factor. A number of recorded peat failures have occurred in close proximity to a convex break in slope.
	Planar to concave	
	Planar to convex	
	Convex	
Evidence of very soft/soft clay at base of peat	No	Based on inspection of exposures in general area from site walkover. Several reported peat failures identify the presence of a weak layer at the base of the peat along which shear failure has occurred.
	Yes	
Evidence of mechanically cut peat	No	Based on site walkover observations. Mechanically cut peat typically cut using a ‘sausage’ machine to extract

Qualitative Factor	Type of Feature/Indicator for each Qualitative Factor (1)	Explanation/Description of Qualitative Factor
	Yes	peat for harvesting. Areas which have been cut in this manner have been linked to peat instability. The mechanical cuts can notably reduce the intrinsic strength of the peat and also allow ingress of rainfall/surface water.
Evidence of quaking or buoyant peat	No	Based on site walkover observations. Quaking/buoyant peat is indicative of highly saturated peat, which would generally be considered to have a low strength. Quaking peat is a feature on sites that have been previously linked with peat instability.
	Yes	
Evidence of bog pools	No	Based on site walkover observations. Bog pools are generally an indicator of areas of weak, saturated peat. Commonly where there are open areas of water within peat these can be interconnected, with the result that there may be sub-surface bodies of water. The presence of bog pools have been previously linked with peat instability.
	Yes	
Other	Varies	In addition to the above features/ indicators and based on site recordings the following are some of the features which may be identified: Excessively deep peat, weak peat, overly steep slope angles, etc.

Note (1) The list of features/indicators for each qualitative factor are given in increasing order of probability of leading to peat instability/failure.

It should be noted that the presence of one of the qualitative factors alone from Table A is unlikely to lead to peat instability/failure. Peat instability/failure at a site is generally the combination of a number of these factors occurring at the same time at a particular location. The probability rating assigned to the quantitative and qualitative factors is judged on a 5-point scale from 1 (indicating negligible or no probability of failure) to 5 (indicating a very likely failure), as outlined in Table B.

Table B: Probability Scale

Scale	Factor of Safety	Probability
1	1.30 or greater	Negligible/None
2	1.29 to 1.20	Unlikely
3	1.19 to 1.11	Likely
4	1.01 to 1.10	Probable
5	≤1.0	Very Likely

Scale	Likelihood of Qualitative Factor leading to Peat Failure	Probability of Failure
1	Negligible/None	Least
2	Unlikely	
3	Probable	
4	Likely	
5	Very Likely	Greatest

Impact

The severity of the risk is also assessed qualitatively in terms of impact. The impact of a peat failure on the environment within and beyond the immediate wind farm site is assessed based on the potential travel distance of a peat failure. Where a peat failure enters a watercourse, it can travel a considerable distance downstream. Therefore, the proximity of a potential peat failure to a drainage course is a significant indicator of the likely potential impact.

The risk is determined based on the combination of hazard and impact. A qualitative scale has been derived for the impact of the hazard based on distance of infrastructure element to a watercourse (Table C).

The location of watercourses is based on topographic maps and supplemented by site observations from walkover survey. Note that not all watercourses are shown on maps.

Table C: Impact Scale

Scale	Criteria	Impact
1	Proposed infrastructure element greater than 150m of watercourse	Negligible/None
2	Proposed infrastructure element within 150 to 101m of watercourse	Low
3	Proposed infrastructure element within 100 to 51m of watercourse	Medium

4	Proposed infrastructure element within 50 m of watercourse	High
5	Proposed infrastructure element within 50 m of watercourse, in an environmentally sensitive area	Extremely High

Risk Rating

The degree of risk is determined as the product of probability (P) and impact (I), which gives the Risk Rating (R) as follows:

The Risk Rating is calculated from: R = P x I

Due to the 5-point scales used to assess Probability and Impact, the Risk Rating can range from 1 to 25 as shown in Table D.

Table D: Qualitative Risk Rating

Impact \ Probability	1	2	3	4	5
5	5	10	15	20	25
4	4	8	12	16	20
3	3	6	9	12	15
2	2	4	6	8	10
1	1	2	3	4	5

Risk Rating & Control Measures	
17 to 25	High: avoid working in area or significant control measures required
11 to 16	Medium: notable control measures required
5 to 10	Low: only routine control measures required
1 to 4	Negligible: none or only routine control measures required

The risk rating is calculated individually for each contributory factor. Control measures are required to reduce the risk to at least a 'Low' risk rating. The control measures in response to the qualitative risk ratings are included in the peat stability risk registers for each main infrastructure element in Appendix B.

The risk rating is calculated individually for each contributory factor. Control measures are required to reduce the risk to at least a 'Tolerable' risk rating.

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APPENDIX E

Ground Investigation
(IDL, 2019)

IRISH DRILLING LIMITED

LOUGHREA, CO. GALWAY, IRELAND

CONTRACT DRILLING
SITE INVESTIGATION

Phone: (091) 841 274
Fax: (091) 847 687

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CAHERMURPHY WIND FARM PHASE 2, 2019

FACTUAL REPORT

MKO,
Tuam Road,
Galway,
H91 VW84.

Fehily Timoney& Company,
The Grainstore,
Bagenalstown,
Co. Carlow.

	Prepared by	Approved by	Rev. Issue Date:	Revision No.
	Ronan Killeen	Declan Joyce	18th November 2019	19 CE/103_001
Signature				

FOREWORD

The trial pit records have been compiled from an examination of the samples by a Geotechnical Engineer and from the Drillers' descriptions.

The report presents an opinion on the configuration of the strata within the site based on the trial pit results. The assumptions, though reasonable, are given for guidance only and no liability can be accepted for changes in conditions not revealed by the trial pits.

The fieldwork was carried out in accordance with IS EN 1997-2 and BS5930, 2015 Code of Practice for Site Investigations with precedence given to IS EN 1997-2 where applicable.

Contents:

1.0 Introduction.

Irish Drilling Ltd. (IDL) was instructed by Fehily Timoney & Company Consulting Engineers, on behalf of MKO, to carry out a site investigation at the site of the proposed Cahermurphy Wind Farm.

This site investigation was carried out to provide detailed factual geotechnical information of the underlying ground conditions along the proposed substation and borrow pit sites and at proposed turbine locations.

The fieldwork commenced on September 18th 2019 and was completed on September 19th 2019.

2.0 Site & Geology

The site is located near Kilmihil, County Clare.

The fieldwork was carried out predominantly on agricultural and/or forestry lands.

Weather conditions in general were quite variable with the majority of the fieldwork carried out over a typical autumn/winter period in Ireland.

Geological Survey maps of the area indicate that the site is underlain by Carboniferous Limestone Rock Formations.

A Site Plan, prepared by the client's representatives and showing approximate fieldwork locations, is included as an appendix with this report.

3.0 Fieldwork.

The following plant was mobilised to site to carry out fieldwork operations:

Hitachi LCN 12T Tracked Excavator.

Fieldwork carried out to date has included the following:

Fourteen trial pits were excavated on site using a 12T wide-padded tracked excavator. The pits were logged and photographed by an Engineer with observations made on ground conditions, pit stability and water ingress.

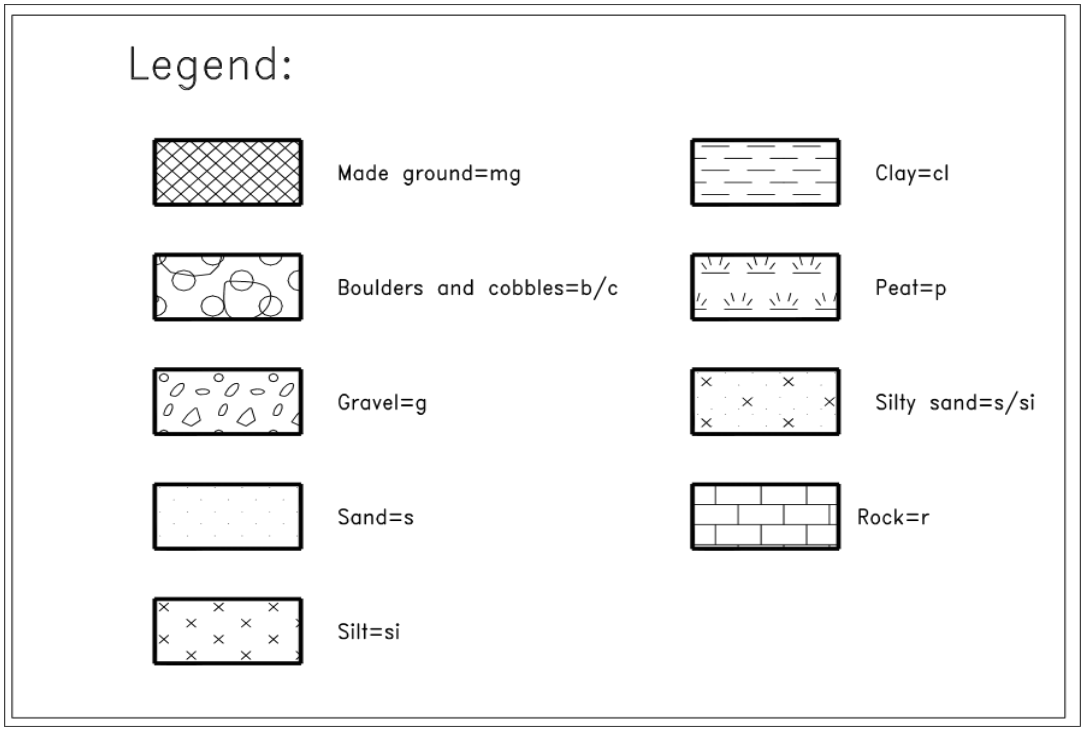
Small and bulk disturbed soil samples were recovered at each change in strata and the samples were returned to the laboratory and presented for testing.

The trial pit locations were set out on site using a Trimble CU Bluetooth GPS Surveying Unit and the co-ordinates are included on the logs presented in the appendices.

All fieldwork co-ordinates are reported to Irish Transverse Mercator (ITM) with Reduced Levels recorded relative to Malin Head Datum and with an accuracy level of + or – 0.10m.

For detailed descriptions of the ground conditions encountered please refer to the engineering logs included in the appendices to this report.

The following Key Legend Table details the symbology used on the engineering logs to describe ground conditions encountered:



The fieldwork was carried out in accordance with IS EN 1997-2 and BS5930, 2015 Code of Practice for Site Investigations with precedence given to IS EN 1997-2 where applicable.

4.0 Laboratory Testing

Representative samples recovered from the trial pits were scheduled for testing in the laboratory.

The test schedules were prepared by the Client's Engineer and included some or all of the following tests on disturbed soil samples:

* Natural Moisture Content.
* Atterberg Limits.
* Particle Size Distribution.
* Sedimentation.

The soil and rock descriptions as noted on the trial pit logs are in general visual descriptions as observed and logged by our Engineers and are described in accordance with IS EN 1997-2 and BS5930, 2015 Code of Practice for Site Investigations.

Soils descriptions (cohesive or otherwise) are also initially assessed based on the texture and 'feel' of the soil materials as witnessed by our Geotechnical Engineers and in accordance with IS EN 1997-2 and BS5930.

Where laboratory classification tests have been carried out on soil or rock samples then these visual descriptions have been amended accordingly to take into account the results of these classification tests.

The records of all fieldwork, laboratory test results and photographs are included in the appendices of this Factual Report.

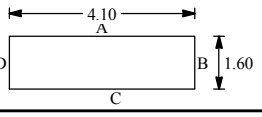
Ronan Killeen
Chartered Engineer
Irish Drilling Limited
November 18th 2019

PROJECT: Cahermurphy Wind Farm 2		**TRIALPIT: BP01**
LOCATION: Co Clare		**Sheet 1 of 1**
CLIENT: MKOS	**Co-ordinates:**	**Rig: Zaxis 130LCN**
ENGINEER: Fehily Timoney & Partners	**E 509,172.9 N 668,757.9**	**Rev: DRAFT**
Ground level: 128.11m O.D.		**DATE: 18.9.19**

GROUNDWATER

Water strikes: Rose to after:
1st: dry
2nd:
3rd:

PIT DIRECTION: 000-180
PIT DIMENSION: 1.60 * 4.10m
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0							127.71	0.40	Grass and reeds over plastic brown amorphous PEAT with rootlets.
			B 1	0.60-0.80			127.11	1.00	Soft light brown sandy gravelly SILT with medium cobble content. Gravel is subangular fine to coarse. Cobbles are subrounded.
1							126.41	1.70	Light brown silty gravelly fine to coarse SAND with medium cobble content. Gravel is subangular fine. Cobbles are subangular to subrounded.
			B 2	1.70-1.90			125.91	2.20	Greyish brown slightly silty coarse SAND and angular to subrounded fine GRAVEL with medium cobble content. Cobbles are subrounded.
2							125.31	2.80	Greyish brown slightly silty sandy and angular and elongate GRAVEL. Sand is coarse.
			B 3	2.60-2.80					
3			B 4	3.00-3.20			124.01	4.10	Greyish black gravelly elongate angular and flat shale COBBLES. Gravel is angular and flat.
4									**END** TP terminated at 4.10m bgl - obstruction as possible rock.
5									

Remarks: TP dry on excavation. TP backfilled with arisings.

Scale: 1:25

irish drilling ltd loughrea

Ph.
Fax

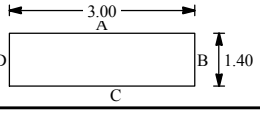
TRIAL PIT VANE & WL RISES CAHERMURPY 2 WF TPS FILE 1 OCT 7 2019.GPJ IRISHDRL.GDT 18/11/19

PROJECT: Cahermurphy Wind Farm 2	**TRIALPIT: BP02**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MKOS	**Co-ordinates:** **Rig: Zaxis 130LCN**
ENGINEER: Fehily Timoney & Partners	**E 508,751.6 N 669,546.8** **Rev: DRAFT**
Ground level: 134.10m O.D.	**DATE: 18.9.19**

GROUNDWATER

Water strikes: Rose to after:
1st: dry
2nd:
3rd:

PIT DIRECTION: 000-180
PIT DIMENSION: 1.40 * 3.00m
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0			B 1	0.40-0.60			133.20	0.90	Brown gravelly medium to coarse SAND with high cobble content and high boulder content. Gravel is subangular to rounded fine to coarse. Cobbles are angular. Boulders are angular.
1						END			TP terminated at 0.90m bgl - obstruction as probable rock.
2									
3									
4									
5									

Remarks: TP dry on excavation. TP backfilled with arisings.

Scale: 1:25

irish drilling ltd loughrea

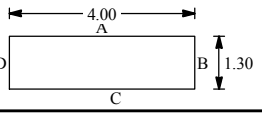
Ph.
Fax

TRIAL PIT VANE & WL RISES CAHERMURPY 2 WF TPS FILE 1 OCT 7 2019.GPJ IRISHDRL.GDT 18/11/19

PROJECT: Cahermurphy Wind Farm 2		**TRIALPIT: SS01-TP01**
LOCATION: Co Clare		**Sheet 1 of 1**
CLIENT: MKOS	**Co-ordinates:**	**Rig: Zaxis 130LCN**
ENGINEER: Fehily Timoney & Partners	**E 509,472.0 N 668,905.9**	**Rev: DRAFT**
Ground level: 140.62m O.D.		**DATE: 18.9.19**

GROUNDWATER
Water strikes: Rose to after:
1st: dry
2nd:
3rd:

PIT DIRECTION: 000-180
PIT DIMENSION: 1.30 * 4.00m
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0							140.42	0.20	Grass and reeds over plastic blackish brown amorphous PEAT with rootlets.
							140.02	0.60	Firm light brown slightly sandy slightly gravelly SILT. Gravel is subrounded coarse.
			B 1 D 2 VANE	0.65-0.85 0.65-0.85 0.80	19mm vane 121 kN/m²		139.52	1.10	Stiff greyish blue SILT with medium cobble content and rootlets. Cobbles are subrounded.
1									
			B 3	1.60-1.80			138.62	2.00	Stiff greyish blue slightly gravelly SILT with medium cobble content and medium boulder content and rootlets. Gravel is subrounded to rounded fine to coarse. Cobbles are subrounded. Boulders are subrounded.
2			B 4	2.10-2.30			137.62	3.00	Brown clayey subangular to subrounded coarse GRAVEL and subangular COBBLES.
3			B 5	3.30-3.50			136.92	3.70	Brown clayey GRAVEL and elongate and angular shale/siltstone COBBLES. Cobble size increasing with depth. Hard digging.
						END			TP terminated at 3.70m bgl - obstruction as possible weathered rock.
4									
5									

Remarks: TP dry on excavation. TP backfilled with arisings.

Scale: 1:25

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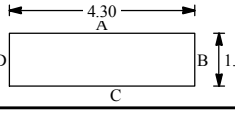
TRIAL PIT VANE & WL RISES CAHERMURPY 2 WF TPS FILE 1 OCT 7 2019.GPJ IRISHDRL.GDT 18/11/19

PROJECT: Cahermurphy Wind Farm 2	**TRIALPIT: SS02**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MKOS	**Co-ordinates:** E 508,901.6 N 669,991.4
ENGINEER: Fehily Timoney & Partners	**Rig: Zaxis 130LCN**
Ground level: 98.61m O.D.	**Rev: DRAFT**
	DATE: 18.9.19

GROUNDWATER

Water strikes: Rose to after:
1st: 0.40m
2nd:
3rd:

PIT DIRECTION: 090-270
PIT DIMENSION: 1.50 * 4.30m
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit unstable. Sidewall collapse.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0									
							98.21	0.40	Grass over soft brown peaty SILT with medium boulder content. Boulders are subangular. Boulders are up to 700mm in length.
			B 1 D 2 VANE	0.60-0.80 0.60-0.80 0.70	19mm vane 129 kN/m²		97.51	1.10	Stiff bluish grey slightly sandy SILT with medium cobble content. Cobbles are subangular.
1									
			B 3	1.60-1.80			96.01	2.60	Stiff bluish grey and brown slightly sandy gravelly SILT with medium cobble content. Gravel is subangular to rounded fine to coarse. Cobbles are subrounded.
2									
			B 4	2.80-3.00			95.41	3.20	Grey slightly sandy silty angular fine to coarse GRAVEL with high cobble content and high boulder content. Cobbles are angular to subrounded. Boulders are angular to subrounded of limestone. Boulders are up to 800mm in length.
3									
			B 5	3.50-3.70			94.61	4.00	Soft damp grey sandy gravelly SILT with high cobble content and low boulder content. Gravel is angular to subangular fine to coarse. Cobbles are subangular to subrounded. Boulders are subangular to subrounded.
4						END			TP terminated at 4.00m bgl. Unable to keep TP open - sidewall collapse.
5									

Remarks: Slight ingress of water at 0.40m bgl. TP backfilled with arisings.

