

**PEAT STABILITY ASSESSMENT REPORT**  
**FOR**  
**ARDDERROO WIND FARM, CO. GALWAY**

**Prepared for:**  
**McCarthy Keville O'Sullivan**



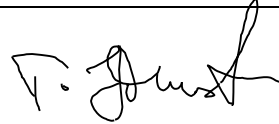

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TABLE OF CONTENTS

	<u>Page No.</u>
TITLE PAGE	i
DOCUMENT APPROVAL FORM	ii
TABLE OF CONTENTS	iii
1 NON-TECHNICAL SUMMARY	1
2 INTRODUCTION	3
2.1 Background and Experience	3
2.2 Peat Stability Assessment Methodology	3
2.3 Peat Failure Definition	5
2.4 Main Approaches to Assessing Peat Stability	5
2.5 Peat Stability Assessment – Deterministic Approach	6
2.6 Applicability of the Factor of Safety (Deterministic) Approach for Peat Slopes	7
2.7 Assessment of Intense Rainfall and Extreme Dry Events on the Peat Slopes	8
3 SITE DESCRIPTION	9
4 DESK STUDY AND SITE RECONNAISSANCE	10
4.1 Desk Study	10
4.2 Site Reconnaissance	10
5 FINDINGS OF SITE RECONNAISSANCE	11
5.1 Previous Failures	11
5.2 Ground Investigation	11
5.3 Findings of Wind Farm Site Reconnaissance	13
5.4 Findings of Alternative Construction Access Road Site Reconnaissance	16
6 SITE GROUND CONDITIONS	18
6.1 Soils & Subsoils	18
6.2 Bedrock	18
7 PEAT DEPTHS, STRENGTH & SLOPE AT PROPOSED INFRASTRUCTURE LOCATIONS	19
8 PEAT STABILITY ASSESSMENT	23
8.1 Methodology for Peat Stability Assessment	23
8.2 Analysis to Determine Factor of Safety (Deterministic Approach)	25
8.3 Results of Analysis	27
8.3.1 Undrained Analysis for the peat	27
8.3.2 Drained Analysis for the peat	30
9 RISK ASSESSMENT	32
9.1 Summary of Risk Assessment Results	32

10	SUMMARY AND RECOMMENDATIONS	34
	10.1 Summary	34
	10.2 Recommendations	35
11	REFERENCES	36

TABLES (within text)

Table 1	Peat Depth & Slope Angle at Proposed Infrastructure Locations
Table 2	List of Effective Cohesion and Friction Angle Values
Table 3	Factor of Safety Limits for Slopes
Table 4	Factor of Safety Results (undrained condition)
Table 5	Factor of Safety Results (drained condition)
Table 6	Risk Rating Legend
Table 7	Summary of Geotechnical Risk Register

FIGURES (within text)

Figure 1	Flow Diagram Showing General Methodology for Peat Stability Assessment
Figure 2	Peat Slope Showing Balance of Forces to Maintain Stability
Figure 3	Ground Investigation Location Plan
Figure 4	Peat Depth Contour Plan
Figure 5	Construction Buffer Zone Plan
Figure 6	Undrained Shear Strength ( $c_u$ ) for Peat with Depth
Figure 7	Factor of Safety Plan - Short Term Critical Condition (Undrained)

APPENDICES

Appendix A	Photos from Site Visit
Appendix B	Ground Investigation Data – Trial Pit Logs & Photographs
Appendix C	Geotechnical Risk Register
Appendix D	Calculated FoS for Peat Slopes on Site
Appendix E	Methodology for Risk Assessment

## ACRONYMS AND SYMBOLS

AGEC	Applied Ground Engineering Consultants Ltd
BS	British Standard
$c'$	Effective cohesion
CMS	Construction Method Statement
$c_u$	Undrained strength
EC7	Eurocode 7
FoS	Factor of Safety
GSI	Geological Survey of Ireland
HES	Hydro Environmental Services
kPa	Kilopascals
m bgl	Metres below ground level
m	Metres
mm	Millimetres
mOD	Metres ordnance datum
$\phi'$	Effective angle of shearing resistance
PHRAG	Peat Hazard and Risk Assessment Guide

## 1 NON-TECHNICAL SUMMARY

Applied Ground Engineering Consultants Ltd (AGEC) was engaged by McCarthy Keville O'Sullivan to undertake an assessment of the proposed Ardderroo wind farm site with respect to peat stability. In accordance with planning guidelines compiled by the Department of the Environment, Heritage and Local Government (DoEHLG), where peat is present on a proposed wind farm development, a peat stability assessment is required.