Scale: 1:25

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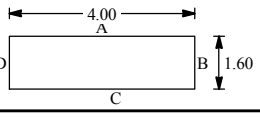
TRIAL PIT VANE & WL RISES CAHERMURPY 2 WF TPS FILE 1 OCT 7 2019.GPJ IRISHDRL.GDT 18/11/19

PROJECT: Cahermurphy Wind Farm 2	**TRIALPIT: TP01**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MKOS	**Co-ordinates:** E 507,392.3 N 669,378.0 — **Rig: Zaxis 130LCN**
ENGINEER: Fehily Timoney & Partners	**Rev: DRAFT**
Ground level: 104.86m O.D.	**DATE: 19.9.19**

GROUNDWATER

Water strikes: Rose to after:
1st: dry
2nd:
3rd:

PIT DIRECTION: 090-270
PIT DIMENSION: 1.60 * 4.00m
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0									
									Grass over plastic black amorphous PEAT.
							104.06	0.80	
			VANE	0.80					Very stiff brown sandy SILT.
			B 1	0.80-1.00					0.80m: hand vane - test failed.
1			D 2	0.80-1.00					
							103.66	1.20	
									Brown silty locally very silty very sandy coarse GRAVEL with high cobble content and medium boulder content. Gravel is angular fine. Cobbles are subrounded of limestone. Boulders are subrounded. Boulders are up to 500mm in length. Hard digging.
			B 3	1.60-1.80					
2									
3			B 4	3.00-3.20					
							100.96	3.90	
							END		TP terminated at 3.90m bgl - obstruction as boulders.
4									
5									

Remarks: TP dry on excavation. TP backfilled with arisings.

Scale: 1:25

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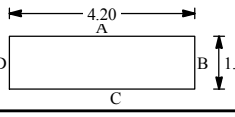
TRIAL PIT VANE & WL RISES CAHERMURPY 2 WF TPS FILE 1 OCT 7 2019.GPJ IRISHDRL.GDT 18/11/19

PROJECT: Cahermurphy Wind Farm 2		**TRIALPIT: TP02**
LOCATION: Co Clare		**Sheet 1 of 1**
CLIENT: MKOS	**Co-ordinates:**	**Rig: Zaxis 130LCN**
ENGINEER: Fehily Timoney & Partners	**E 507,895.2 N 669,761.6**	**Rev: DRAFT**
Ground level: 90.97m O.D.		**DATE: 19.9.19**

GROUNDWATER
Water strikes: Rose to after:
1st: dry
2nd:
3rd:

PIT DIRECTION: 090-270
PIT DIMENSION: 1.70 * 4.20m
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit unstable. Sidewall collapse.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0							90.77	0.20	Soft brown silty PEAT.
							90.57	0.40	Stiff orangish brown SILT.
			B 1	0.50-0.70					Dark grey silty sandy subrounded to rounded fine to coarse GRAVEL with high cobble content. Cobbles are angular to subrounded. Cobbles increasing with depth.
1									
			B 2	1.50-1.70					
2									2.00m: with medium boulder content. Boulders are subrounded of limestone.
									2.40m: becoming dark grey.
3			B 3	3.00-3.20			87.67	3.30	
						END			TP terminated at 3.30m bgl. Unable to keep TP open - sidewall collapse.
4									
5									

Remarks: TP damp below 0.80m bgl. TP backfilled with arisings.

Scale: 1:25

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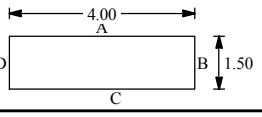
TRIAL PIT VANE & WL RISES CAHERMURPY 2 WF TPS FILE 1 OCT 7 2019.GPJ IRISHDRL.GDT 18/11/19

PROJECT: Cahermurphy Wind Farm 2	**TRIALPIT: TP03**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MKOS	**Co-ordinates:** **Rig: Zaxis 130LCN**
ENGINEER: Fehily Timoney & Partners	**E 508,561.5 N 669,811.3** **Rev: DRAFT**
Ground level: 101.26m O.D.	**DATE: 19.9.19**

GROUNDWATER

Water strikes: **Rose to after:**
1st: 2.20m
2nd:
3rd:

PIT DIRECTION: 000-180
PIT DIMENSION: 1.50 * 4.00m
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0							101.01	0.25	TOPSOIL: Grass and reeds over firm brown organic SILT.
			B 1 J 2	0.50-0.70 0.50-0.70			100.41	0.85	Firm brownish grey SILT with rootlets.
1			B 3	1.00-1.20			99.96	1.30	Stiff brown slightly gravelly sandy SILT with high cobble content. Gravel is subangular to subrounded fine to coarse.
							99.46	1.80	Brown silty gravelly medium to coarse SAND with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded of limestone.
2		▼							Orange brown very sandy very silty coarse GRAVEL with high cobble content and low boulder content. Gravel is subangular to rounded fine to coarse. Cobbles are angular to subrounded. Boulders are angular. Boulders are up to 550mm in length.
			B 4	2.70-2.90					
3							97.76	3.50	
						END			TP terminated at 3.50m bgl - obstruction as boulders.
4									
5									

Remarks: Seepage of water at 2.20m bgl. TP backfilled with arisings.

Scale: 1:25

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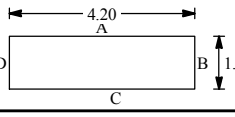
TRIAL PIT VANE & WL RISES CAHERMURPY 2 WF TPS FILE 1 OCT 7 2019.GPJ IRISHDRL.GDT 18/11/19

PROJECT: Cahermurphy Wind Farm 2	**TRIALPIT: TP04**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MKOS	**Co-ordinates:** E 507,835.3 N 669,046.5
ENGINEER: Fehily Timoney & Partners	**Rig: Zaxis 130LCN**
Ground level: 104.81m O.D.	**Rev: DRAFT**
	DATE: 19.9.19

GROUNDWATER

Water strikes: Rose to after:
1st: 2.70m
2nd:
3rd:

PIT DIRECTION: 090-270
PIT DIMENSION: 1.60 * 4.20m
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit unstable. Sidewall collapse.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0									
									Firm brownish black fibrous PEAT.
1			B 1	1.00-1.20					
2									
							102.11	2.70	
			B 2 J 3	2.80-3.00 2.80-3.00					Stiff bluish grey slightly sandy slightly gravelly SILT with medium cobble content. Gravel is angular to subrounded fine to coarse. Cobbles are subrounded. 2.80m: increase in sand content.
3									
							100.81	4.00	
4						END			TP terminated at 4.00m bgl. Unable to keep TP open - sidewall collapse.
5									

Remarks: Rapid ingress of water at 2.70m bgl. TP backfilled with arisings.

Scale: 1:25

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TRIAL PIT VANE & WL RISES CAHERMURPY 2 WF TPS FILE 1 OCT 7 2019.GPJ IRISHDRL.GDT 18/11/19

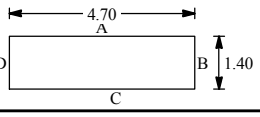
PROJECT: Cahermurphy Wind Farm 2
LOCATION: Co Clare
TRIALPIT: TP05
Sheet 1 of 1

CLIENT: MKOS
ENGINEER: Fehily Timoney & Partners
Co-ordinates: E 508,296.4 N 669,435.4
Rig: Zaxis 130LCN
Rev: DRAFT

Ground level: 125.99m O.D.
DATE: 19.9.19

GROUNDWATER
Water strikes: Rose to after:
1st: dry
2nd:
3rd:

PIT DIRECTION: 000-180
PIT DIMENSION: 1.40 * 4.70m
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0							125.64	0.35	Plastic black amorphous PEAT.
			B 1 D 2 VANE	0.50-0.70 0.50-0.70 0.70	19mm vane 158 kN/m²		125.14	0.85	Stiff bluish grey and brown SILT with medium cobble content and rootlets. Cobbles are subrounded.
1			B 3 D 4	1.20-1.40 1.20-1.40					Stiff brown and grey slightly sandy gravelly SILT/CLAY with low cobble content and low boulder content. Gravel is subrounded medium to coarse. Cobbles are subrounded. Boulders are subrounded of limestone. Boulders are up to 600mm in length. Hard digging.
2									
			B 5	2.60-2.80					
3							122.09	3.90	
4						END			TP terminated at 3.90m bgl - obstruction as boulders.
5									

Remarks: TP dry on excavation. TP backfilled with arisings.

Scale: 1:25

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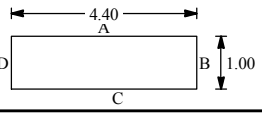
TRIAL PIT VANE & WL RISES CAHERMURPY 2 WF TPS FILE 1 OCT 7 2019.GPJ IRISHDRL.GDT 18/11/19

PROJECT: Cahermurphy Wind Farm 2	**TRIALPIT: TP06**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MKOS	**Co-ordinates:**
ENGINEER: Fehily Timoney & Partners	**E 508,920.0 N 669,598.2**
Rig: Zaxis 130LCN	
Rev: DRAFT	
Ground level: 133.92m O.D.	**DATE: 18.9.19**

GROUNDWATER

Water strikes: Rose to after:
1st: dry
2nd:
3rd:

PIT DIRECTION: 090-270
PIT DIMENSION: 1.00 * 4.40m
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0									
							133.52	0.40	Grass and heather over plastic dark brown amorphous PEAT.
							133.22	0.70	Stiff light brown organic SILT.
			B 1 D 2	0.70-0.90 0.70-0.90					Bluish grey very sandy very silty coarse GRAVEL with high cobble content. Gravel is subangular to subrounded medium to coarse. Cobbles are subrounded.
1							132.32	1.60	
			B 3	1.80-2.00					Grey silty sandy angular to subangular fine to coarse GRAVEL and COBBLES with medium boulder content. Boulders are angular to subrounded of limestone. Boulders are up to 550mm in length.
2							131.32	2.60	
									END TP terminated at 2.60m bgl - obstruction as possible rock.
3									
4									
5									

Remarks: TP dry on excavation. TP backfilled with arisings.

Scale: 1:25

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TRIAL PIT VANE & WL RISES CAHERMURPY 2 WF TPS FILE 1 OCT 7 2019.GPJ IRISHDRL.GDT 18/11/19

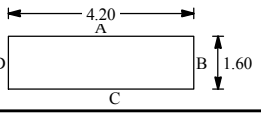
PROJECT: Cahermurphy Wind Farm 2
LOCATION: Co Clare
TRIALPIT: TP07
Sheet 1 of 1

CLIENT: MKOS
ENGINEER: Fehily Timoney & Partners
Co-ordinates: E 508,224.8 N 668,669.4
Rig: Zaxis 130LCN
Rev: DRAFT

Ground level: 112.59m O.D.
DATE: 19.9.19

GROUNDWATER
Water strikes: Rose to after:
1st: dry
2nd:
3rd:

PIT DIRECTION: 000-180
PIT DIMENSION: 1.60 * 4.20m
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0									
			D 1	0.50-0.70					Firm brown fibrous PEAT.
			VANE	0.60	33mm vane 26 kN/m²		112.14	0.45	
									Soft light brown organic SILT.
							111.89	0.70	
1			B 2	1.10-1.30					Stiff bluish grey gravelly SILT with high cobble content. Gravel is angular to subrounded fine to coarse. Cobbles are subrounded.
			D 3	1.10-1.30					
							111.19	1.40	
									Stiff damp dark grey slightly sandy gravelly SILT with high cobble content and medium boulder content. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded. Boulders are subangular to subrounded of limestone. Boulders are up to 600mm in length.
2			B 4	1.80-2.00					1.80-2.00m: grey sandy very silty medium and coarse GRAVEL.
							109.79	2.80	
						END			TP terminated at 2.80m bgl - obstruction as possible rock.
3									
4									
5									

Remarks: TP damp below 1.40m bgl. TP backfilled with arisings.

Scale: 1:25

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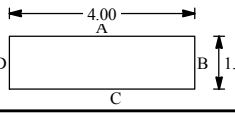
TRIAL PIT VANE & WL RISES CAHERMURPY 2 WF TPS FILE 1 OCT 7 2019.GPJ IRISHDRL.GDT 18/11/19

PROJECT: Cahermurphy Wind Farm 2	**TRIALPIT: TP08**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MKOS	**Co-ordinates:** **Rig: Zaxis 130LCN**
ENGINEER: Fehily Timoney & Partners	**E 509,140.5 N 669,028.7** **Rev: DRAFT**
Ground level: 121.87m O.D.	**DATE: 18.9.19**

GROUNDWATER

Water strikes: **Rose to after:**
1st: 1.90m
2nd:
3rd:

PIT DIRECTION: 090-270
PIT DIMENSION: 1.20 * 4.00m
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit unstable. Sidewall collapse from 2.50m bgl.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0							121.62	0.25	Grass and reeds over light brown silty PEAT.
			VANE	0.50	19mm vane 89 kN/m²		121.32	0.55	Firm light brown organic SILT.
1			B 1	0.70-0.90			119.97	1.90	Bluish grey silty sandy angular to subangular fine to coarse GRAVEL with low cobble content and low boulder content. Cobbles are subrounded. Boulders are subrounded of limestone. Boulders are up to 500mm in length.
2		1	B 2	1.90-2.10			119.37	2.50	Stiff brown sandy gravelly CLAY with high cobble content. Gravel is subangular to subrounded fine to coarse. Cobbles are subrounded.
3			B 3	2.90-3.10			117.57	4.30	Light grey silty sandy angular to subrounded medium to coarse GRAVEL with high cobble content. Cobbles are angular to subrounded. 2.80m to 4.30m: with low boulder content. Boulders are subangular. Boulders are up to 500mm in length.
4						END			TP terminated at 4.30m bgl. Unable to keep TP open - sidewall collapse.
5									

Remarks: Moderate ingress of water at 1.90m bgl. TP backfilled with arisings.

Scale: 1:25

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TRIAL PIT VANE & WL RISES CAHERMURPY 2 WF TPS FILE 1 OCT 7 2019.GPJ IRISHDRL.GDT 18/11/19

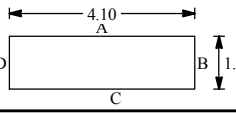
PROJECT: Cahermurphy Wind Farm 2
LOCATION: Co Clare
TRIALPIT: TP09
Sheet 1 of 1

CLIENT: MKOS
ENGINEER: Fehily Timoney & Partners
Co-ordinates: E 508,318.4 N 668,179.3
Rig: Zaxis 130LCN
Rev: DRAFT

Ground level: 90.26m O.D.
DATE: 19.9.19

GROUNDWATER
Water strikes: Rose to after:
1st: 3.70m
2nd:
3rd:

PIT DIRECTION: 000-180
PIT DIMENSION: 1.60 * 4.10m
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit unstable. Sidewall collapse.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0							89.96	0.30	Grass and heather over firm brown fibrous PEAT.
							89.61	0.65	Soft light brown fibrous organic SILT.
			B 1 D 2	0.70-0.90 0.70-0.90			88.46	1.80	Stiff bluish grey slightly sandy slightly gravelly SILT with medium cobble content. Cobbles are subrounded.
1									
2			B 3	2.00-2.20					Stiff damp light brown slightly sandy gravelly SILT with medium cobble content and low boulder content. Gravel is subrounded medium to coarse. Cobbles are subangular. Boulders are subangular. Boulders are up to 700mm in length.
3			B 4	3.20-3.40			86.96	3.30	2.90m to 3.00m: becoming firm and wet. 3.00m to 3.30m: becoming locally soft. Gravel is angular.
		▼					86.26	4.00	Wet brown silty sandy angular coarse GRAVEL with medium cobble content. Cobbles are subrounded.
4						END			TP terminated at 4.00m bgl. Unable to keep TP open - sidewall collapse.
5									

Remarks: Slight ingress of water at 3.00m bgl. Rapid ingress of water at 3.70m bgl. TP backfilled with arisings.

Scale: 1:25

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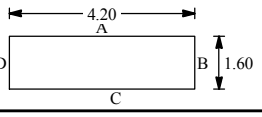
TRIAL PIT VANE & WL RISES CAHERMURPY 2 WF TPS FILE 1 OCT 7 2019.GPJ IRISHDRL.GDT 18/11/19

PROJECT: Cahermurphy Wind Farm 2	**TRIALPIT: TP10**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MKOS	**Co-ordinates:** E 509,010.5 N 668,537.0 — **Rig: Zaxis 130LCN**
ENGINEER: Fehily Timoney & Partners	**Rev: DRAFT**
Ground level: 109.85m O.D.	**DATE: 18.9.19**

GROUNDWATER

Water strikes: Rose to after:
1st: dry
2nd:
3rd:

PIT DIRECTION: 000-180
PIT DIMENSION: 1.60 * 4.20m
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	In-situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION
0									
							109.25	0.60	Grass and heather over firm brown fibrous PEAT.
			D 1	0.60-0.80					Stiff light brown slightly gravelly SILT with high cobble content and medium boulder content. Gravel is subangular coarse. Cobbles are subangular. Boulders are subangular.
			B 2	0.90-1.10			108.95	0.90	
1									Firm bluish grey organic SILT with rootlets.
							108.25	1.60	
									Firm light grey slightly gravelly sandy SILT with high cobble content and medium boulder content. Gravel is subangular to rounded fine to coarse. Cobbles are subrounded of limestone. Boulders are subrounded. Boulders are up to 450mm in length.
2							107.85	2.00	
									Brownish grey sandy very silty coarse GRAVEL with high cobble and boulder content. Gravel is subangular to rounded fine to coarse. Cobbles are subrounded of limestone. Boulders are subrounded. Boulders are up to 700mm in length.
			B 3	2.40-2.60					
			D 4	2.40-2.60					2.50m to 3.50m: hard digging due to boulders.
3							106.35	3.50	
			B 5	3.60-3.80					Stiff dark bluish grey gravelly SILT with medium cobble content. Gravel is angular coarse. Cobbles are subrounded.
							105.95	3.90	
4									Stiff brown gravelly SILT with high cobble content. Gravel is angular to subrounded fine to coarse. Cobbles are subrounded.
			D 6	4.10-4.30					
							105.25	4.60	
						END			TP terminated at 4.60m bgl on REs instruction.
5									

Remarks: TP damp at 1.60m bgl. Rapid ingress of water at 4.50m bgl. TP backfilled with arisings.