The findings of the peat assessment, which involved analysis of over 920 locations, showed that the site has an acceptable margin of safety and is suitable for the proposed wind farm development. The findings include recommendations and control measures for construction work in peat lands to ensure that all works adhere to an acceptable standard of safety.

The proposed wind farm comprises 25 no. wind turbines with associated infrastructure including access roads (new and upgrading of existing roads), substation, construction compounds, met mast and borrow pits. In addition the report includes an assessment of the proposed alternative construction access road and junction from N59 (national road).

The northern part of the site (turbines T1 to T6) is located on elevated ground that is situated to the east of Knocknalee Hill and south of Buffy Lough. The southern part of the site (T7 to T25) comprises low-lying undulating generally flat terrain. Most of the proposed site is covered by blanket bog that has been planted with conifer plantations. Whilst slope inclinations in the northern part of the site are greater the combination of a relatively high peat strength and thin and variable cover of blanket peat results in an acceptable risk of peat stability. In relation to the southern part of the site, whilst the deeper peat has a relatively lower strength (compared to the shallower peat deposits in the north of the site) due to the flatter terrain this results again in an acceptable level of peat stability.

Peat thicknesses recorded during the site walkovers from over 1,700 no. probes ranged from 0 to 7.2m with an average of 1.7m. 95 percent of the peat depth readings are 4m or less and all except 2 no. of the 1,700 no. probes are 6m or less. The deepest peat was recorded in the south of the site in localised depressions where the topography is typically flatter and where some 16.8km of existing access roads are in place. Based on anecdotal information some of the existing access roads have been in operation for over 50 years. In addition, at the location of the deeper peat deposits on site either existing or proposed floating access roads will be constructed hence no excavation works will take place within the deeper peat deposits. The deeper peat areas were generally avoided when optimising the wind farm layout for site.

Ground conditions comprised mainly of peat overlying locally glacial till overlying bedrock.

A walkover including intrusive peat depth probing, a ground investigation including trial pits, 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 (Scottish Executive, 2007).

The purpose of the stability analysis is 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. An acceptable FoS for slopes is generally taken as a minimum of 1.3.

Based on the stability assessment carried out on the peat slopes the calculated FoS's are acceptable. Localised areas of deeper peat deposits are present which may require specific construction methods, but do not represent a peat slide risk. The risk assessment at each infrastructure location includes mitigation/control measures to ensure the continued stability of the site.

The results of the stability assessment reflect the nature of the terrain and show that the site has an acceptable FoS with respect to peat stability. In addition, the terrain is considered to have a low susceptibility to peat failure due to:

- Limited historical peat failures in the area (nearest located some 22km to the northwest (occurred in 1821) and the next nearest some 35km northwest (occurred in 2006).
- AGEC walkover and assessment of sites showing absence of peat failures within the area including Galway Wind Park, Letterpeak and Lettergunnet Wind Farms, Connemara 110kV Reinforcement Project amongst others.

## **2 INTRODUCTION**

### **2.1 Background and Experience**

Applied Ground Engineering Consultants Ltd (AGEC) were originally engaged in 2013 by McCarthy Keville O'Sullivan to undertake an assessment of the proposed wind farm site with respect to peat stability.

AGEC have been involved in over 120 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.

The proposed Ardderroo site is located approximately 6.6km south of Oughterard, Co. Galway.

The proposed wind farm comprises 25 no. wind turbines with associated infrastructure including access roads (new and upgrading of existing roads), construction compounds, met mast and borrow pits. In addition the report includes an assessment of the proposed alternative construction access road and junction from N59 (national road). A full and detailed description of the proposed development is provided in Chapter 4 of the Environmental Impact Assessment Report (EIAR).

A number of walkover surveys of the site were carried out by AGEC between 2013 and 2018. The peat depth data previously recorded by AGEC will be used in the assessment of peat stability for the proposed wind farm in addition to the walkover survey completed by AGEC in 2018.

A number of walkover surveys of the site were also carried out by McCarthy Keville O'Sullivan and Hydro Environmental Services (HES) between 2013 and 2018. The peat depth data recorded by McCarthy Keville O'Sullivan & HES during these walkover surveys will also be used in the assessment of peat stability for the proposed wind farm site.

### **2.2 Peat Stability Assessment Methodology**

AGEC undertook the assessment following the principles in Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Scottish Executive, 2007). The Peat Hazard and Risk Assessment Guide (PHRAG) 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 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.