Scale: 1:25

irish drilling ltd loughrea

Ph.
Fax

TRIAL PIT VANE & WL RISES CAHERMURPY 2 WF TPS FILE 1 OCT 7 2019.GPJ IRISHDRL.GDT 18/11/19

Project ID	2019CE103	Client	MKOS	Remarks		Turnaround	
Project Name	Cahermurphy Wind Farm 2	Due Date	24/09/2019 16:05				
Schedule ID	2019CE103_1	Scheduled Date	24/09/2019 16:05				

Sample Details							Classification						Chemical / Concrete								Compaction					Compressibility				Strength (Total)						Shear Stregth (Effective Stress)			Rock		Other								
Location	Depth (m)	Base Depth	Sample Type	Sample Ref	Date Sampled	Storage	Moisture Content	Atterberg 4 Point	Particle Density by Gas Jar	Particle Density by Small Pyknometer	Particle Size Distribution	Hydrometer	Organic Content	Loss On Ignition	Sulphate Total	Sulphate Water Gravimetric	Carbonate Titration	ph	Chloride Content	Chloride Content Acid	Compaction Light	Compaction Heavy	Compaction Vibrating Hammer	Moisture Condition Value	Moisture Condition Relationship	CBR	Consolidation	Pressures	Swelling Pressure Test	Laboratory Vane test	Small Direct Shearbox	Ring shear Test	Triaxial Quick Undrained	(Specify Cell Pressure)	Triaxial UU Multi Stage	Triaxial UU Multi Specimen	Consolidated Drained Triaxial Test	Consolidated Undrained Triaxial Test	Consolidated Undrained Triaxial Multi	Rock Uniaxial compression	Point Load								
BP01	0.60	0.80	B	1	18/09/19																																											
BP01	1.70	1.90	B	2	18/09/19																																											
BP01	2.60	2.80	B	3	18/09/19																																											
BP01	3.00	3.20	B	4	18/09/19																																											
BP02	0.40	0.60	B	1	18/09/19																																											
SS01-TP01	0.65	0.85	B	1	18/09/19																																											
SS01-TP01	0.65	0.85	D	2	18/09/19																																											
SS01-TP01	1.60	1.80	B	3	18/09/19																																											
SS01-TP01	2.10	2.30	B	4	18/09/19																																											
SS01-TP01	3.30	3.50	B	5	18/09/19																																											
SS02	0.60	0.80	B	1	18/09/19																																											
SS02	0.60	0.80	D	2	18/09/19																																											
SS02	1.60	1.80	B	3	18/09/19																																											
SS02	2.80	3.00	B	4	18/09/19																																											
SS02	3.50	3.70	B	5	18/09/19																																											
TP01	0.80	1.00	B	1	19/09/19																																											
TP01	0.80	1.00	D	2	19/09/19																																											
TP01	1.60	1.80	B	3	19/09/19		1				1																																					
TP01	3.00	3.20	B	4	19/09/19																																											
TP02	0.50	0.70	B	1	19/09/19																																											
TP02	1.50	1.70	B	2	19/09/19		1				1																																					
TP02	3.00	3.20	B	3	19/09/19																																											
TP03	0.50	0.70	B	1	19/09/19																																											
TP03	0.50	0.70	J	2	19/09/19																																											
TP03	1.00	1.20	B	3	19/09/19																																											
TP03	2.70	2.90	B	4	19/09/19		1	1			1	1																																					
TP04	1.00	1.20	B	1	19/09/19																																											
TP04	2.80	3.00	B	2	19/09/19																																											
TP04	2.80	3.00	J	3	19/09/19																																											
TP05	0.50	0.70	B	1	19/09/19																																											
TP05	0.50	0.70	D	2	19/09/19																																											
TP05	1.20	1.40	B	3	19/09/19		1	1			1																																					
TP05	1.20	1.40	D	4	19/09/19																																											
TP05	2.60	2.80	B	5	19/09/19																																											
TP06	0.70	0.90	B	1	18/09/19		1	1			1	1																																					
TP06	0.70	0.90	D	2	18/09/19																																											
TP06	1.80	2.00	B	3	18/09/19																																											
TP07	0.50	0.70	D	1	19/09/19																																											
TP07	1.10	1.30	B	2	19/09/19																																											
TP07	1.10	1.30	D	3	19/09/19																																											
TP07	1.80	2.00	B	4	19/09/19		1	1			1	1																																					
TP08	0.70	0.90	B	1	18/09/19																																											
TP08	1.90	2.10	B	2	18/09/19																																											
TP08	2.90	3.10	B	3	18/09/19		1				1																																					
TP09	0.70	0.90	B	1	19/09/19																																											
TP09	0.70	0.90	D	2	19/09/19																																											
TP09	2.00	2.20	B	3	19/09/19		1	1			1	1																																					
TP09	3.20	3.40	B	4	19/09/19																																											
TP10	0.60	0.80	D	1	18/09/19																																											
TP10	0.90	1.10	B	2	18/09/19																																											

Project ID	2019CE103	Client	MKOS	Remarks	Turnaround
Project Name	Cahermurphy Wind Farm 2	Due Date	24/09/2019 16:05		
Schedule ID	2019CE103_1	Scheduled Date	24/09/2019 16:05		

Sample Details							Classification						Chemical / Concrete								Compaction					Compressibility				Strength (Total)						Shear Stregth (Effective Stress)			Rock		Other							
Location	Depth (m)	Base Depth	Sample Type	Sample Ref	Date Sampled	Storage	Moisture Content	Atterberg 4 Point	Particle Density by Gas Jar	Particle Density by Small Pyknometer	Particle Size Distribution	Hydrometer	Organic Content	Loss On Ignition	Sulphate Total	Sulphate Water Gravimetric	Carbonate Titration	ph	Chloride Content	Chloride Content Acid	Compaction Light	Compaction Heavy	Compaction Vibrating Hammer	Moisture Condition Value	Moisture Condition Relationship	CBR	Consolidation	Pressures	Swelling Pressure Test	Laboratory Vane test	Small Direct Shearbox	Ring shear Test	Triaxial Quick Undrained	(Specify Cell Pressure)	Triaxial UU Multi Stage	Triaxial UU Multi Specimen	Consolidated Drained Triaxial Test	Consolidated Undrained Triaxial Test	Consolidated Undrained Triaxial Multis	Rock Uniaxial compression	Point Load							
TP10	2.40	2.60	B	3	18/09/19		1	1			1	1																																			
TP10	2.40	2.60	D	4	18/09/19																																										
TP10	3.60	3.80	B	5	18/09/19																																										
TP10	4.10	4.30	D	6	18/09/19																																										
Scheduled							9	6			9	5																																			
Completed							9	6			9	5																																			

Summary of Classification Test Results

Project No.: 2019CE103

Project Name: Cahermurphy Wind Farm 2

Hole No.	Sample Ref	Top	Base	Type		Soil Description	Density bulk Mg/m3	Density dry Mg/m3	w %	Passing 425µm %	LL %	PL %	PI %	Particle density Mg/m3	Remarks
TP01	3	1.60	1.80	B		Brown very silty very sandy coarse GRAVEL.			9.2	35					
TP02	2	1.50	1.70	B		Grey very silty vert sandy fmc GRAVEL.			8.1	29					
TP03	4	2.70	2.90	B		Orange-brown very sandy very silty coarse GRAVEL.			11.0	44	31	16	15		CL
TP05	3	1.20	1.40	B		Grey and orange-brown slightly sandy gravelly SILT.			11.0	53	28	14	14		CL
TP06	1	0.70	0.90	B		Grey very sandy very silty coarse GRAVEL.			12.0	41	26	NP			NP
TP07	4	1.80	2.00	B		Grey sandy very silty medium and coarse GRAVEL.			7.9	32	26	14	12		CL
TP08	3	2.90	3.10	B		Grey silty sandy fmc GRAVEL.			8.5	24					
TP09	3	2.00	2.20	B		Orange and grey slightly sandy gravelly SILT.			12.0	49	32	16	16		CL
TP10	3	2.40	2.60	B		Brownish-grey sandy very silty coarse GRAVEL.			7.1	29					NP

All tests performed in accordance with BS1377:1990 unless specified otherwise

Key

Density test | Liquid Limit | Particle density

Linear measurement unless : | 4pt cone unless : | sp - small pyknometer

wd - water displacement | 1pt - single point test | gj - gas jar

wi - immersion in water | NP - Non Plastic

Date Printed: 11/01/2019 00:00

QC From No: R1

Approved By:

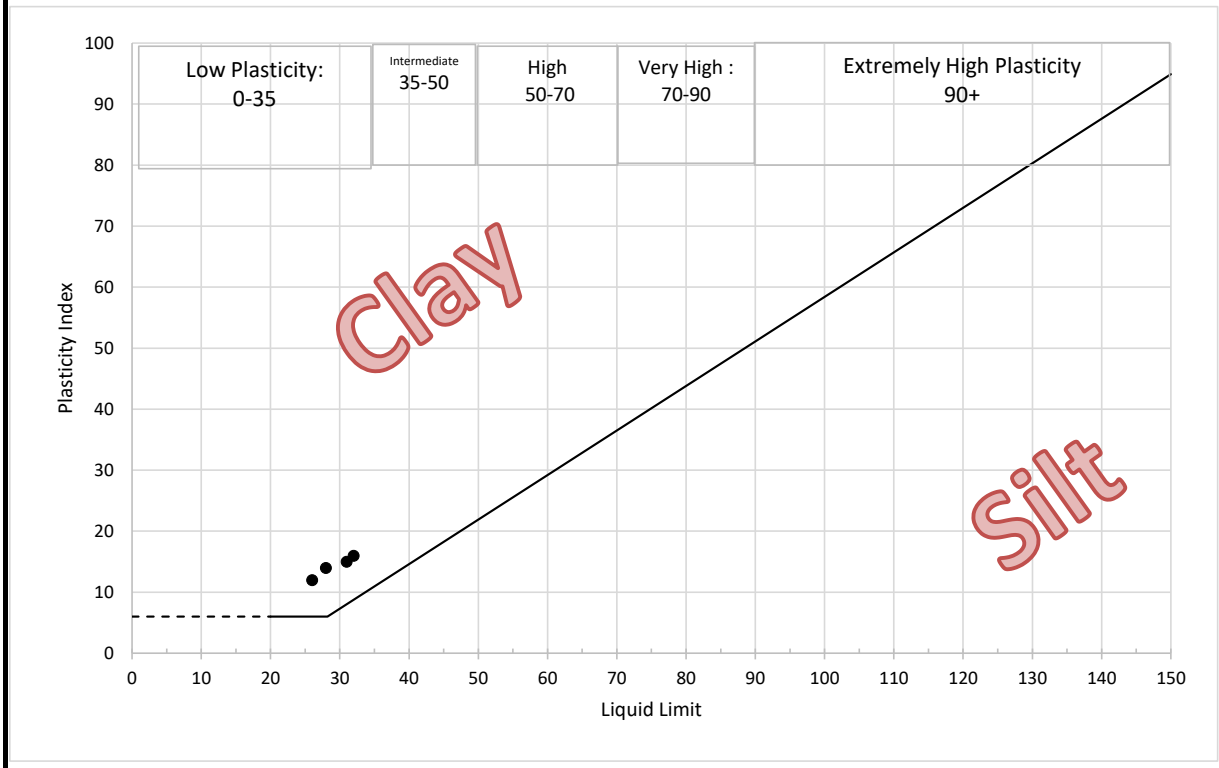
Table 1

sheet 1

Tested in: Irish Drilling Ltd.(IDL), Old Galway Road, Loughrea, Co. Galway, Ireland. H62VX39

Approved Signatures: Dympna Darcy (DCD) Lab Manager, Declan Joyce (DJ) Chartered Geotechnical Engineer, Ronan Killeen (RK) Quality Manager.

	Plasticity (A-Line) Chart	Project Number
Project Name:	**Cahermurphy Wind Farm 2**	
Location:		2019CE103



Abreviations in the remarks column of the Classification Summary Sheet: C = Clay, M = Silt

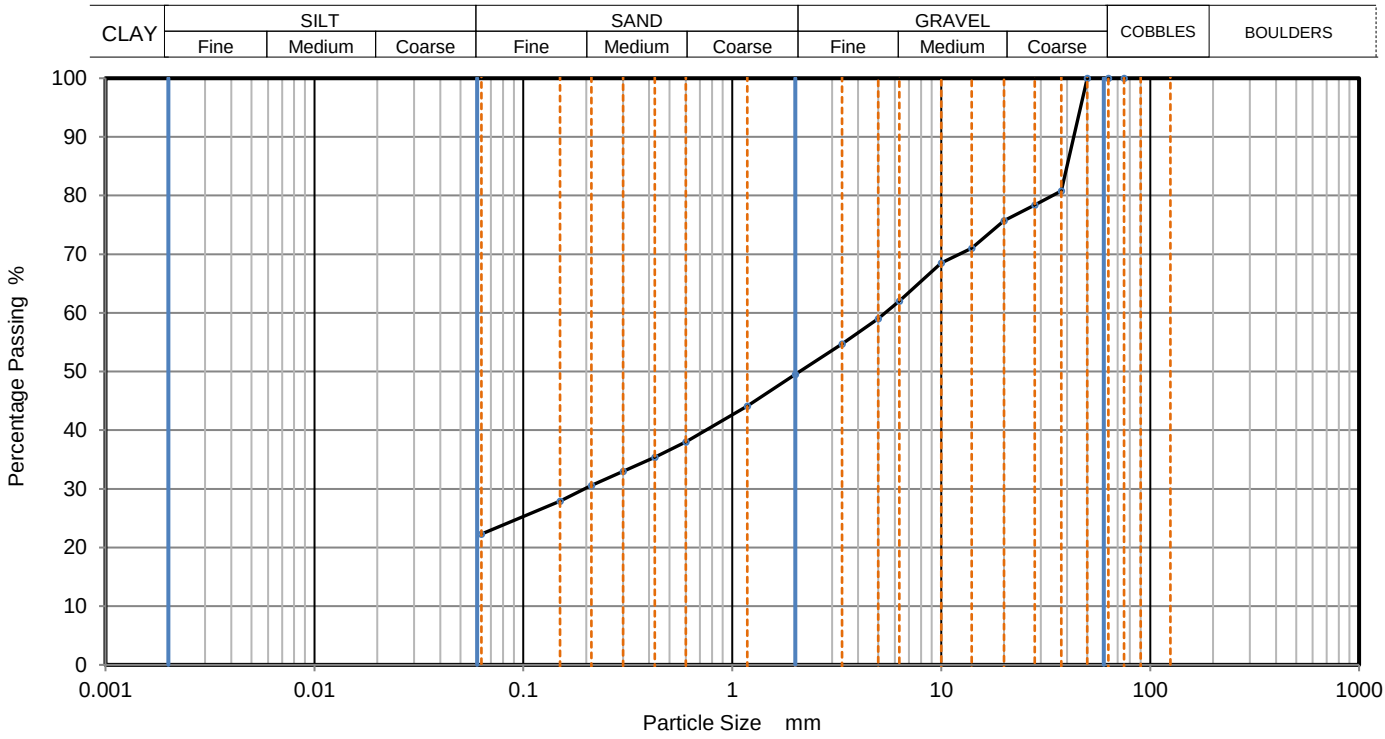
Plasticity abeviations: L = Low, I = Intermediate = H = High, V = Very High, E = Extremely High.

The letter O is added to the symbol of any material containing a significant proportion of organic material.

Chart taken from BS5930: 2010

QC Form: R1

IRISH DRILLING LIMITED	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**2019CE103**
				Borehole/Pit No.	TP01
Site Name	Cahermurphy Wind Farm 2			Sample No.	3
Soil Description	Brown very silty very sandy coarse GRAVEL.			Depth, m	1.60
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	IDL12019092420



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	81		
28	78		
20	76		
14	71		
10	69		
6.3	62		
5	59		
3.35	55		
2	50		
1.18	44		
0.6	38		
0.425	35		
0.3	33		
0.212	31		
0.15	28		
0.063	22		

Dry Mass of sample, g	1952

Sample Proportions	% dry mass
Very coarse	0
Gravel	51
Sand	27
Fines <0.063mm	22

Grading Analysis		
D100	mm	
D60	mm	5.4
D30	mm	0.196
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

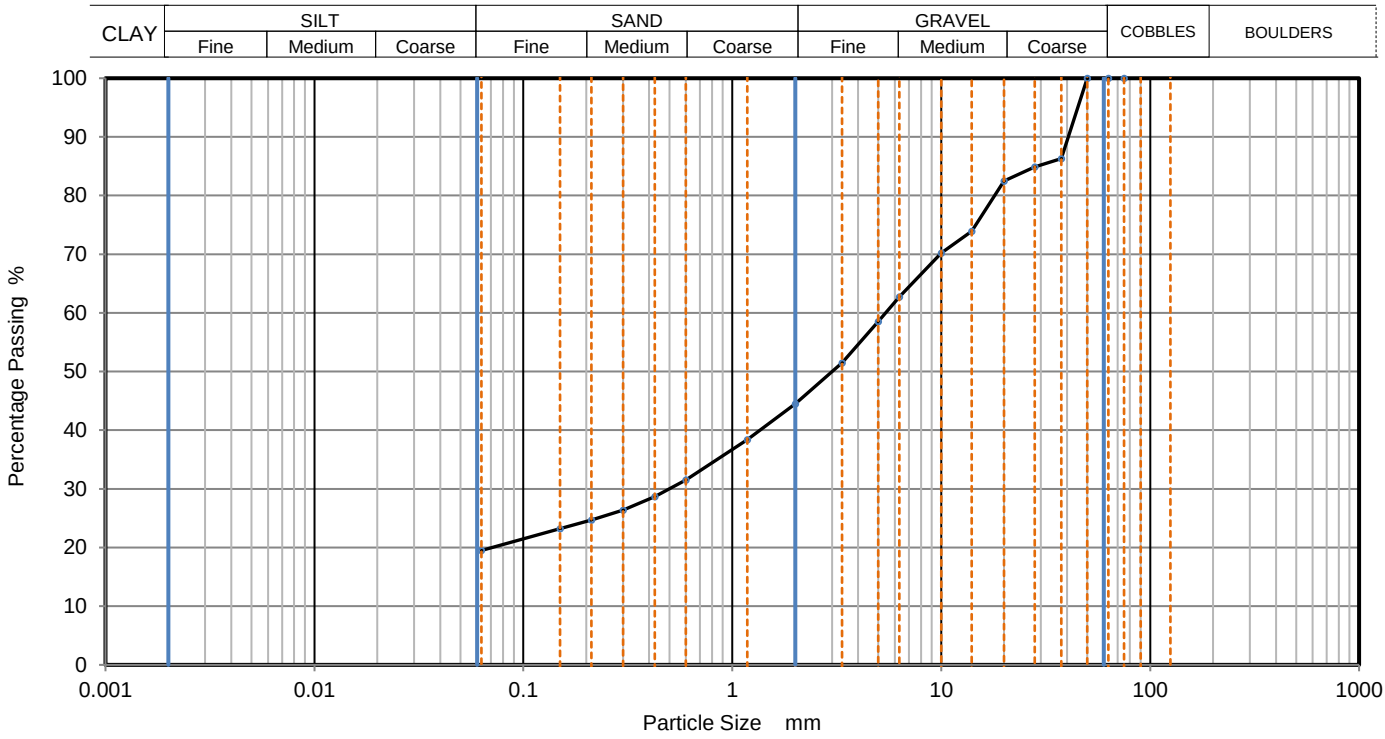
Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	
		Dympna Darcy B.Sc.	01/11/2019 14:28	**1**
				QC From No:R2

Tested in: Irish Drilling Ltd.(IDL), Old Galway Road, Loughrea, Co. Galway, Ireland. H62VX39

Approved Signatures: Dympna Darcy (DCD) Lab Manager, Declan Joyce (DJ) Chartered Geotechnical Engineer, Ronan Killeen (RK) Quality Manager.