The assessment of peat stability at the proposed site included the following activities:

- (1) Site reconnaissance including shear strength and peat depth measurements
- (2) Peat stability assessment of the peat slopes on site using a deterministic and qualitative approach



- (3) Peat contour depth plan – is compiled based on the peat depth probes carried out across the site by AGECE, McCarthy Keville O’Sullivan & Hydro Environmental Services
- (4) Factor of safety plan – is compiled for the short term critical condition (undrained) for over 920 no. FoS points analysed across the site
- (5) 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
- (6) A risk register is 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

A flow diagram showing the general methodology for peat stability assessment is shown in Figure 1. The methodology illustrates the optimisation of the wind farm layout based on the findings from a site reconnaissance and subsequent feedback from the peat stability and risk assessment results.

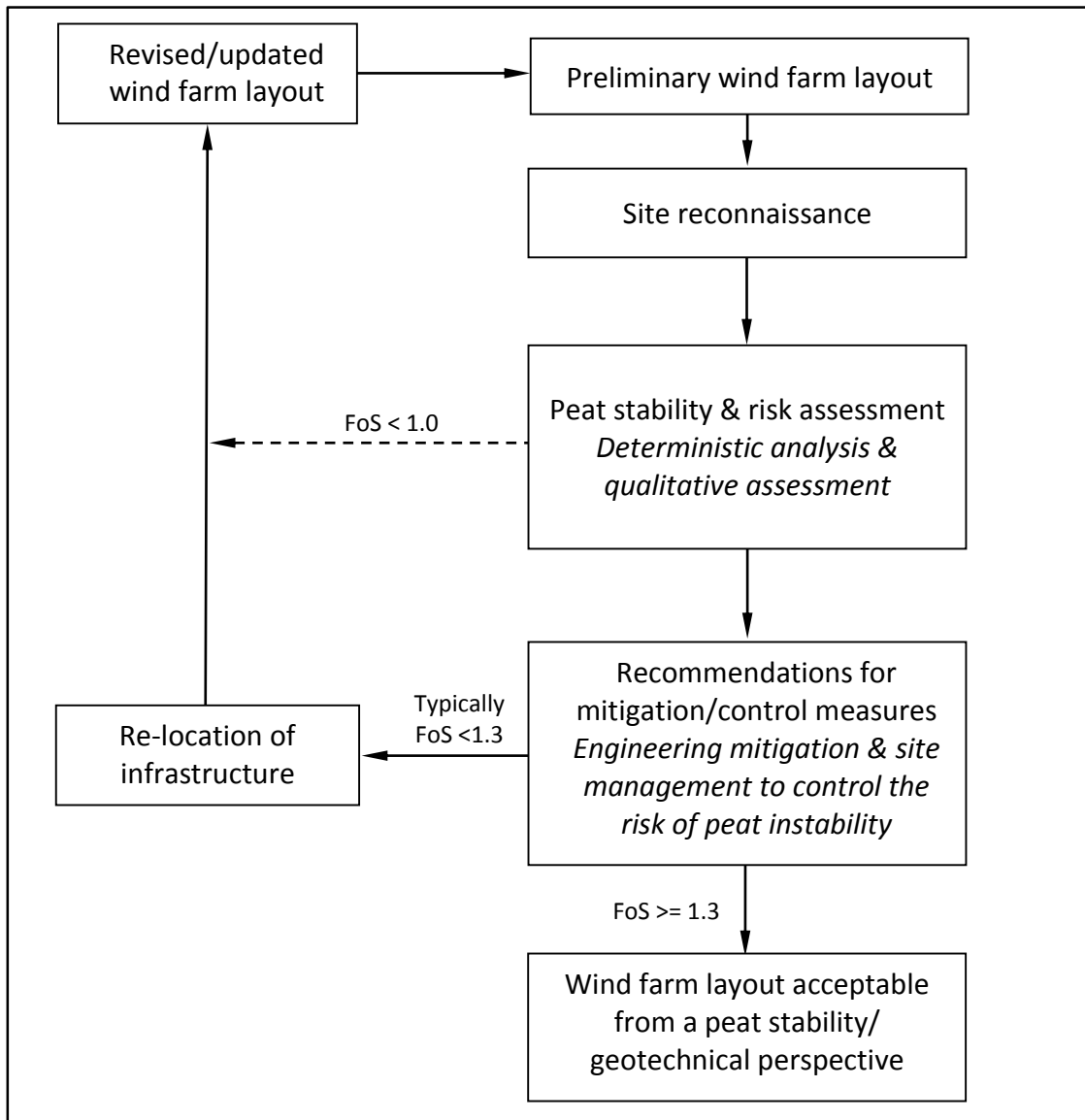


Figure 1 Flow Diagram Showing General Methodology for Peat Stability Assessment

### 2.3 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 proposed wind farm development and the surrounding environment. Peat failure excludes localised movement of peat that would occur (say) 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.