IRISH DRILLING LIMITED	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**2019CE103**
				Borehole/Pit No.	TP02
Site Name	Cahermurphy Wind Farm 2			Sample No.	2
Soil Description	Grey very silty vert sandy fmc GRAVEL.			Depth, m	1.50
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	IDL12019092423



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	86		
28	85		
20	83		
14	74		
10	70		
6.3	63		
5	59		
3.35	52		
2	45		
1.18	38		
0.6	32		
0.425	29		
0.3	26		
0.212	25		
0.15	23		
0.063	20		

Dry Mass of sample, g	2529

Sample Proportions	% dry mass
Very coarse	0
Gravel	56
Sand	25
Fines <0.063mm	19

Grading Analysis		
D100	mm	
D60	mm	5.43
D30	mm	0.501
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

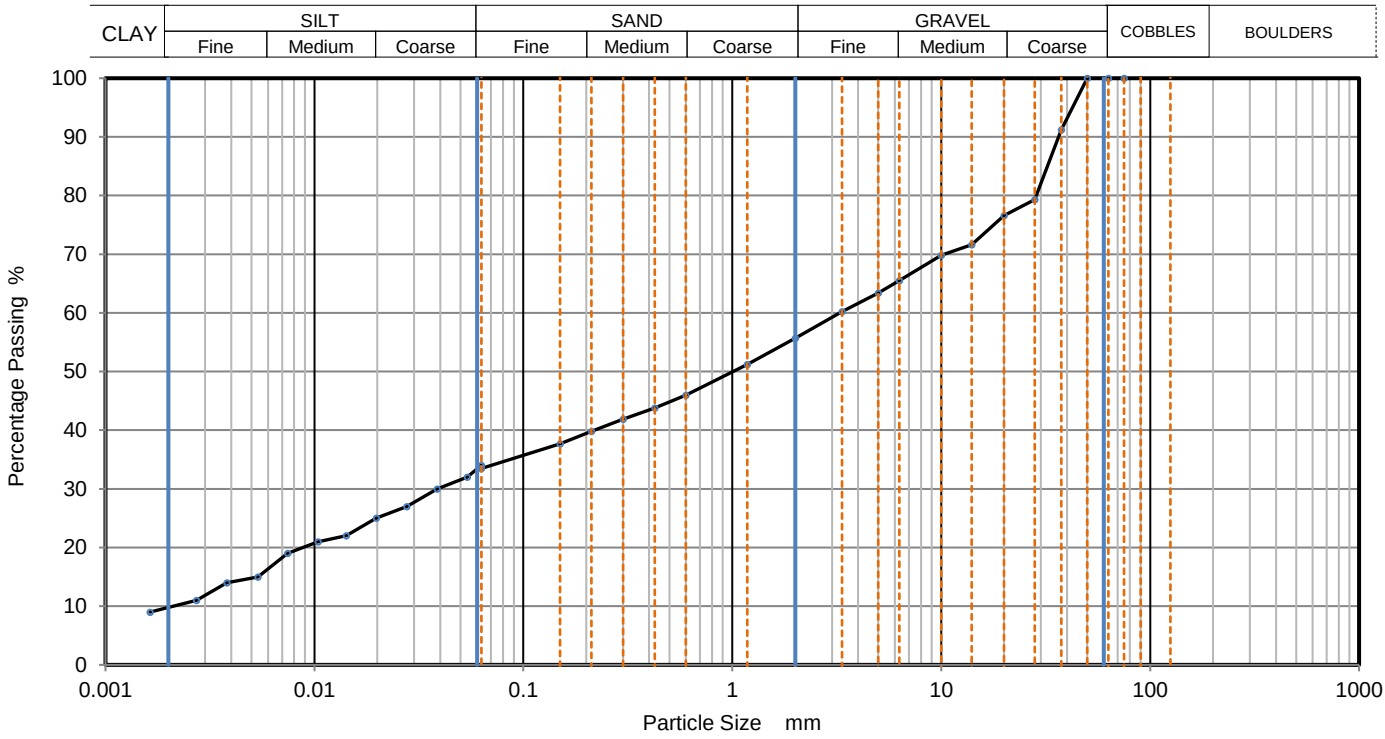
Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	
		Dympna Darcy B.Sc.	01/11/2019 14:28	**1** QC From No:R2

Tested in: Irish Drilling Ltd.(IDL), Old Galway Road, Loughrea, Co. Galway, Ireland. H62VX39

Approved Signatures: Dympna Darcy (DCD) Lab Manager, Declan Joyce (DJ) Chartered Geotechnical Engineer, Ronan Killeen (RK) Quality Manager.

IRISH DRILLING LIMITED	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**2019CE103**
				Borehole/Pit No.	TP03
Site Name	Cahermurphy Wind Farm 2			Sample No.	4
Soil Description	Orange-brown very sandy very silty coarse GRAVEL.			Depth, m	2.70
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	IDL12019092428



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0630	34
		0.0539	32
75	100	0.0386	30
63	100	0.0277	27
50	100	0.0198	25
37.5	91	0.0142	22
28	79	0.0104	21
20	77	0.0075	19
14	72	0.0054	15
10	70	0.0038	14
6.3	66	0.0027	11
5	63	0.0016	9
3.35	60		
2	56		
1.18	51		
0.6	46	Particle density (assumed)	
0.425	44	2.65	Mg/m3
0.3	42		
0.212	40		
0.15	38		
0.063	34		

Dry Mass of sample, g	1594

Sample Proportions	% dry mass
Very coarse	0
Gravel	44
Sand	22
Silt	24
Clay	10

Grading Analysis		
D100	mm	
D60	mm	3.28
D30	mm	0.0398
D10	mm	0.00214
Uniformity Coefficient		1500
Curvature Coefficient		0.23

Remarks

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		Dympna Darcy B.Sc.	01/11/2019 14:28	**1** QC From No:R2

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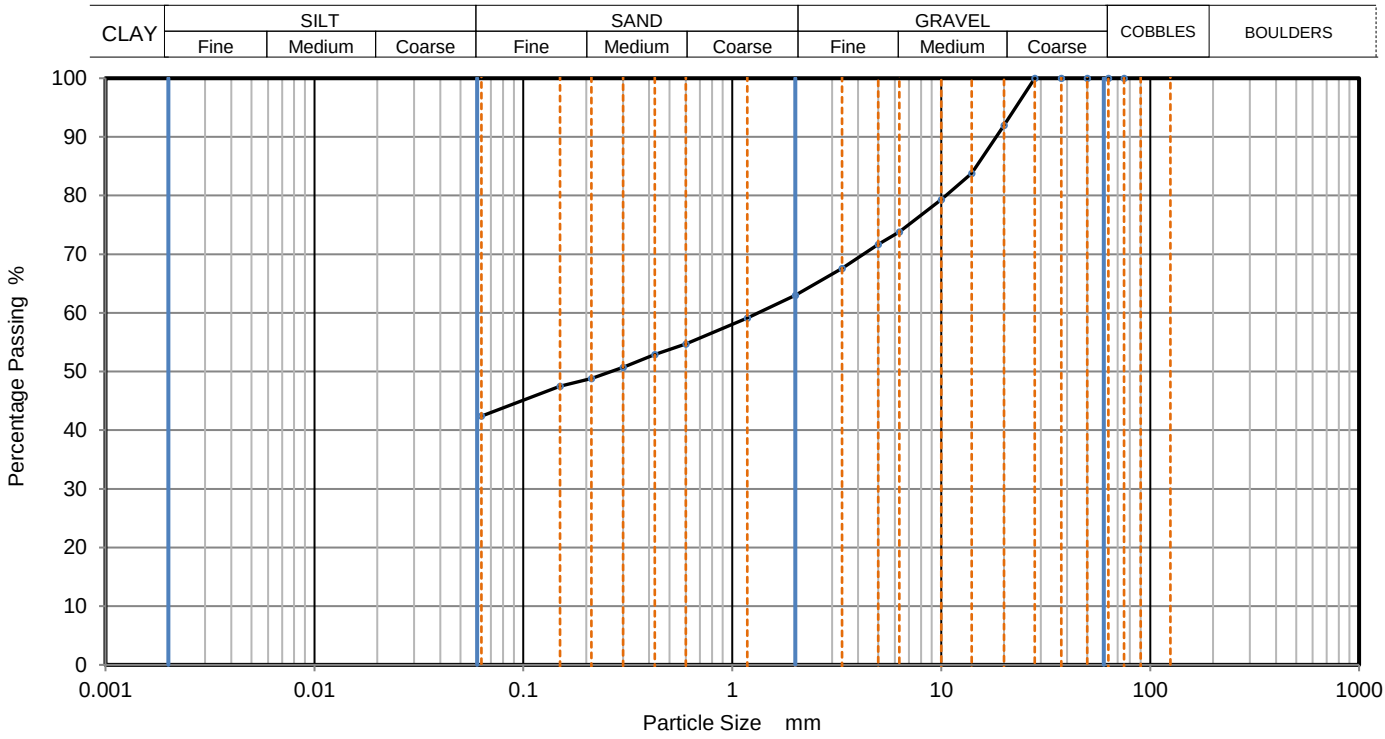
Approved Signatures: Dympna Darcy (DCD) Lab Manager, Declan Joyce (DJ) Chartered Geotechnical Engineer, Ronan Killeen (RK) Quality Manager.

IRISH DRILLING LIMITED	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**2019CE103**
				Borehole/Pit No.	TP05
Site Name	Cahermurphy Wind Farm 2			Sample No.	3
Soil Description	Grey and orange-brown slightly sandy gravelly SILT.			Depth, m	1.20
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	IDL12019092435



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	92		
14	84		
10	79		
6.3	74		
5	72		
3.35	68		
2	63		
1.18	59		
0.6	55		
0.425	53		
0.3	51		
0.212	49		
0.15	48		
0.063	42		

Dry Mass of sample, g	1043

Sample Proportions	% dry mass
Very coarse	0
Gravel	37
Sand	21
Fines <0.063mm	42

Grading Analysis		
D100	mm	
D60	mm	1.34
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

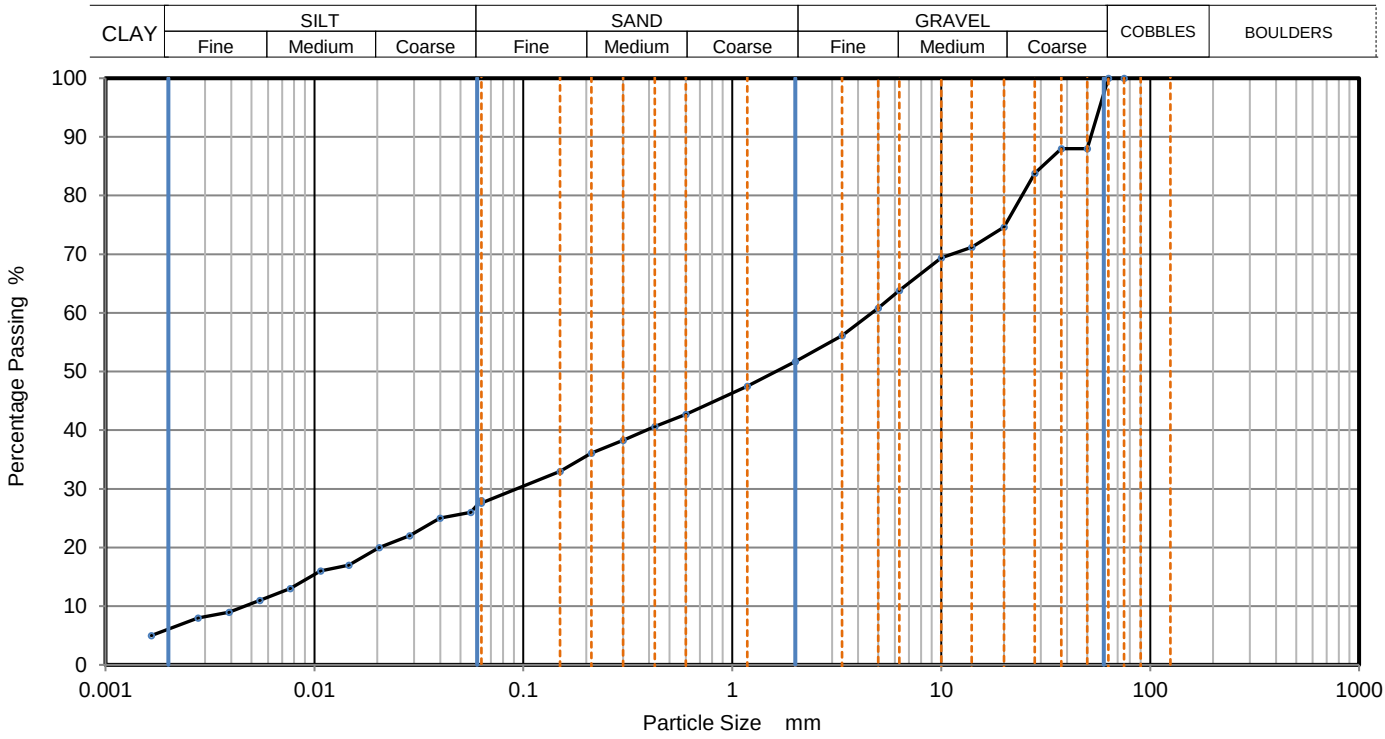
Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	
		Dympna Darcy B.Sc.	01/11/2019 14:28	**1** QC From No:R2

Tested in: Irish Drilling Ltd.(IDL), Old Galway Road, Loughrea, Co. Galway, Ireland. H62VX39

Approved Signatures: Dympna Darcy (DCD) Lab Manager, Declan Joyce (DJ) Chartered Geotechnical Engineer, Ronan Killeen (RK) Quality Manager.

IRISH DRILLING LIMITED	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**2019CE103**
				Borehole/Pit No.	TP06
Site Name	Cahermurphy Wind Farm 2			Sample No.	1
Soil Description	Grey very sandy very silty coarse GRAVEL.			Depth, m	0.70
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	IDL12019092438



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0630	28
		0.0560	26
75	100	0.0399	25
63	100	0.0285	22
50	88	0.0204	20
37.5	88	0.0146	17
28	84	0.0107	16
20	75	0.0077	13
14	71	0.0055	11
10	69	0.0039	9
6.3	64	0.0028	8
5	61	0.0017	5
3.35	56		
2	52		
1.18	48		
0.6	43	Particle density (assumed)	
0.425	41	2.65 Mg/m3	
0.3	38		
0.212	36		
0.15	33		
0.063	28		

Dry Mass of sample, g	1655

Sample Proportions	% dry mass
Very coarse	0
Gravel	48
Sand	24
Silt	21
Clay	6

Grading Analysis		
D100	mm	
D60	mm	4.69
D30	mm	0.0925
D10	mm	0.0048
Uniformity Coefficient		980
Curvature Coefficient		0.38

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	
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Tested in: Irish Drilling Ltd.(IDL), Old Galway Road, Loughrea, Co. Galway, Ireland. H62VX39

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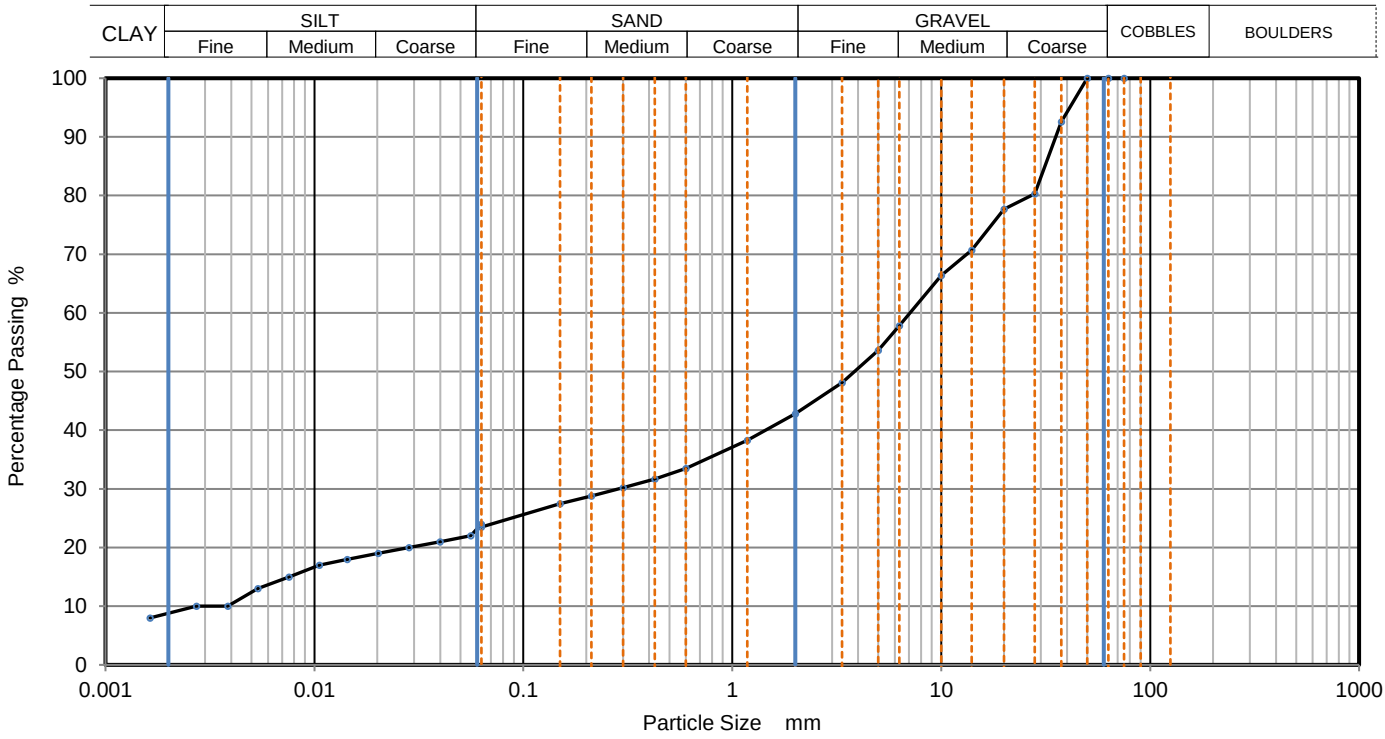
IRISH DRILLING LIMITED	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**2019CE103**
				Borehole/Pit No.	TP07
Site Name	Cahermurphy Wind Farm 2			Sample No.	4
Soil Description	Grey sandy very silty medium and coarse GRAVEL.			Depth, m	1.80
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	IDL12019092445



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0630	24
		0.0560	22
75	100	0.0399	21
63	100	0.0284	20
50	100	0.0202	19
37.5	93	0.0143	18
28	80	0.0105	17
20	78	0.0075	15
14	71	0.0054	13
10	66	0.0039	10
6.3	58	0.0027	10
5	54	0.0016	8
3.35	48		
2	43		
1.18	38		
0.6	34	Particle density (assumed)	
0.425	32	2.65	Mg/m3
0.3	30		
0.212	29		
0.15	28		
0.063	24		

Dry Mass of sample, g	1711

Sample Proportions	% dry mass
Very coarse	0
Gravel	57
Sand	19
Silt	15
Clay	9

Grading Analysis		
D100	mm	
D60	mm	7.1
D30	mm	0.288
D10	mm	0.00268
Uniformity Coefficient		2600
Curvature Coefficient		4.3

Remarks

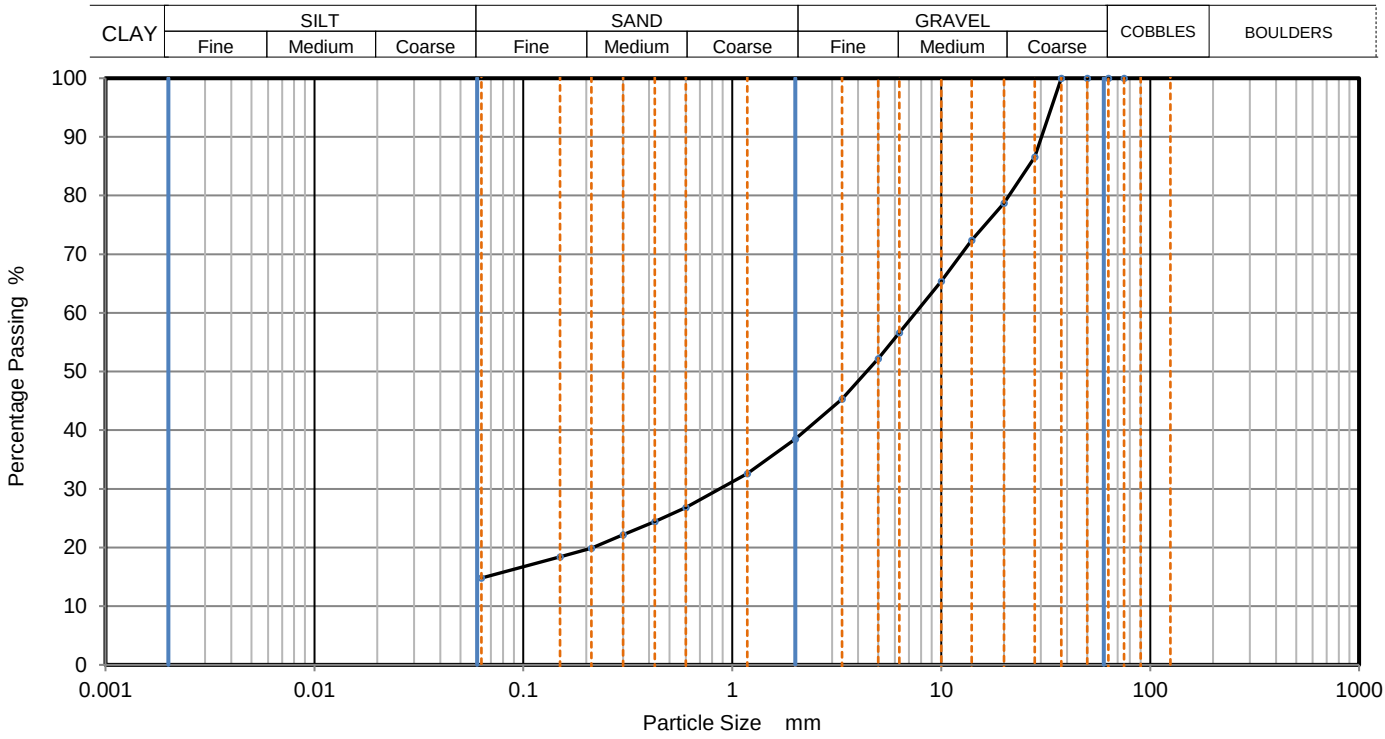
Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	
		Dympna Darcy B.Sc.	01/11/2019 14:28	**1** QC From No:R2

Tested in: Irish Drilling Ltd.(IDL), Old Galway Road, Loughrea, Co. Galway, Ireland. H62VX39

Approved Signatures: Dympna Darcy (DCD) Lab Manager, Declan Joyce (DJ) Chartered Geotechnical Engineer, Ronan Killeen (RK) Quality Manager.

IRISH DRILLING LIMITED	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**2019CE103**
				Borehole/Pit No.	TP08
Site Name	Cahermurphy Wind Farm 2			Sample No.	3
Soil Description	Grey silty sandy fmc GRAVEL.			Depth, m	2.90
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clause 9.2			KeyLAB ID	IDL12019092449



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
75	100		
63	100		
50	100		
37.5	100		
28	87		
20	79		
14	72		
10	65		
6.3	57		
5	52		
3.35	45		
2	39		
1.18	33		
0.6	27		
0.425	24		
0.3	22		
0.212	20		
0.15	18		
0.063	15		

Dry Mass of sample, g	2198

Sample Proportions	% dry mass
Very coarse	0
Gravel	62
Sand	24
Fines <0.063mm	15

Grading Analysis		
D100	mm	
D60	mm	7.53
D30	mm	0.871
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

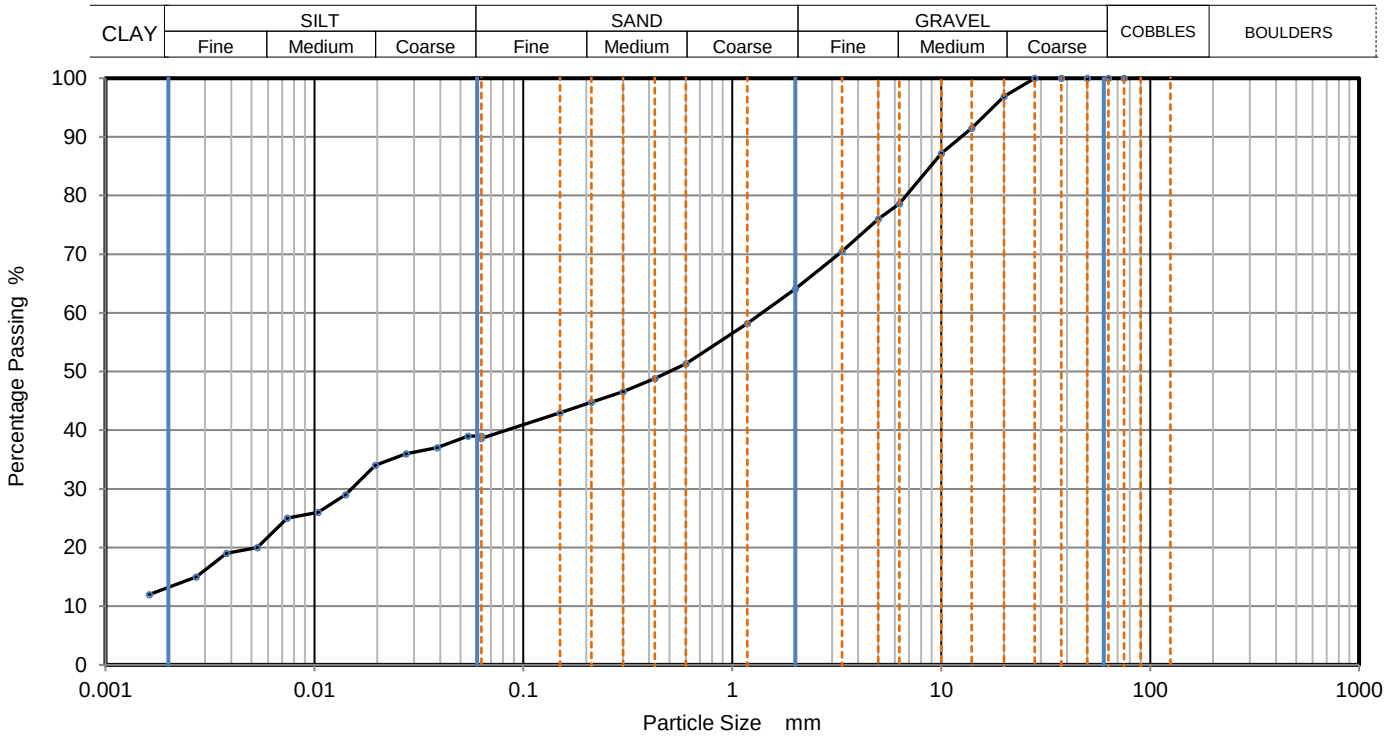
Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	
		Dympna Darcy B.Sc.	01/11/2019 14:28	**1**
				QC From No:R2

Tested in: Irish Drilling Ltd.(IDL), Old Galway Road, Loughrea, Co. Galway, Ireland. H62VX39

Approved Signatures: Dympna Darcy (DCD) Lab Manager, Declan Joyce (DJ) Chartered Geotechnical Engineer, Ronan Killeen (RK) Quality Manager.

IRISH DRILLING LIMITED	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**2019CE103**
				Borehole/Pit No.	TP09
Site Name	Cahermurphy Wind Farm 2			Sample No.	3
Soil Description	Orange and grey slightly sandy gravelly SILT.			Depth, m	2.00
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	IDL12019092452



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0630	39
		0.0542	39
75	100	0.0386	37
63	100	0.0275	36
50	100	0.0196	34
37.5	100	0.0141	29
28	100	0.0104	26
20	97	0.0074	25
14	92	0.0053	20
10	87	0.0038	19
6.3	79	0.0027	15
5	76	0.0016	12
3.35	71		
2	64		
1.18	58		
0.6	51	Particle density (assumed)	
0.425	49	2.65	Mg/m3
0.3	47		
0.212	45		
0.15	43		
0.063	39		

Dry Mass of sample, g	1493

Sample Proportions	% dry mass
Very coarse	0
Gravel	36
Sand	26
Silt	25
Clay	14

Grading Analysis		
D100	mm	
D60	mm	1.39
D30	mm	0.0148
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Remarks

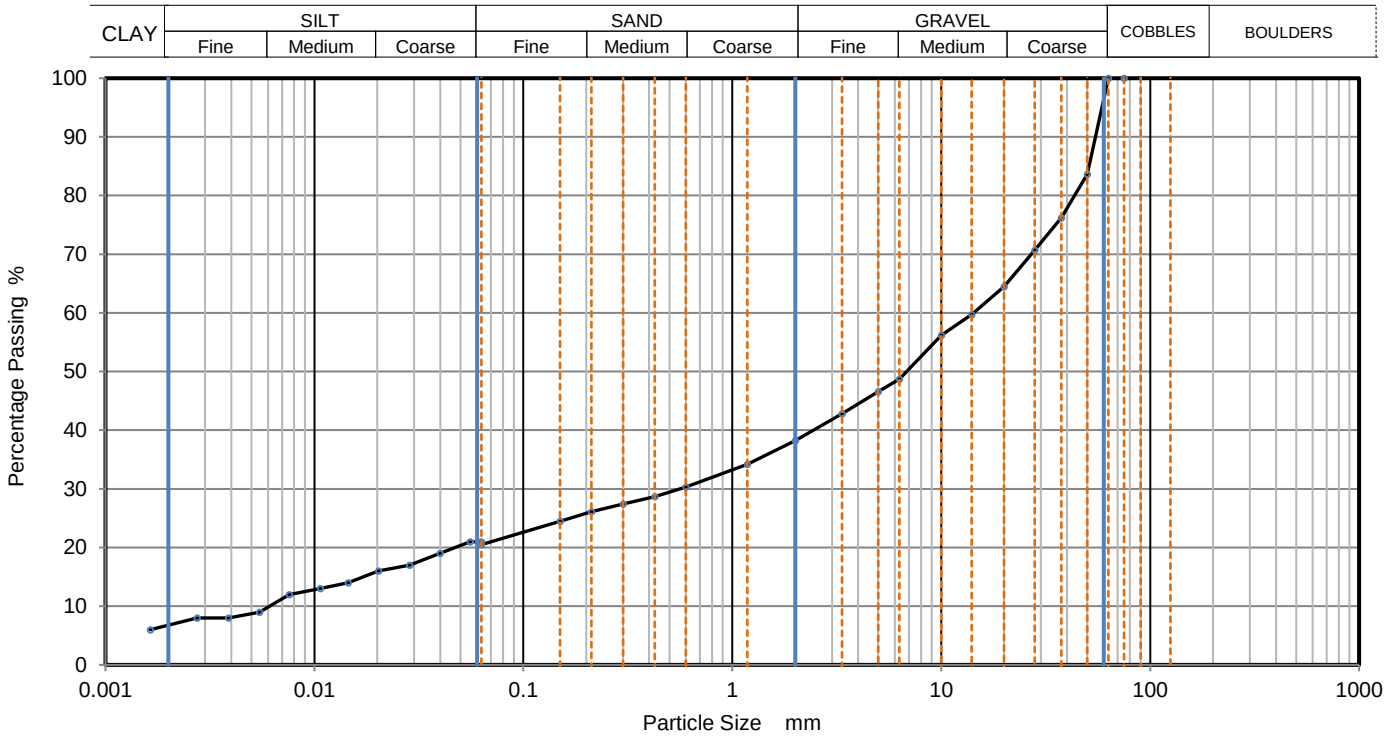
Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	
		Dympna Darcy B.Sc.	01/11/2019 14:28	**1** QC From No:R2

Tested in: Irish Drilling Ltd.(IDL), Old Galway Road, Loughrea, Co. Galway, Ireland. H62VX39

Approved Signatures: Dympna Darcy (DCD) Lab Manager, Declan Joyce (DJ) Chartered Geotechnical Engineer, Ronan Killeen (RK) Quality Manager.

IRISH DRILLING LIMITED	**PARTICLE SIZE DISTRIBUTION**			Job Ref	**2019CE103**
				Borehole/Pit No.	TP10
Site Name	Cahermurphy Wind Farm 2			Sample No.	3
Soil Description	Brownish-grey sandy very silty coarse GRAVEL.			Depth, m	2.40
Specimen Reference		Specimen Depth	m	Sample Type	B
Test Method	BS1377:Part 2:1990, clauses 9.2 and 9.5			KeyLAB ID	IDL12019092456



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
		0.0630	21
		0.0557	21
75	100	0.0399	19
63	100	0.0285	17
50	84	0.0203	16
37.5	76	0.0145	14
28	71	0.0107	13
20	65	0.0076	12
14	60	0.0055	9
10	56	0.0039	8
6.3	49	0.0027	8
5	47	0.0016	6
3.35	43		
2	38		
1.18	34		
0.6	30	Particle density (assumed)	
0.425	29	2.65 Mg/m3	
0.3	27		
0.212	26		
0.15	25		
0.063	21		

Dry Mass of sample, g	2302

Sample Proportions	% dry mass
Very coarse	0
Gravel	62
Sand	18
Silt	14
Clay	7

Grading Analysis		
D100	mm	
D60	mm	14.3
D30	mm	0.566
D10	mm	0.00625
Uniformity Coefficient		2300
Curvature Coefficient		3.6

Remarks

Preparation and testing in accordance with BS1377 unless noted below

Operator	Checked	Approved	Sheet printed	
		Dympna Darcy B.Sc.	01/11/2019 14:28	**1** QC From No:R2

Tested in: Irish Drilling Ltd.(IDL), Old Galway Road, Loughrea, Co. Galway, Ireland. H62VX39

Approved Signatures: Dympna Darcy (DCD) Lab Manager, Declan Joyce (DJ) Chartered Geotechnical Engineer, Ronan Killeen (RK) Quality Manager.

Figure 1 H:\2019CE103_Cahermurphy2\Bp1...jpg

Figure 3 H:\2019CE103_Cahermurphy2\Bp1.jpg

Figure 2 H:\2019CE103_Cahermurphy2\Bp1..jpg

Figure 4 H:\2019CE103_Cahermurphy2\Bp2...jpg

Figure 5 H:\2019CE103_Cahermurphy2\Bp2..jpg

Figure 7 H:\2019CE103_Cahermurphy2\Ss1-tp1...jpg

Figure 6 H:\2019CE103_Cahermurphy2\Bp2.jpg

Figure 8 H:\2019CE103_Cahermurphy2\Ss1-tp1..jpg

Figure 9 H:\2019CE103_Cahermurphy2\Ss1-tp1.jpg

Figure 11 H:\2019CE103_Cahermurphy2\Ss2..jpg

Figure 10 H:\2019CE103_Cahermurphy2\Ss2...jpg

Figure 12 H:\2019CE103_Cahermurphy2\Ss2.jpg

Figure 13 H:\2019CE103_Cahermurphy2\T1...jpg

Figure 15 H:\2019CE103_Cahermurphy2\T1.jpg

Figure 14 H:\2019CE103_Cahermurphy2\T1..jpg

Figure 16 H:\2019CE103_Cahermurphy2\T2...jpg

Figure 17 H:\2019CE103_Cahermurphy2\T2..jpg

Figure 19 H:\2019CE103_Cahermurphy2\T3....jpg

Figure 18 H:\2019CE103_Cahermurphy2\T2.jpg

Figure 20 H:\2019CE103_Cahermurphy2\T3...jpg

Figure 21 H:\2019CE103_Cahermurphy2\T3.jpg

Figure 23 H:\2019CE103_Cahermurphy2\T4..jpg

Figure 22 H:\2019CE103_Cahermurphy2\T4...jpg

Figure 24 H:\2019CE103_Cahermurphy2\T4.jpg

Figure 25 H:\2019CE103_Cahermurphy2\T5...jpg

Figure 27 H:\2019CE103_Cahermurphy2\T5.jpg

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Figure 28 H:\2019CE103_Cahermurphy2\T6...jpg

Figure 29 H:\2019CE103_Cahermurphy2\T6..jpg

Figure 31 H:\2019CE103_Cahermurphy2\T7...jpg

Figure 30 H:\2019CE103_Cahermurphy2\T6.jpg

Figure 32 H:\2019CE103_Cahermurphy2\T7..jpg

Figure 33 H:\2019CE103_Cahermurphy2\T7.jpg

Figure 35 H:\2019CE103_Cahermurphy2\T8..jpg

Figure 34 H:\2019CE103_Cahermurphy2\T8...jpg

Figure 36 H:\2019CE103_Cahermurphy2\T8.jpg

Figure 37 H:\2019CE103_Cahermurphy2\T9...jpg

Figure 39 H:\2019CE103_Cahermurphy2\T9.jpg

Figure 38 H:\2019CE103_Cahermurphy2\T9..jpg

Figure 40 H:\2019CE103_Cahermurphy2\T10...jpg

Figure 41 H:\2019CE103_Cahermurphy2\T10..jpg

Figure 42 H:\2019CE103_Cahermurphy2\T10.jpg

Map Legend

- Site Location
- Proposed Turbine Location (V5)
- Proposed Substation Compound
- Proposed Borrow Pit Location
- Proposed Temporary Construction Compound
- Proposed New Road
- Existing Coillte Forest Roads
- Coillte Properties
- Regional Road
- Local Road
- Access Road for Permitted Cahermurphy Site
- Trial Pit Access Roads
- Trial Pit Representative Locations

Possible access close to T3 at corner of field

Excavate on edge of access track instead

Southern access preferred as it gets much closer to turbine location

N
W E
S

MAP TITLE: Trial Pit Locations	MAP NO.: Figure 1	SCALE: 1:12,000
PROJECT TITLE: Cahermurphy Two Wind Farm		DATE: 26-07-2019
DRAWING BY: Eoin O'Sullivan	CHECKED BY: Michael Watson	ISSUE NO.: 170238-2019.07.26-D4

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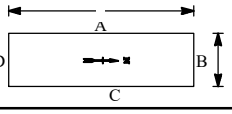
APPENDIX F

Ground Investigation
(IDL, 2024 – Phase A and B)

PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT:TP-01A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates:** **Rig: Hitachi Zaxis 130LCN**
ENGINEER: FTCO	**E 507,781.7 N 669,353.8** **Rev:**
Ground level: 117.40m O.D.	**DATE: 9.1.24**

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 0°
PIT DIMENSION: 3.00m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0							117.00	0.40	Firm orangish brown slightly sandy SILT with occasional cobbles. Cobbles are subangular to subrounded.	
			B 1 D 2	0.60-0.80 0.60-0.80			116.50	0.90	Firm light grey slightly gravelly sandy SILT with frequent cobbles and frequent boulders. Gravel is angular to subrounded fine to coarse. Cobbles are angular to subrounded. Boulders are angular to subrounded.	
1						END				
2										
3										
4										
5										

Remarks: TP dry on excavation. TP terminated at 0.90m bgl. Obstruction as possible rock. TP backfilled with arisings.