### 2.4 Main Approaches to Assessing Peat Stability

The main approaches for assessing peat stability for wind farm developments 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. AGEC apply a more objective approach, the deterministic approach (as discussed in section 2.4).

As part of AGEC'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 AGEC's experience of assessments and construction in peat land sites and peat failures throughout Ireland and the UK. This approach follows the guidelines for geotechnical risk management as given in Clayton (2001), as referenced in the best practice for Peat Hazard and Risk Assessment Guide (Scottish Executive, 2007), 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.

## 2.5 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 discriminate 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 8).

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.

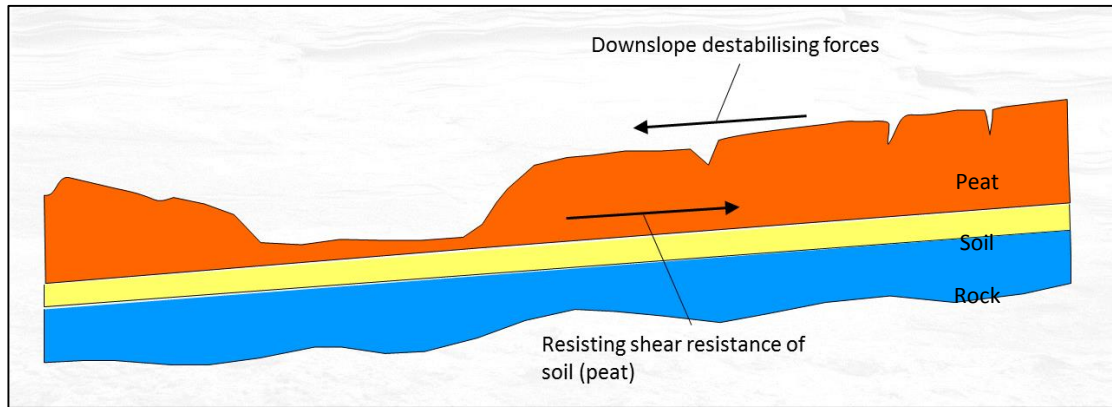


Figure 2 Peat Slope Showing Balance of Forces to Maintain Stability

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 range for factor of safety is typically from 1.3 to 1.4.

## 2.6 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 (Scottish Executive, 2007); see section 5.2.2 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 5.2.2 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 AGECE 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.

## **2.7 Assessment of Intense Rainfall and Extreme Dry Events on the Peat Slopes**

The deterministic approach carried out by AGECE 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 in particular, 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 between 0 and 100% of the peat depth is conducted, where 0% equates to the peat been completely dry and 100% equates to the peat been 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 8 of this report.

### 3 SITE DESCRIPTION

The terrain and ground conditions at the Ardderroo site are best described when separated out into a northern and southern part.

The northern part of the site (turbines T1 to T6) is located on elevated ground that is situated to the east of Knocknalee Hill and south of Buffy Lough. The southern part of the site (turbines T7 to T25) comprises low-lying undulating generally flat terrain. Most of the proposed site is covered by blanket bog that has been planted with conifer plantations. The conifer plantations are being actively managed.

The northern part of the site generally comprises a thinner peat cover with an average peat depth at turbines (T1 to T6) of 1m. The ground conditions in the northern part of the site comprise generally a thin and variable cover of blanket peat over locally glacial soil with bedrock at shallow depth. Numerous bedrock exposures are present indicating the shallow depth of bedrock. Given the thin peat cover, the peat has a relatively high strength (compared to deeper peat deposits).

The southern part of the site (turbines T7 to T25) generally comprises localised deeper peat cover than the northern part of the site as a result of the lower-lying and generally flat terrain. The ground conditions in the southern part of the site comprise generally a relatively deeper cover of blanket peat over glacial soil over granite bedrock, which at localised areas rise to the surface.

## 4 DESK STUDY AND SITE RECONNAISSANCE

### 4.1 Desk Study

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

- Geological plans
- Ordnance Survey plans
- Literature review of peat failures

The Geological Survey of Ireland (GSI, 2004) geological plans for the site were used to verify the bedrock conditions.

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

The desk study also included a review of both published literature and GSI online dataset viewer (GSI, 2006 & 2017) on peat failures/landslides in the vicinity of the site.

### 4.2 Site Reconnaissance

As part of the peat stability assessment at the proposed wind farm, numerous site reconnaissance's were carried out by AGECE between 2013 and 2018 with recording of salient geomorphological features with respect to the wind farm development and to provide peat thickness and preliminary assessment of peat strength.