Scale: 1:25

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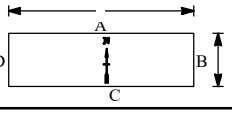
TRIALPIT CAHERMURPHY TPS FILE 1 JAN 11 2024.GPJ ID GINT AGS 4_0_4.GDT 11/1/24

PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP-02A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates:** E 508,211.8 N 669,467.5 — **Rig: Hitachi Zaxis 130LCN**
ENGINEER: FTCO	**Rev:**
Ground level: 127.68m O.D.	**DATE: 9.1.24**

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 90°
PIT DIMENSION: 4.00m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0							126.78	0.90	Grass over spongy black pseudo fibrous PEAT.	
1			B 1 D 2	1.10-1.30 1.10-1.30			125.78	1.90	Grey mottled orangish brown SILT. 0.90-1.90: becoming firm grey mottled orangish brown.	
2			B 3	2.00-2.20			125.38	2.30	Brown silty sandy angular fine to coarse GRAVEL with frequent cobbles. Cobbles are subangular.	
						END				
3										
4										
5										

Remarks: TP dry on excavation. TP terminated at 2.30m bgl. Obstruction as boulders. TP backfilled with arisings.

Scale: 1:25

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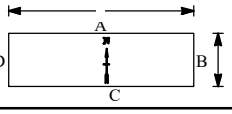
PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP-03A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates:** E 508,010.6 N 669,678.4 — **Rig: Hitachi Zaxis 130LCN**
ENGINEER: FTCO	**Rev:**
Ground level: 96.84m O.D.	**DATE: 9.1.24**

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 90°
PIT DIMENSION: 3.00m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0							96.34	0.50	TOPSOIL: Grass over soft brown SILT.	
1			B 1	0.80-1.00			95.54	1.30	Firm brown and orangish brown sandy SILT with frequent cobbles and frequent boulders. Cobbles are subangular. Boulders are subangular. Boulders are up to 500mm in length.	
						END				
2										
3										
4										
5										

Remarks: TP dry on excavation. TP terminated at 1.30m bgl. Obstruction as possible rock. TP backfilled with arisings.

Scale: 1:25

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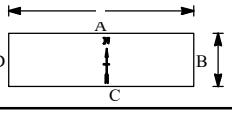
TRIALPIT CAHERMURPHY TPS FILE 1 JAN 11 2024.GPJ ID GINT AGS 4_0_4.GDT 11/1/24

PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP-04A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates:** **Rig: Hitachi Zaxis 130LCN**
ENGINEER: FTCO	**E 508,322.5 N 669,709.4** **Rev:**
Ground level: 100.04m O.D.	**DATE: 9.1.24**

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 90°
PIT DIMENSION: 3.00m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0							99.94	0.10	Reeds over plastic brown amorphous PEAT.	
			B 1 D 2	0.30-0.50 0.30-0.50			99.44	0.60	Stiff greyish brown slightly gravelly SILT with occasional cobbles. Gravel is subangular fine to coarse. Cobbles are angular.	
							99.24	0.80	Angular to subangular COBBLES and angular to subangular BOULDERS.	
						END				
1										
2										
3										
4										
5										

Remarks: TP dry on excavation. TP terminated at 0.80m bgl. Obstruction as possible rock. TP backfilled with arisings.

Scale: 1:25

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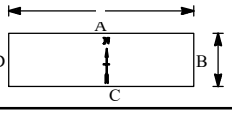
TRIALPIT CAHERMURPHY TPS FILE 1 JAN 11 2024.GPJ ID GINT AGS 4_0_4.GDT 11/1/24

PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP-05A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates: E 508,532.2 N 669,928.2**
ENGINEER: FTCO	**Rig: Hitachi Zaxis 130LCN**
Ground level: 96.65m O.D.	**Rev:**
	DATE: 9.1.24

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 90°
PIT DIMENSION: 3.00m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0							96.05	0.60	Firm brown fibrous PEAT. H3 B3 F3 R1 W0 TV0 TH0 A0.	
							95.65	1.00	Soft brown slightly sandy SILT with occasional decaying organic fragments.	
1			B 1 D 2	1.00-1.20 1.00-1.20			95.20	1.45	Firm to stiff bluish grey slightly gravelly SILT with occasional cobbles. Gravel is angular to subrounded fine to coarse.	
						END				
2										
3										
4										
5										

Remarks: TP dry on excavation. TP terminated at 1.45m bgl. Obstruction as possible rock. TP backfilled with arisings.

Scale: 1:25

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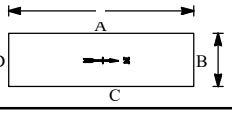
TRIALPIT CAHERMURPHY TPS FILE 1 JAN 11 2024.GPJ ID GINT AGS 4_0_4.GDT 11/1/24

PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT:TP-06A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates:** **Rig: Hitachi Zaxis 130LCN**
ENGINEER: FTCO	**E 508,664.9 N 669,573.3** **Rev:**
Ground level: 137.09m O.D.	**DATE: 9.1.24**

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 0°
PIT DIMENSION: 3.00m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0										
							136.44	0.65	Heather over firm brown fibrous PEAT. H3.	
						END				
1										
2										
3										
4										
5										

Remarks: TP dry on excavation. TP terminated at 0.65m bgl. Obstruction as probable rock. TP backfilled with arisings.

Scale: 1:25

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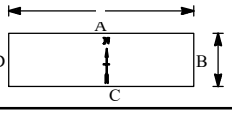
TRIALPIT CAHERMURPHY TPS FILE 1 JAN 11 2024.GPJ ID GINT AGS 4_0_4.GDT 11/1/24

PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP-06B**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates: E 508,653.8 N 669,627.9**
ENGINEER: FTCO	**Rig: Hitachi Zaxis 130LCN**
Ground level: 129.32m O.D.	**Rev:**
	DATE: 9.1.24

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 90°
PIT DIMENSION: 3.00m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0							129.12	0.20	Spongy black pseudo fibrous PEAT. H6.	
			B 1 D 2	0.30-0.50 0.30-0.50			128.82	0.50	Firm brown organic SILT with rare cobbles. Cobbles are subangular.	
						END				
1										
2										
3										
4										
5										

Remarks: TP dry on excavation. TP terminated at 0.50m bgl. Obstruction as rock. TP backfilled with arisings.

Scale: 1:25

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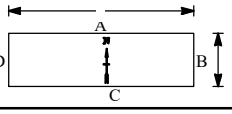
PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP-07A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates: E 508,754.6 N 669,766.4**
ENGINEER: FTCO	**Rig: Hitachi Zaxis 130LCN**
Ground level: 114.55m O.D.	**Rev:**
GROUNDWATER	**DATE: 9.1.24**

Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 90°
PIT DIMENSION: 2.50m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0										
							114.25	0.30	Heather over brown clayey COBBLES and BOULDERS. Boulders are up to 600mm in length.	
						END				
1										
2										
3										
4										
5										

Remarks: TP dry on excavation. TP terminated at 0.30m bgl. Obstruction as rock. TP backfilled with arisings.

Scale: 1:25

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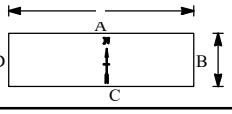
PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP-08A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates:** E 509,001.0 N 669,643.0 — **Rig: Hitachi Zaxis 130LCN**
ENGINEER: FTCO	**Rev:**
Ground level: 141.01m O.D.	**DATE: 9.1.24**

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 90°
PIT DIMENSION: 3.00m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0										
							140.41	0.60	Spongy black pseudo fibrous PEAT. H6.	
			B 1	0.60-0.80						
							140.11	0.90	Grey slightly silty angular to subangular GRAVEL with frequent cobbles.	
									END	
1										
2										
3										
4										
5										

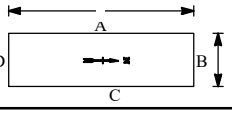
Remarks: TP dry on excavation. TP terminated at 0.90m bgl. Obstruction as rock. TP backfilled with arisings.

Scale: 1:25

PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP-09A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates:** E 508,646.1 N 669,273.9
ENGINEER: FTCO	**Rig: Hitachi Zaxis 130LCN**
Ground level: 123.67m O.D.	**Rev:**
GROUNDWATER	**DATE: 9.1.24**

Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 0°
PIT DIMENSION: 4.10m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0									Grass over spongy black and orangish brown pseudo fibrous PEAT. H5.	
							122.22	1.45		
			B 1 D 2	1.60-1.80 1.60-1.80					Stiff brown and grey SILT with occasional cobbles. Cobbles are subangular to subrounded.	
							121.67	2.00		
			B 3	2.20-2.40					Soft grey slightly sandy slightly gravelly SILT with occasional cobbles. Cobbles are subangular.	
		▼1					121.17	2.50		
									END	

Remarks: Seepage of water at 2.50m bgl. TP terminated at 2.50m bgl. Obstruction. TP backfilled with arisings.

Scale: 1:25

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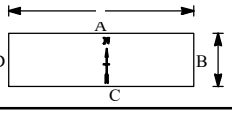
PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP-10A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates: E 508,613.9 N 668,989.2**
ENGINEER: FTCO	**Rig: Hitachi Zaxis 130LCN**
Ground level: 115.84m O.D.	**Rev:**
GROUNDWATER	**DATE: 9.1.24**

Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 90°
PIT DIMENSION: 3.00m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0										
							114.94	0.90	Grass over plastic brownish black amorphous PEAT. H8.	
1			B 1	1.00-1.20						
							114.34	1.50	Grey slightly silty medium SAND and subrounded fine to coarse GRAVEL with occasional cobbles. Cobbles are subrounded.	
									END	
2										
3										
4										
5										

Remarks: TP dry on excavation. TP terminated at 1.50m bgl. Obstruction as boulders. TP backfilled with arisings.

Scale: 1:25

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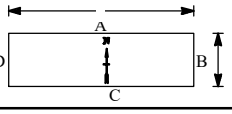
TRIALPIT CAHERMURPHY TPS FILE 1 JAN 11 2024.GPJ ID GINT AGS 4_0_4.GDT 11/1/24

PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP-11A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates: E 508,407.8 N 668,612.8**
ENGINEER: FTCO	**Rig: Hitachi Zaxis 130LCN**
Ground level: 120.33m O.D.	**Rev:**
	DATE: 9.1.24

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 90°
PIT DIMENSION: 4.00m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0									Grass over plastic black amorphous PEAT.	
1			B 1	1.10-1.30			119.23	1.10		
							118.88	1.45	Firm light brown peaty organic SILT.	
2			B 2	1.50-1.70			118.13	2.20	Soft grey organic SILT. 1.80-2.20: becoming firm.	
3			B 3	2.50-2.70			117.23	3.10	Damp bluish grey silty angular to subangular GRAVEL with frequent cobbles and occasional boulders. Cobbles are angular to subangular. Boulders are angular. Boulders are up to 500mm in length.	
									END	
4										
5										

Remarks: TP dry on excavation. TP terminated at 3.10m bgl. Obstruction as boulders. TP backfilled with arisings.

Scale: 1:25

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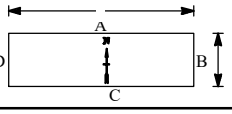
PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP-12A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates: E 508,229.4 N 668,452.0**
ENGINEER: FTCO	**Rig: Hitachi Zaxis 130LCN**
Ground level: 110.65m O.D.	**Rev:**
	DATE: 9.1.24

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 90°
PIT DIMENSION: 3.70m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0							110.25	0.40	Reeds over firm brown fibrous PEAT.	
			B 1	0.50-0.70					Light grey silty SAND and subangular to subrounded fine to coarse GRAVEL with frequent cobbles. Cobbles are subangular to subrounded. Increase in cobble content and size with depth.	
1							109.45	1.20	1.00-1.20: with occasional boulders. Boulders are up to 400mm in length.	
									Stiff brown slightly sandy gravelly SILT with occasional cobbles. Gravel is angular to rounded fine to coarse. Cobbles are subangular.	
			B 2	1.60-1.80			108.65	2.00		
2									Possible weathered rock. Wet bluish grey angular flat and elongate GRAVEL.	
									2.60-3.10: becoming brown.	
3		▼					107.55	3.10		
									END	
4										
5										

Remarks: Seepage of water at 3.10m bgl. TP terminated at 3.10m bgl. Hard digging. TP backfilled with arisings.

Scale: 1:25

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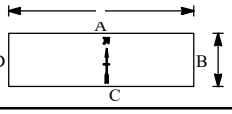
TRIALPIT CAHERMURPHY TPS FILE 1 JAN 11 2024.GPJ ID GINT AGS 4_0_4.GDT 11/1/24

PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT:TP-13A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates:** **Rig: Hitachi Zaxis 130LCN**
ENGINEER: FTCO	**E 508,629.9 N 668,627.2** **Rev:**
Ground level: 121.17m O.D.	**DATE: 9.1.24**

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 90°
PIT DIMENSION: 3.60m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0									Reeds over plastic black amorphous PEAT. H9.	
							120.22	0.95		
1			B 1	1.10-1.30					Stiff light bluish grey slightly gravelly SILT with organic material. Gravel is subangular fine to coarse.	
							119.67	1.50		
			B 2	1.60-1.80					Grey silty SAND and angular to subrounded fine to coarse GRAVEL with frequent cobbles. Cobbles are subangular.	
2							119.07	2.10		
									END	
3										
4										
5										

Remarks: TP dry on excavation. TP terminated at 2.10m bgl. Obstruction. TP backfilled with arisings.

Scale: 1:25

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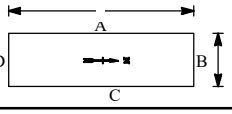
TRIALPIT CAHERMURPHY TPS FILE 1 JAN 11 2024.GPJ ID GINT AGS 4_0_4.GDT 11/1/24

PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP-14A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates:** E 509,004.7 N 669,247.6 — **Rig: Hitachi Zaxis 130LCN**
ENGINEER: FTCO	**Rev:**
Ground level: 126.51m O.D.	**DATE: 9.1.24**

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 0°
PIT DIMENSION: 3.60m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0							126.21	0.30	Grass over plastic black amorphous PEAT.	
							125.91	0.60	Soft brown peaty SILT.	
1			B 1	0.70-0.90			125.21	1.30	Grey silty sandy angular elongate and tabular GRAVEL.	
2			B 2	1.50-1.70			123.61	2.90	Wet grey angular elongate and tabular GRAVEL.	
3									**END**	
4										
5										

Remarks: Moderate ingress of water at 1.90m bgl. TP terminated at 2.90m bgl. Unable to progress TP - sidewall collapse. TP backfilled with arisings.

Scale: 1:25

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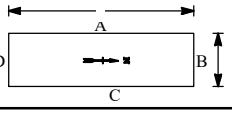
TRIALPIT CAHERMURPHY TPS FILE 1 JAN 11 2024.GPJ ID GINT AGS 4_0_4.GDT 11/1/24

PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP-15A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates: E 508,878.4 N 669,577.5**
ENGINEER: FTCO	**Rig: Hitachi Zaxis 130LCN**
	Rev:
Ground level: 132.66m O.D.	**DATE: 9.1.24**

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 0°
PIT DIMENSION: 3.00m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0							132.46	0.20	Heather over plastic brownish black amorphous PEAT.	
							132.16	0.50	Soft brown gravelly SILT with frequent cobbles. Gravel is subrounded fine to coarse. Cobbles are subrounded.	
1			B 1	0.80-1.00			131.46	1.20	Grey silty sandy subrounded to rounded fine to coarse GRAVEL with frequent cobbles. Cobbles are subrounded to rounded.	
						END				
2										
3										
4										
5										

Remarks: TP dry on excavation. TP terminated at 1.20m bgl. Obstruction as rock. TP backfilled with arisings.

Scale: 1:25

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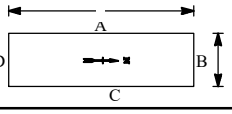
PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP-16A**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates: E 508,932.0 N 668,607.1**
ENGINEER: FTCO	**Rig: Hitachi Zaxis 130LCN**
Ground level: 115.37m O.D.	**Rev:**
	DATE: 9.1.24

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 0°
PIT DIMENSION: 3.70m * 0.60
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0							114.92	0.45	Grass over firm brown fibrous PEAT.	
							114.72	0.65	Firm black slightly sandy gravelly SILT. Gravel is angular to subangular fine to coarse.	
1			B 1	0.70-0.90					Brown silty SAND and GRAVEL with occasional cobbles. Cobbles are subangular.	
									1.40-1.70: with boulders.	
							113.67	1.70	**END**	
2										
3										
4										
5										

Remarks: TP dry on excavation. TP terminated at 1.70m bgl. Obstruction as boulders. TP backfilled with arisings.

Scale: 1:25

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DRILLHOLE LOG

Project	Location	DRILLHOLE No
Cahermurphy Drumquin Phase 2	Co Clare	**BP-01**

Job No	Date	Ground Level (m OD)	Co-Ordinates ()
2023CE105	03-01-24 03-01-24	124.72	E 509,135.9 N 668,709.4

Engineer	Sheet	Status
FTCO	1 of 3	FINAL

RUN DETAILS

Depth / Date	TCR (SCR) RQD	(SPT) Fracture Index	Red'cd Level	Legend	Depth (Thick-ness)
0.00					
	- - -				(1.50)
1.50			123.22		1.50
	90 - -				
2.60					(2.40)
	50 - -				
			120.82		3.90
4.10					
		NI			(0.60)
			120.22		4.50
	100 (63) 14	13			
5.60		18			
	100 (94) 15	23			
7.20					
	100 (94)	6			

STRATA DESCRIPTION

Discontinuities	Detail	Main
0.00 - 3.90 : overburden.		Open hole drilling. No recovery. Drillers Comment: Clay/gravel.
		Subrounded to subangular fine to coarse and elongate brown sandstone and assorted grey siltstone GRAVEL with rare cobbles and a little dark orangish grey silt and minor orangish brown iron stain and powder. Cobbles are of dark grey siltstone.
3.90 - 4.50 Non-intact as weathered rock.		Weathered rock. Strong and medium strong thinly bedded dark grey fine grained siltstone with surficial orange and orangish brown iron stain and powder recovered as angular fine to coarse gravel sized clasts with some orangish grey silt. 4.10m: Very strong.
4.50 - 17.00 Discontinuities, closely spaced to 7.20m bgl, then medium spaced, locally closely spaced, dipping 10 to 12°, planar, smooth, with 0.5 to 3mm thick grey silt smear and minor orange and orangish brown iron stain and powder to 6.70m bgl. 5.20 - 5.25 Joint, dipping 45°, stepped, rough, with 0.5 to 2mm thick dark grey silt smear and orangish brown iron stain and powder, open. 5.65 - 5.85 Joint, subvertical dip, stepped, rough, with 0.5 to 1mm thick grey silt smear and orangish brown iron stain and powder, open. 17.00 - 17.00 iron stain absent.		Strong locally very strong thinly bedded dark grey fine grained SILTSTONE.