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, substation, met mast, construction compounds, existing and proposed new access roads and all associated infrastructure.

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

The findings of the site reconnaissance for the wind farm site and the alternative construction access road and junction from the N59 are presented separately in sections 5.3 and 5.4 of this report.

## 5 FINDINGS OF SITE RECONNAISSANCE

### 5.1 Previous Failures

The investigation works carried out at the study area have been used in conjunction with a desk study review to assess the susceptibility of the study area to peat failure.

There are no recorded peat failures at the Ardderroo wind farm site (GSI, 2006 & GSI, 2017).

The nearest documented peat failure is located some 22km northwest of the study area. The failure recorded occurred at Joyces Country, Co. Galway in 1821, no description of the failure mechanism is given. The material and terrain type were described as peat and blanket bog respectively.

Another recorded peat failure located some 35km northwest of the site occurred in December 2006 at Letterass, Co. Mayo. The failure mechanism is described as a flow and the material and terrain type were described as peat and high hill respectively.

Based on the review carried out no other peat failures occurred within a 40km radius of the site.

The presence, or otherwise, of relict peat failures or clustering of relict failures within an area is an indicator that particular site conditions exist that pre-dispose a site to failure or not as the case may be. Hence based on the historical data reviewed above it can be concluded that site conditions in the area of the Ardderroo site have low potential for peat failure.

### 5.2 Ground Investigation

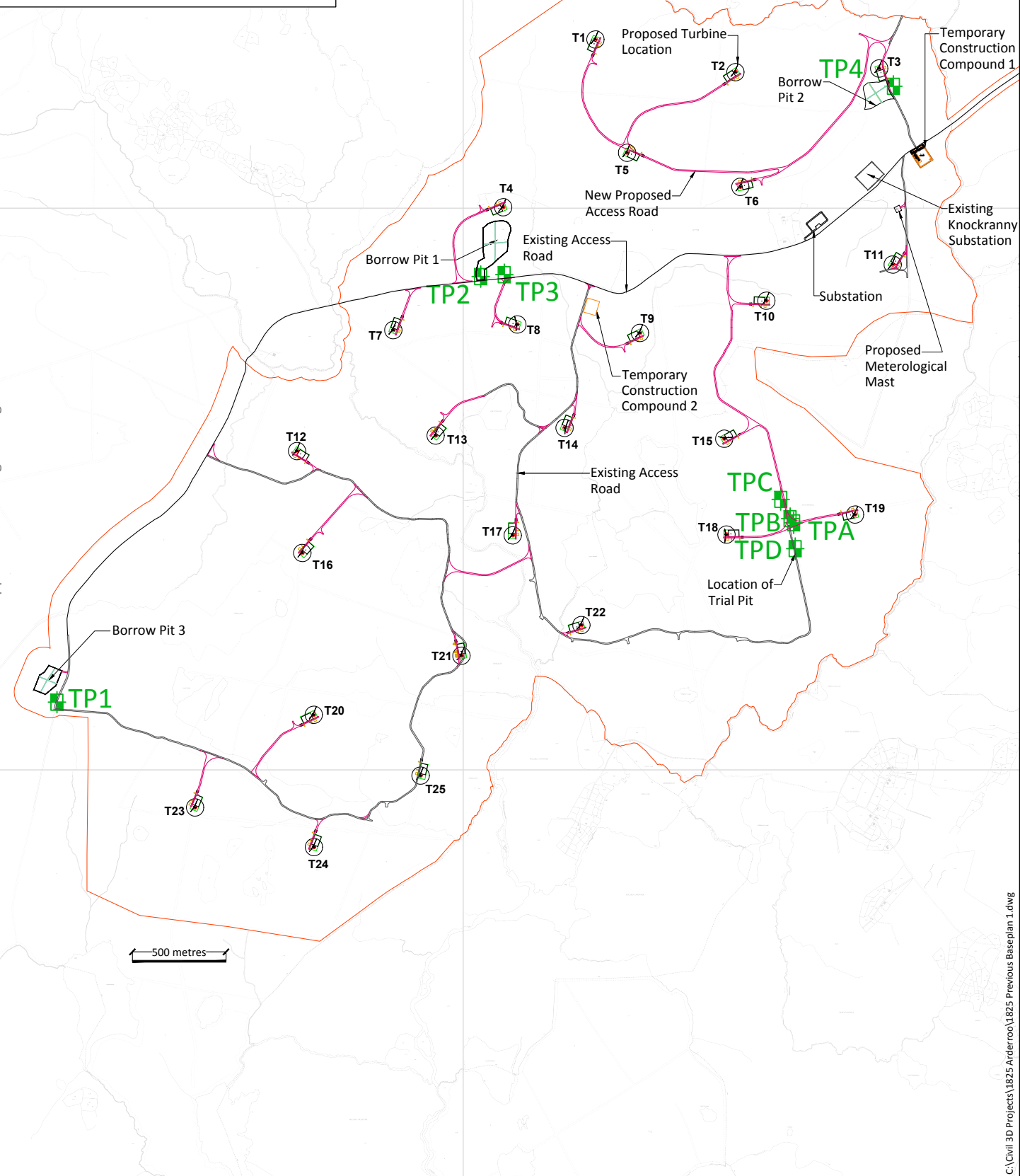
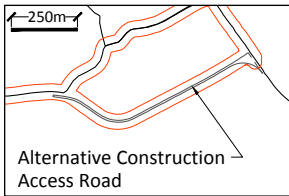
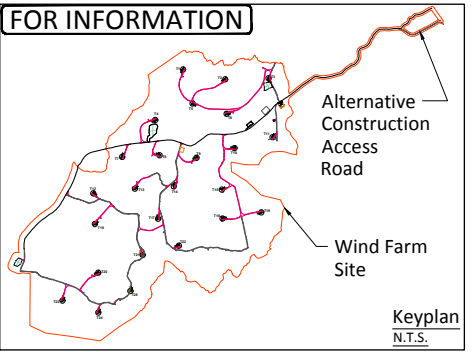
Two ground investigations were carried out at the Ardderroo site by AGECE in July 2015 and November 2016. In total 8 no. trial pits were excavated (4 no. from each investigation). 4 no. trial pits were carried out at the proposed borrow pit locations and 4 no. trial pits were carried out in the southeast of the site. The trial pits were carried out to depths of up to 3.5m below ground level (bgl). The locations of the trial pits are shown on Figure 3 and the trial pit logs and photographs are included in Appendix B of this report. The purpose of the ground investigations were to assess the ground conditions and the potential for borrow pits at various locations across the site.

Based on the trial pits carried out the ground conditions were typically categorised into the following deposits:

- Peat – Typically described as firm and spongy black & brown fibrous to amorphous peat. Peat thicknesses ranged from 0.5 to 3.4m.
- Glacial Granular Soils – Medium dense slightly silty gravelly Sand with occasional cobbles and boulders.
- Bedrock – Possible bedrock was encountered in the trial pits from depths ranging from 1.9 to 3.4m bgl. Bedrock was encountered in 7 of the 8 no. trial pits. The bedrock was described as weathered Granite.



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Figure 3 Ground Investigation Location Plan

### 5.3 Findings of Wind Farm Site Reconnaissance

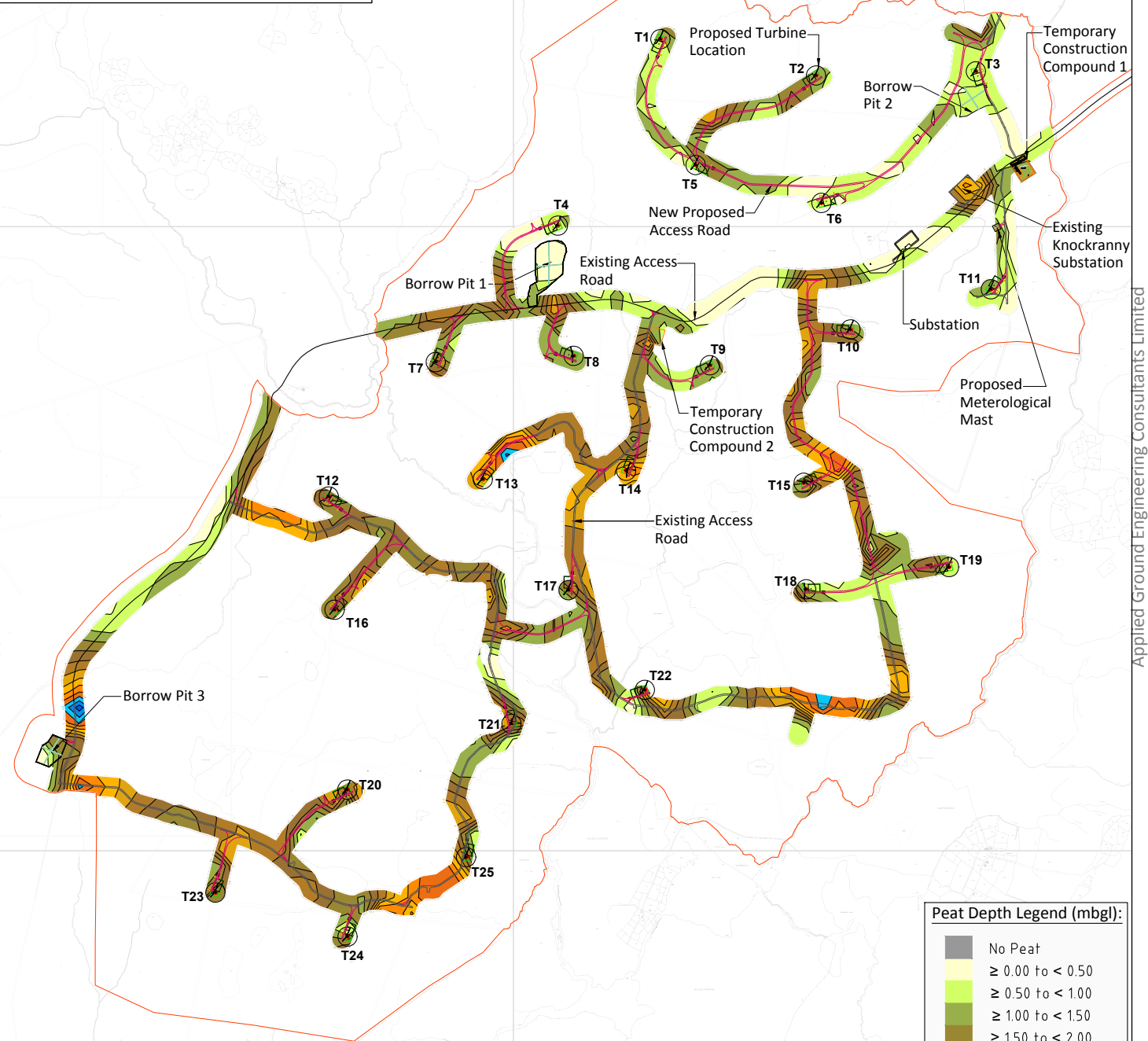
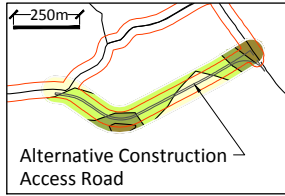
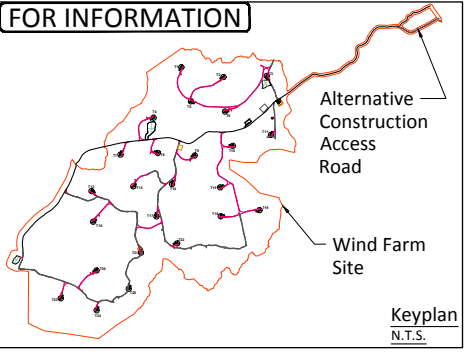
The site reconnaissance comprised numerous walkover inspections of the site between 2013 and 2018. The most recent site reconnaissance carried out by AGECEC was completed in July 2018.

The walkovers were carried out by geotechnical engineers experienced in peat failure assessment. The findings from the site reconnaissance have been used to optimise the layout of the infrastructure on site.

The main findings of the site reconnaissance's are as follows:

- (1) The northern part of the site (turbines T1 to T6) is located on elevated ground that is situated to the east of Knocknalee Hill and south of Buffy Lough. The southern part of the site (turbines T7 to T25) comprises low-lying undulating generally flat terrain. Most of the proposed site is covered by blanket bog that has been planted with conifer plantations (Appendix A – Photos 1 and 2).