Instrument/Backfill

Drilling Progress and Water Observations

Date	Time	Depth	Casing Depth	Casing Dia	Core Dia mm	Water Strike	Water Standing
			1.50	96			

Rotary Flush

From (m)	To (m)	Type	Return (%)
0	17	Water	100

GENERAL REMARKS

BH terminated at 17.00m bgl on REs instruction.
50mm standpipe installed.

All dimensions in metres Scale 1:50	Client: MCRE	Method/ Plant Used CS-14		Driller DC	Logged By EAT

IDL AGS4 UK DH (SPTS) CAHERMURPHY FILE 2 JAN 8 2024.GPJ ID GINT AGS 4_0_4.GDT 9/1/24

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DRILLHOLE LOG

Project	Location	DRILLHOLE No
Cahermurphy Drumquin Phase 2	Co Clare	**BP-01**

Job No	Date	Ground Level (m OD)	Co-Ordinates ()
2023CE105	03-01-24 03-01-24	124.72	E 509,135.9 N 668,709.4

Engineer	Sheet	Status
FTCO	2 of 3	FINAL

RUN DETAILS					STRATA			
Depth / Date	TCR (SCR) RQD	(SPT) Fracture Index	Red'cd Level	Legend	Depth (Thick-ness)	DESCRIPTION: Discontinuities / Detail	DESCRIPTION: Main	Instrument / Backfill
	75						Strong locally very strong thinly bedded dark grey fine grained SILTSTONE. *(continued)*	
8.60		7				8.30 - 8.85 Joint, subvertical dip, undulating, rough, with 0.5 to 2mm thick dark grey silt smear and minor orangish brown iron stain and powder to 8.60m, open as drilling induced?		
	100 (96) 69	8						
10.20								
	100 (97) 82	4			(12.50)			
11.60		7				11.20 - 11.40 Joint, subvertical dip, stepped, smooth, with 0.5 to 1mm thick grey silt smear, open.		
	100 (94) 79	5					12.10-12.30m: Medium Strong.	
13.20								
	100 (97) 61	3						
14.60		6				14.10 - 14.60 Joint, subvertical dip, stepped, smooth, with 0.5 to 1mm thick grey silt smear and orangish brown iron stain and powder, open.		
	100 (97) 76	6						

Drilling Progress and Water Observations								Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia	Core Dia mm	Water Strike	Water Standing	From (m)	To (m)	Type	Return (%)	BH terminated at 17.00m bgl on REs instruction. 50mm standpipe installed.

All dimensions in metres Scale 1:50	Client: MCRE	Method/ Plant Used CS-14		Driller DC	Logged By EAT

IDL AGS4 UK DH (SPTS) CAHERMURPHY FILE 2 JAN 8 2024.GPJ ID GINT AGS 4_0_4.GDT 9/1/24

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DRILLHOLE LOG

Project	Location	DRILLHOLE No
Cahermurphy Drumquin Phase 2	Co Clare	**BP-01**

Job No	Date	Ground Level (m OD)	Co-Ordinates ()
2023CE105	03-01-24 03-01-24	124.72	E 509,135.9 N 668,709.4

Engineer	Sheet	Status
FTCO	3 of 3	FINAL

RUN DETAILS					STRATA			
Depth Date	TCR (SCR) RQD	(SPT) Fracture Index	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION Discontinuities	Detail	Main	Instrument/ Backfill
16.20								Strong locally very strong thinly bedded dark grey fine grained SILTSTONE. *(continued)*	
	100 (96) 82	8				16.60 - 16.65 Joint, dipping 45°, stepped, rough, with 0.5 to 1mm thick grey silt smear and minor orangish brown iron stain and powder, open.			
03.01 17.00			107.72		17.00				

Drilling Progress and Water Observations								Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia	Core Dia mm	Water Strike	Water Standing	From (m)	To (m)	Type	Return (%)	
03/01/24	16.00	17.00										BH terminated at 17.00m bgl on REs instruction. 50mm standpipe installed.

All dimensions in metres Scale 1:50	Client: MCRE	Method/ Plant Used CS-14		Driller DC	Logged By EAT

IDL AGS4 UK DH (SPTS) CAHERMURPHY FILE 2 JAN 8 2024.GPJ ID GINT AGS 4_0_4.GDT 9/1/24

Irish drilling LTD

DRILLHOLE LOG

Project	Location	DRILLHOLE No
Cahermurphy Drumquin Phase 2	Co Clare	**BP-02**

Job No	Date	Ground Level (m OD)	Co-Ordinates ()
2023CE105	04-01-24 04-01-24	129.96	E 508,670.8 N 669,509.4

Engineer	Sheet	Status
FTCO	1 of 3	FINAL

RUN DETAILS					STRATA			
Depth Date	TCR (SCR) RQD	(SPT) Fracture Index	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION Discontinuities	Detail	Main	Instrument/ Backfill
0.00			129.56		(0.40) 0.40	0.00 - 3.90 : overburden.		Open hole drilling. No recovery. Drillers Comment: PEAT.	
	-							Open hole drilling. No recovery. Drillers Comment: GRAVEL.	
	-				(1.10)				
1.50	-		128.46		1.50				
	90							Subrounded to subangular fine to coarse dark grey limestone and assorted brownish grey and grey sandstone GRAVEL with some brownish grey slightly sandy gravelly silt. Sand is fine to coarse. Gravel is subrounded to subangular fine to coarse of assorted grey limestone and assorted grey sandstone.	
	-				(1.10)				
2.60	-		127.36		2.60				
								Extremely strong locally very strong thinly bedded greenish grey fine and medium grained SANDSTONE.	
	33 (13)								
	-								
4.10					(2.80)	3.90 - 8.20 Discontinuities, medium spaced, locally closely spaced, dipping 8 to 10°, stepped, rough, with 0.5 to 3mm thick dark greenish grey silt smear.			
		5				4.60 - 5.20 Joint, subvertical dip, stepped, rough, with 0.5 to 20mm thick greenish grey silt smear, open to wide.			
	100 (96) 55								
			124.56		5.40				
5.60		6				5.40 - 5.55 Joint, subvertical dip, undulating, smooth, with 0.5 to 1mm thick dark grey silt smear and orangish brown iron stain and powder, open.			Weak and medium strong, locally strong thinly bedded grey and dark grey fine grained SILTSTONE with surficial orangish brown iron stain.	
	100 (84) 15					5.65 - 6.30 Joint, subvertical dip, undulating, smooth, with 0.5 to 20mm thick dark greenish grey silt smear and orangish brown iron stain and powder, open to wide.			
		18							
7.20						6.90 - 7.30 Joint, subvertical dip, undulating, smooth, with 0.5 to 1mm thick greenish grey silt smear and orangish brown iron stain and powder, open.			
	100 (73)	6							

Drilling Progress and Water Observations

Date	Time	Depth	Casing Depth	Casing Dia	Core Dia mm	Water Strike	Water Standing
			1.50	96			

Rotary Flush

From (m)	To (m)	Type	Return (%)
0	17.1	Water	100

GENERAL REMARKS

BH terminated at 17.10m bgl on REs instruction.
50mm standpipe installed.

All dimensions in metres Scale 1:50	Client: MCRE	Method/ Plant Used CS-14		Driller CD	Logged By EAT

IDL AGS4 UK DH (SPTS) CAHERMURPHY FILE 2 JAN 8 2024.GPJ ID GINT AGS 4_0_4.GDT 9/1/24

Irish drilling LTD

DRILLHOLE LOG

Project	Location	DRILLHOLE No
Cahermurphy Drumquin Phase 2	Co Clare	**BP-02**

Job No	Date	Ground Level (m OD)	Co-Ordinates ()
2023CE105	04-01-24 04-01-24	129.96	E 508,670.8 N 669,509.4

Engineer	Sheet	Status
FTCO	2 of 3	FINAL

RUN DETAILS					STRATA			
Depth Date	TCR (SCR) RQD	(SPT) Fracture Index	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION Discontinuities Detail	Main	Instrument/ Backfill
	55					8.20 - 17.10 Discontinuities, very closely spaced and closely spaced to 10.00m bgl, then medium spaced, locally closely spaced, dipping 8 to 10°, planar, smooth, with 0.5 to 2mm thick dark grey silt smear. 8.21 - 9.00 Non-intact as very closely and closely spaced discontinuities. 17.10 - 17.10 no surficial orangish brown iron stain. 17.10 - 17.10 becoming strong locally very strong.	Weak and medium strong, locally strong thinly bedded grey and dark grey fine grained SILTSTONE with surficial orangish brown iron stain. *(continued)*	
8.60		NI						
	100 (77) 15	24					9.10m: Very strong.	
10.20								
	100 (96) 93	6			(11.70)			
11.60		6						
	100 (95) 75	6						
13.20		6						
	100 (96) 94							
14.60		5						
	100 (97) 94	5						

Drilling Progress and Water Observations								Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia	Core Dia mm	Water Strike	Water Standing	From (m)	To (m)	Type	Return (%)	BH terminated at 17.10m bgl on REs instruction. 50mm standpipe installed.

All dimensions in metres Scale 1:50	Client: MCRE	Method/ Plant Used CS-14		Driller CD	Logged By EAT

IDL AGS4 UK DH (SPTS) CAHERMURPHY FILE 2 JAN 8 2024.GPJ ID GINT AGS 4_0_4.GDT 9/1/24

Irish drilling LTD

DRILLHOLE LOG

Project	Location	DRILLHOLE No
Cahermurphy Drumquin Phase 2	Co Clare	**BP-02**

Job No	Date	Ground Level (m OD)	Co-Ordinates ()
2023CE105	04-01-24 04-01-24	129.96	E 508,670.8 N 669,509.4

Engineer	Sheet	Status
FTCO	3 of 3	FINAL

RUN DETAILS					STRATA			
Depth Date	TCR (SCR) RQD	(SPT) Fracture Index	Red'cd Level	Legend	Depth (Thick- ness)	DESCRIPTION Discontinuities	Detail	Main	Instrument/ Backfill
16.10 04.01 17.10	100 (98) 84	8	112.86	× × ×	17.10			Weak and medium strong, locally strong thinly bedded grey and dark grey fine grained SILTSTONE with surficial orangish brown iron stain. *(continued)*	

Drilling Progress and Water Observations								Rotary Flush				GENERAL REMARKS
Date	Time	Depth	Casing Depth	Casing Dia	Core Dia mm	Water Strike	Water Standing	From (m)	To (m)	Type	Return (%)	
04/01/24	16.00	17.10										BH terminated at 17.10m bgl on REs instruction. 50mm standpipe installed.

All dimensions in metres Scale 1:50	Client: MCRE	Method/ Plant Used CS-14		Driller CD	Logged By EAT


Cahermurphy
Drumquin Phase 2
Co. Clare
2023 CE 105
BP 1
Box
1.2.3.


Cahermurphy
Drumquin Phase 2
Co. Clare
2023 CE 105
BP 1
Box
4.5.6.


Cahermurphy
Drumquin Phase 2
Co. Clare
2023 CE 105
BP 2
Box
1.2.3.
4.1
5.6
7.2
8.6
10.2
Cahermurphy
Drumquin Phase 2
Co. Clare
2023 CE 105
BP 2
Box
4.5.6.
11.6
13.2
14.6
16.1

IDL

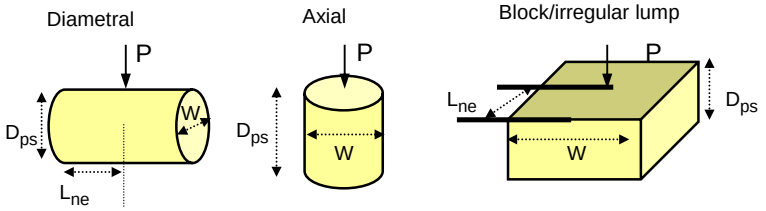
Point Load Strength Index Tests
Summary of Results

Project No.: 2023CE105

Project Name: Cahermurphy Drumquin Phase 2

Borehole No.	Sample			Specimen		Rock Type and Test condition	Test Type see ISRM		Failure Valid (Y/N)	Dimensions				Force P	Equivalent diameter, De	Point Load Strength Index		Remarks (including water content if measured)
	Top Depth	Base Depth	Type	Ref	Top		Type (D, A, I, B)	Direction (L, P or U)		Lne	W	Dps	Dps'			Is	Is(50)	
	m	m			m					mm	mm	mm	mm	kN	mm	MPa	MPa	
BP-01	4.10	5.6	C	4.6-4.75	4.60		D	U	YES		63.4		63.4	28.4	63.4	7.1	7.9	Very Strong
BP-01	7.20	8.6	C	7.7-7.9	7.70		D	U	YES		63.4		63.4	26.6	63.4	6.6	7.4	Very Strong
BP-01	11.60	13.2	C	12.1-12.3	12.10		D	U	YES		63.4		63.4	4.6	63.4	1.1	1.3	Medium Strong
BP-02	7.20	8.6	C	7.9-8.1	7.90		D	U	YES		63.4		63.4	2.2	63.4	0.5	0.6	Weak
BP-02	8.60	10.2	C	10.0-10.2	10.00		D	U	YES		63.4		63.4	3.0	63.4	0.7	0.8	Weak
BP-02	14.60	16.1	C	15.1-15.3	15.10		D	U	YES		63.4		63.4	3.1	63.4	0.8	0.9	Weak

Test Type
D - Diametral, A - Axial, I - Irregular Lump, B - Block
Direction
L - parallel to planes of weakness
P - perpendicular to planes of weakness
U - unknown or random
Dimensions
Dps - Distance between platens (platen separation)
Dps' - at failure (see ISRM note 6)
Lne - Length from platens to nearest free end
W - Width of shortest dimension perpendicular to load, P



Test performed in accordance with ISRM Suggested Methods : 2007, unless noted otherwise
Detailed legend for test and dimensions, based on ISRM, is shown above.
Size factor, F = (De/50)0.45 for all tests.

Date Printed: 09/01/2024

Approved By: Administrator

Table 1 sheet 1

Tested in: Irish Drilling Ltd.(IDL), Old Galway Road, Loughrea, Co. Galway, Ireland. H62VX39
Approved Signatures: Dympna Darcy (DCD) Lab Manager, Declan Joyce (DJ) Chartered Geotechnical Engineer, Ronan Killeen (RK) Quality Manager.

IDL

UNIAXIAL COMPRESSION TEST ON ROCK - SUMMARY OF RESULTS

Project No.: 2023CE105

Project Name: Cahermurphy Drumquin Phase 2

Hole No.	Sample				Specimen Depth (m)	Specimen Dimensions2			Bulk Density2	Water Content 1	Uniaxial Compression3				Remarks
	Ref	Top	Base	Type		Dia. mm	Length mm	H/D	Mg/m3	%	Condition	Stress Rate MPa/s	Mode of failure	UCS MPa	
BP-01		4.10	5.60	C	4.1	63.4	160.4	2.5	2.64		as received	0.6264	F	231.0	Very Strong
BP-02		8.60	10.20	C	9.1	63.4	159.5	2.5	2.69		as received	0.2590	AC	126.0	Very Strong

Notes

1 ISRM p87 test 1, water content at 105 ± 3 oC, specimen as tested for UCS

2 ISRM p86 clause (vii), Caliper method used for determination of bulk volume and derivation of bulk density

3 ISRM p153 part 1, determination of Uniaxial Compressive Strength (UCS) of Rock Materials

above notes apply unless annotated otherwise in the remarks

Mode of failure :

S - Single shear MS - multiple shear

AC - Axial cleavage F - Fragmented

Test Specification	Date Printed	Approved By	Table
International Society for Rock Mechanics, The complete ISRM suggested methods for Rock Characterization Testing and Monitoring, 2007	09/01/2024	Administrator	sheet 1 of 1

Tested in: Irish Drilling Ltd.(IDL), Old Galway Road, Loughrea, Co. Galway, Ireland. H62VX39

Approved Signatures: Dympna Darcy (DCD) Lab Manager, Declan Joyce (DJ) Chartered Geotechnical Engineer, Ronan Killeen (RK) Quality Manager.

IRISH DRILLING LIMITED

LOUGHREA, CO. GALWAY, IRELAND

CONTRACT DRILLING
SITE INVESTIGATION

Phone: (091) 841 274
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email: info@irishdrilling.i

CAHERMURPHY WEST WIND FARM

SITE INVESTIGATION FACTUAL REPORT

Cahermurphy Renewables DAC,

MKO,
Tum Road,
Galway.

	Prepared by	Approved by	Rev. Issue Date:	Revision No.
	Ronan Killeen	Declan Joyce	6th November 2024	23_CE _106A
Signature				

FOREWORD

The trial pit records have been compiled from an examination of the samples by a Geotechnical Engineer and from the Drillers' descriptions.

The report presents an opinion on the configuration of the strata within the site based on the trial pit results. The assumptions, though reasonable, are given for guidance only and no liability can be accepted for changes in conditions not revealed by the trial pits.

The fieldwork was carried out in accordance with IS EN 1997-2 and BS5930:2015+A1:2020 Code of Practice for Site Investigations with precedence given to IS EN 1997-2 where applicable.

Contents:

1.0 Introduction.

Irish Drilling Ltd. (IDL) was instructed by FTCO/MKO, on behalf of the Applicant, Cahermurphy Renewable DAC, to carry out additional site investigation works at the site of the proposed Cahermurphy West Wind Farm.

This additional site investigation is considered to provide further information for the application and in conjunction with previous site investigations carried out here to date.

The Cahermurphy West Wind Farm Project includes for the construction of eight wind turbines, associated hardstands, on site roads, permanent met mast, substation, site compound, rock borrow pits, peat storage areas and ancillary works associated with the construction of same.

This site investigation was carried out to provide detailed factual geotechnical information of the underlying ground conditions at the proposed wind farm and including five locations not previously included in previous site investigation works.

The fieldwork was carried out on September 30th 2024.

2.0 Site & Geology

The site is located near Kilmihil, County Clare.

The fieldwork was carried out predominantly on agricultural and/or forestry lands.

Weather conditions in general were quite variable with the majority of the fieldwork carried out over a typical autumn period in Ireland.

A Site Plan showing approximate fieldwork locations, is included as an appendix with this report.

The following were the main published information sources used:
Geological Map of Ireland: 1:500,000 scale map series.

Site investigation data is available as point source data along the proposed route, and the majority of the ground in between the points can only be assumed to follow the characteristics of the nearest available data.