- (2) Peat depths recorded during the site reconnaissance's from over 1,700 no. probes range from 0 to 7.2m with an average of 1.7m (Figure 4). 95 percent of the peat depth readings are 4m or less and all except 2 no. of the 1,700 no. probes are 6m or less. The deepest peat was recorded in the south of the site in localised depressions where the topography is typically flatter. The deepest peat deposits on site have been identified and are highlighted on the construction buffer zone plan (Figure 5).
- (3) The peat depths recorded at the turbine locations varied from 0.3 to 3.7m with an average depth of 1.7m. The turbines where relatively deep peat deposits of in excess of 2.5m are present have shallow slope angles typically ranging from 1 to 2 degrees.
- (4) The access roads for the wind farm comprise upgrading of existing access roads and construction of new proposed access roads. The existing access roads have been constructed using both excavate & replace and floated construction techniques (Photos 3 and 4). The upgrading works and construction of new proposed access roads will be carried out using both excavate and replace and floated construction techniques.
- (5) With respect to the existing access roads, peat depths are typically less than 2m in the north of the site, with localised depths of up to 3.5m. Typically peat depths varied between less than 1m and up to 4m in the south of the site with localised depths of up to 7.2m. Up to 16.8km of existing access roads are present across the site and based on anecdotal information have been in operation for a number of years.
- (6) The typical make-up of the existing floating access roads on site appears to be (locally) tree brush/trunks laid directly onto the peat surface and/or geogrid overlain by up to 500mm of coarse granular fill.
- (7) With respect to the new proposed access roads, peat depths along the proposed route are typically less than 2.5m in the north of the site and typically between less than 1m and up to 4m in the south of the site.