Overview of Subsoil Geology

Peat:
The deposition of peat occurred in post-glacial periods and is generally associated with the start of warmer and wetter climatic conditions. Peat is an unconsolidated usually dark brown to black organic material comprising a mixture of decomposed and undecomposed plant matter that accumulated in an acidic waterlogged environment. Peat has an extremely high-water content generally averaging over 90% by volume.

Glacial Till:
Glacial Till is what was often referred to as Boulder Clay. It is a diverse material that is largely deposited sub-glacially and has a wide range of characteristics due to the variety of parent materials and different processes of deposition. Tills are tightly packed, unsorted, heterogeneous, unbedded, and can have a wide range of particle sizes and types, which are often but not exclusively angular or sub-angular.

The type of parent material plays a critical role in providing the particles that create different subsoil permeability with sandstones giving rise to a high proportion of sand sized grains in the till matrix.

Solid Geology
The Geological Map of Ireland: (GSI 1:100,000 scale map series) indicate that the site is predominantly underlain by siltstone and sandstone of the Gull Island Formation.

3.0 Fieldwork.

The following plant was mobilised to site to carry out fieldwork operations:

Hitachi LCN 12T Tracked Excavator.

Fieldwork carried out to date has included the following:

Five trial pits were excavated on site using a 12T wide-padded tracked excavator. The pits were logged and photographed by an Engineer with observations made on ground conditions, pit stability and water ingress.

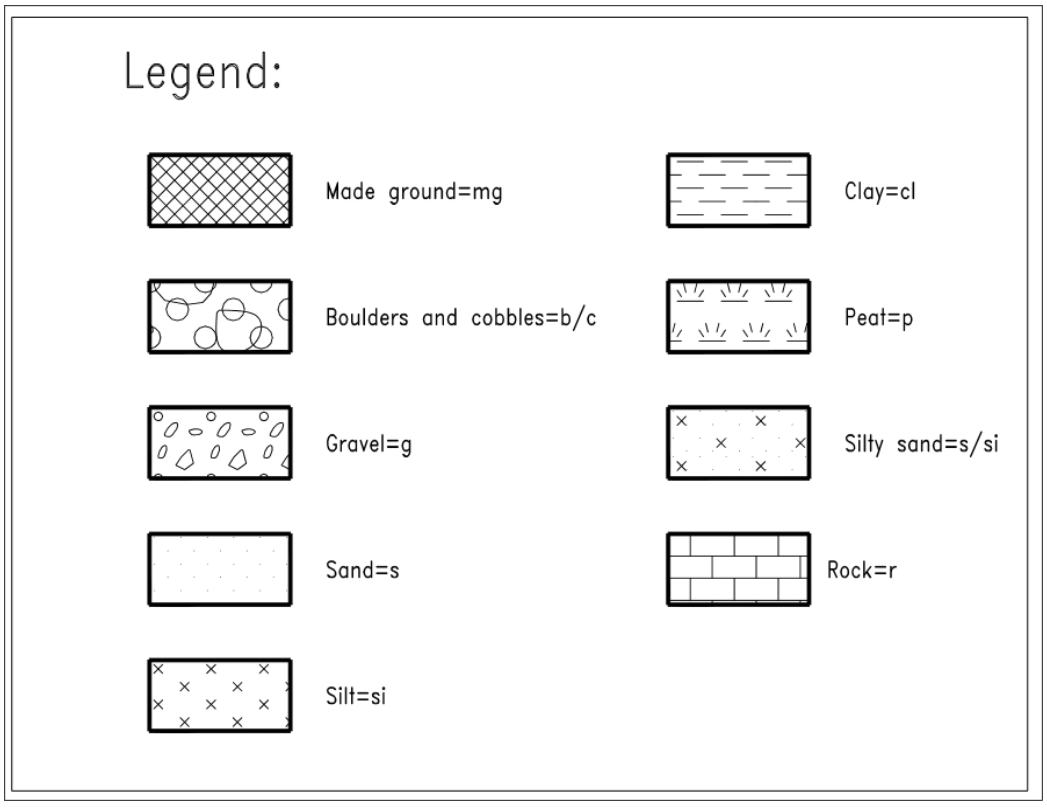
Small and bulk disturbed soil samples were recovered at each change in strata and the samples were returned to the laboratory and presented for testing.

The trial pit locations were set out on site using a Trimble CU Bluetooth GPS Surveying Unit and the co-ordinates are included on the logs presented in the appendices.

All fieldwork co-ordinates are reported to Irish Transverse Mercator (ITM) with Reduced Levels recorded relative to Malin Head Datum and with an accuracy level of + or – 0.10m.

For detailed descriptions of the ground conditions encountered please refer to the engineering logs included in the appendices to this report.

The following Key Legend Table details the symbology used on the engineering logs to describe ground conditions encountered:



Ground conditions encountered during the completion of the fieldwork were typical and as expected for this region and predominantly consisted of Peat and/or Glacial Tills.

The Glacial Tills in general consisted of slightly gravelly sandy silt with cobbles and boulders and/or silty sands and/or gravels with cobbles and boulders.

Soft brown peat was also encountered at location TP 4 Cunning to a depth of 1.60m below ground level.

For detailed descriptions of the ground conditions encountered please refer to the engineering logs included as Appendix 1 of this report

The fieldwork was carried out in accordance with IS EN 1997-2 and BS5930:2015+A1:2020 Code of Practice for Site Investigations with precedence given to IS EN 1997-2 where applicable.

The borehole and trial pit locations were set out on site using a Trimble CU Bluetooth GPS Surveying Unit and the co-ordinates are included on the logs presented in the appendices.

All fieldwork co-ordinates are reported to Irish Transverse Mercator (ITM) with Reduced Levels recorded relative to Malin Head Datum and with an accuracy level of + or – 0.10m.

The soil and rock descriptions as noted on the borehole logs are in general visual descriptions as observed and logged by our Engineers and are described in accordance with IS EN 1997-2 and BS5930:2015+A1:2020 Code of Practice for Site Investigations.

Soils descriptions (cohesive or otherwise) are also initially assessed based on the texture and ‘feel’ of the soil materials as witnessed by our Geotechnical Engineers and in accordance with IS EN 1997-2 and BS5930:2015+A1:2020.

Where laboratory classification tests have been carried out on soil or rock samples then these visual descriptions have been amended accordingly to take into account the results of these classification tests.

The records of all fieldwork, laboratory test results and photographs are included in the appendices of this Factual Report.

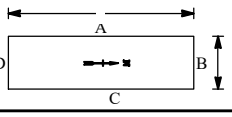
Ronan Killeen
Chartered Engineer
Irish Drilling Limited
November 6th 2024

Appendix 01
Trial Pit Records

PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP01-Coillte**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates: E 508,219.2 N 669,251.1**
ENGINEER: FTCO	**Rig: Hyundai 130**
	Rev:
Ground level: 114.18m O.D.	**DATE: 30.9.24**

GROUNDWATER
Water strikes: **Rose to after:**
1st: 2.00m **1min** **2.00m**
2nd:
3rd:

PIT DIRECTION: 0°
PIT DIMENSION: 3.50m * 1.50
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit unstable. Sidewall collapse.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0							114.03	0.15	TOPSOIL: Soft brown peaty SILT.	
			B 1 D 2	0.30-0.50 0.30-0.50			113.18	1.00	Stiff bluish grey slightly gravelly SILT with occasional cobbles. Gravel is angular medium to coarse. Cobbles are subrounded.	
1							112.98	1.20	Grey silty sandy angular fine to coarse GRAVEL.	
			B 3 D 4	1.30-1.50 1.30-1.50			112.38	1.80	Stiff bluish grey gravelly SILT with frequent cobbles. Gravel is angular to subangular fine to coarse. Cobbles are angular to subrounded.	
		▽					112.18	2.00	Grey silty sandy angular to subangular fine to coarse GRAVEL with frequent cobbles. Cobbles are angular.	
2			B 5	2.30-2.50					Greenish grey slightly sandy angular fine to coarse GRAVEL with frequent cobbles. Cobbles are angular. 2.50: becoming bluish grey.	
3			B 6	3.30-3.50						
4							110.18	4.00	**END**	
5										

Remarks: Coillte location. Ingress of water at 2.00m bgl. TP terminated at 4.00m bgl. Unable to progress TP - sidewall collapse. TP backfilled with arisings.

Scale: 1:25

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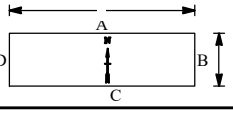
Ph.
Fax

TRIALPIT CAHERMURPHY TPS ALL FILE OCT 16 2024.GPJ ID GINT AGS 4_0_4.GDT 6/11/24

PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP02-PD**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates: E 508,441.4 N 669,755.9**
ENGINEER: FTCO	**Rig: Hyundai 130**
	Rev:
Ground level: 100.31m O.D.	**DATE: 30.9.24**

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 90°
PIT DIMENSION: 4.00m * 1.10
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0							99.86	0.45	Grass over soft dark brown peaty SILT.	
							99.21	1.10	Angular COBBLES and angular BOULDERS with a soft dark brown silt infill. Boulders are up to 600mm in length.	
1			B 1	1.10-1.30			98.86	1.45	Orangish brown and grey angular COBBLES and orangish brown and grey angular BOULDERS with a brown silt infill.	
						END				
2										
3										
4										
5										

Remarks: PD location.TP dry on excavation. TP terminated at 1.45m bgl. Obstruction as possible rock. TP backfilled with arisings.

Scale: 1:25

Irish drilling LTD

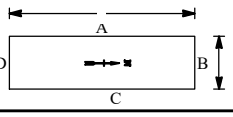
Ph.
Fax

TRIALPIT CAHERMURPHY TPS ALL FILE OCT 16 2024.GPJ ID GINT AGS 4_0_4.GDT 6/11/24

PROJECT: Cahermurphy Drumquin Phase 2		**TRIALPIT: TP03-LCQuarry**
LOCATION: Co Clare		**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates:**	**Rig: Hyundai 130**
ENGINEER: FTCO	**E 509,046.8 N 668,758.4**	**Rev:**
Ground level: 129.37m O.D.		**DATE: 30.9.24**

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 0°
PIT DIMENSION: 4.40m * 1.10
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0							128.97	0.40	Heather over plastic black amorphous PEAT with occasional cobbles and occasional boulders. Cobbles are angular to subangular. Boulders are angular to subangular.	
							128.47	0.90	Firm orangish brown SILT with frequent cobbles and frequent boulders. Cobbles are angular to subangular. Boulders are angular to subangular. Boulders are up to 450mm in length.	
1			B 1	0.90-1.10					Light brown slightly silty slightly gravelly fine to medium SAND with frequent cobbles and frequent boulders. Cobbles are angular to subangular. Boulders are angular to subangular. Boulders are up to 450mm in length. Boulder content increasing with depth.	
2			B 2	2.00-2.20			126.97	2.40		
						END				
3										
4										
5										

Remarks: LC Quarry location. TP dry on excavation. TP terminated at 2.40m bgl. Obstruction as possible rock. TP backfilled with arisings.

Scale: 1:25

Irish drilling LTD

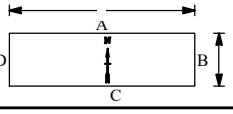
Ph.
Fax

TRIALPIT CAHERMURPHY TPS ALL FILE OCT 16 2024.GPJ ID GINT AGS 4_0_4.GDT 6/11/24

PROJECT: Cahermurphy Drumquin Phase 2	**TRIALPIT: TP04-Cunning**
LOCATION: Co Clare	**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates: E 509,090.9 N 669,148.6**
ENGINEER: FTCO	**Rig: Hyundai 130**
	Rev:
Ground level: 122.25m O.D.	**DATE: 30.9.24**

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 90°
PIT DIMENSION: 4.00m * 1.20
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit unstable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0									Plastic black amorphous PEAT.	
							120.65	1.60		
			B 1	1.60-1.80					Firm grey gravelly SILT. Gravel is angular to subangular fine to coarse.	
							119.65	2.60		
			B 2	2.60-2.80					Creamish grey slightly silty angular to subangular fine to coarse GRAVEL with frequent cobbles and occasional boulders, Cobbles are angular to subangular. Boulders are angular.	
							119.25	3.00		
									END	

Remarks: Cunning location. TP dry on excavation. TP terminated at 3.00m bgl. Obstruction as possible rock. TP backfilled with arisings.

Scale: 1:25

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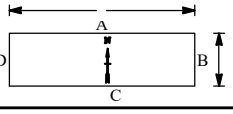
TRIALPIT CAHERMURPHY TPS ALL FILE OCT 16 2024.GPJ ID GINT AGS 4_0_4.GDT 6/11/24

PROJECT: Cahermurphy Drumquin Phase 2		**TRIALPIT: TP05-Compoun**
LOCATION: Co Clare		**Sheet 1 of 1**
CLIENT: MCRE	**Co-ordinates:**	**Rig: Hyundai 130**
ENGINEER: FTCO	**E 509,383.5 N 669,322.1**	**Rev:**
Ground level: 142.32m O.D.		**DATE: 30.9.24**

GROUNDWATER
Water strikes: **Rose to after:**
1st: dry
2nd:
3rd:

PIT DIRECTION: 90°
PIT DIMENSION: 3.80m * 1.10
LOGGED BY: DF



Shoring/Support: N/A
Stability: Pit stable.

Depth (m)	Date	Water	Samples	Depth (m)	SPT (N) / In Situ Vane Tests	LEGEND	Elevation m O.D.	Depth (m)	DESCRIPTION	Instrument/ Backfill
0										
							142.02	0.30	Grass over firm brown fibrous PEAT.	
			B 1 D 2	0.40-0.60 0.40-0.60					Soft greenish grey fibrous SILT.	
1							141.12	1.20		
			B 3 D 4	1.40-1.60 1.40-1.60					Soft greyish green gravelly SILT with frequent cobbles. Gravel is subangular to rounded fine to coarse. Cobbles are subrounded. Boulder content increasing with depth.	
2									2.00: with occasional boulders. Boulders are subangular.	
							139.42	2.90		
3									**END**	
4										
5										

Remarks: Compound location. TP dry on excavation. TP terminated at 2.90m bgl on REs instruction. TP backfilled with arisings.

Scale: 1:25

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Appendix 02
Photographs (Trial Pits)

Figure 1 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp1coillte,.jpg

Figure 3 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp1coillte.jpg

Figure 2 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp1coillte..jpg

Figure 4 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp2pd,.jpg

Figure 5 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp2pd..jpg

Figure 7 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp3LCQuarry,.jpg

Figure 6 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp2pd.jpg

Figure 8 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp3LCQuarry..jpg

Figure 9 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp3LCQuarry.jpg

Figure 11 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp4 cunning..jpg

Figure 10 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp4 cunning,.jpg

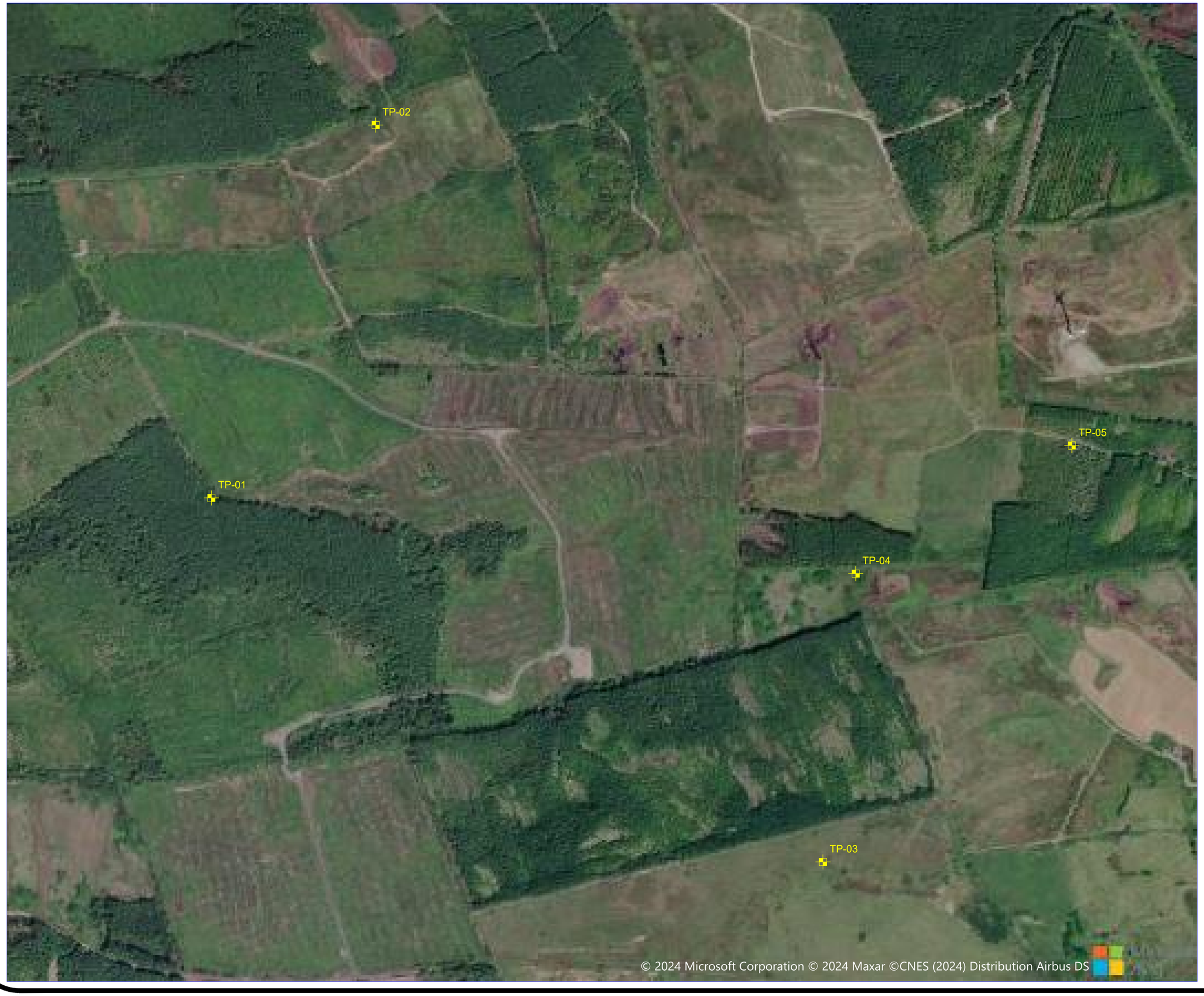
Figure 12 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp4 cunning.jpg

Figure 13 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp5compound,.jpg

Figure 15 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp5compound.jpg

Figure 14 H:\24CECahermurphyWest.Site photos\cahermurphy west\Tp5compound..jpg

Appendix 03
Site Plan



General Notes

LEGEND:

TRIAL PIT LOCATIONS

No.	Revision/Issue	Date

Firm Name and Address

Irish Drilling Limited
Old Galway Road
Loughrea
Co. Galway,
Tel: 091 841274
Email : info@irishdrilling.ie

Project Name and Address

CAHERMURPHY SOUTH

Project	Sheet
Date 06/11/2024	
Scale Not to Scale	

Appendix 04
AGS Data

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