FOR INFORMATION



**Peat Depth Legend (mbgl):**

Grey	No Peat
Lightest Yellow	≥ 0.00 to < 0.50
Light Yellow	≥ 0.50 to < 1.00
Yellow-Green	≥ 1.00 to < 1.50
Yellow	≥ 1.50 to < 2.00
Light Orange	≥ 2.00 to < 2.50
Orange	≥ 2.50 to < 3.00
Dark Orange	≥ 3.00 to < 3.50
Red-Orange	≥ 3.50 to < 4.00
Red	≥ 4.00 to < 4.50
Dark Red	≥ 4.50 to < 5.00
Dark Red-Orange	≥ 5.00 to < 5.50
Dark Red	≥ 5.50 to < 6.00
Dark Red	≥ 6.00 to < 6.50
Dark Red	≥ 6.50 to < 7.00
Dark Red	≥ 7.00 to < 7.20

NOTE:  
1 The peat depth contour plan shown on the figure is based on peat depth probes carried out by AGECE and McCarthy Keville O'Sullivan from walkovers between 2013 and 2018.

Figure 4 Peat Depth Contour Plan

- (8) Slope angles at the turbine locations range from 0 to 10 degrees with an average of 4 degrees. These slope angle readings are based on site recordings. The elevation across the study area varies from 70 to 227mOD based on ordnance survey maps.
- (9) At localised areas across the site, steep slopes of up to 20 degrees were recorded during the site walkover particularly in the north of the site where the peat cover is generally shallower and minimal construction work is proposed in the area.
- (10) The peat situated on the raised areas particularly in the north of the site, has a notable vegetation cover, which is generally indicative of relatively well-drained peat.
- (11) Localised areas of waterlogged peat and surface water are present at numerous areas across the site, primarily in the south. This is not unexpected given the type of terrain present on site.
- (12) No evidence of mechanically cut peat or relict and active peat cuttings were noted on site.
- (13) Seven localised areas of deep weak peat were identified during the site walkover (Figure 5). Locally the peat in these areas was recorded as quaking (or buoyant) indicating highly saturated peat, which would be considered to have low strength. These areas are within flatter locations and do not represent a peat slide risk but a safety risk during construction. Consequently, these areas have an elevated construction risk and will be subject to additional mitigation/control measures (Appendix C).
- (14) Three potential borrow pits have been identified across the site. Borrow pits will be used to provide suitable material to construct foundations, hardstandings and for access roads. A ground investigation in the form of trial pits was carried out at each of the borrow pits to confirm bedrock level (see section 5.2 of this report). Following removal of the soil/rock from a borrow pit, it is proposed to reinstate the borrow pit by placing excavated peat & spoil within cells inside the borrow pit. By placing the excavated peat & spoil within the confines of the borrow pit this prevents inadvertent placement of peat arising's on the site, which can result in potential peat instability.
- (15) In addition to the reinstatement of peat and spoil within the borrow pits, it is proposed to place excavated arising's at designated spoil areas alongside the access roads in the south of the site where the topography is typically flat. Given the relatively flat topography present at the southern part of the site, the placement of peat & spoil alongside the access roads is deemed appropriate. Further information on the reinstatement of the borrow pits with excavated peat and spoil is given in the Peat & Spoil Management Plan for site (AGEC 2018).
- (16) No evidence of past failures or any significant signs of peat instability were noted on site.
- (17) The conclusions from the site reconnaissance are as follows:
  - (a) The peat depths recorded at the turbine locations varied from 0.3 to 3.7m with an average depth of 1.7m. The turbines where relatively deep peat deposits of

in excess of 2.5m are present have shallow slope angles typically ranging from 1 to 2 degrees and hence are considered to have a low risk of peat instability.

- (b) Mitigation/control measures for each infrastructure location are given in the risk register (Appendix C).
- (c) A construction buffer zone plan has been produced for the site (Figure 5). This Figure shows areas which have an elevated or higher construction risk due to the terrain and features encountered during the site reconnaissance. Additional mitigation/control measures will be implemented in these areas, as required (see Appendix C).

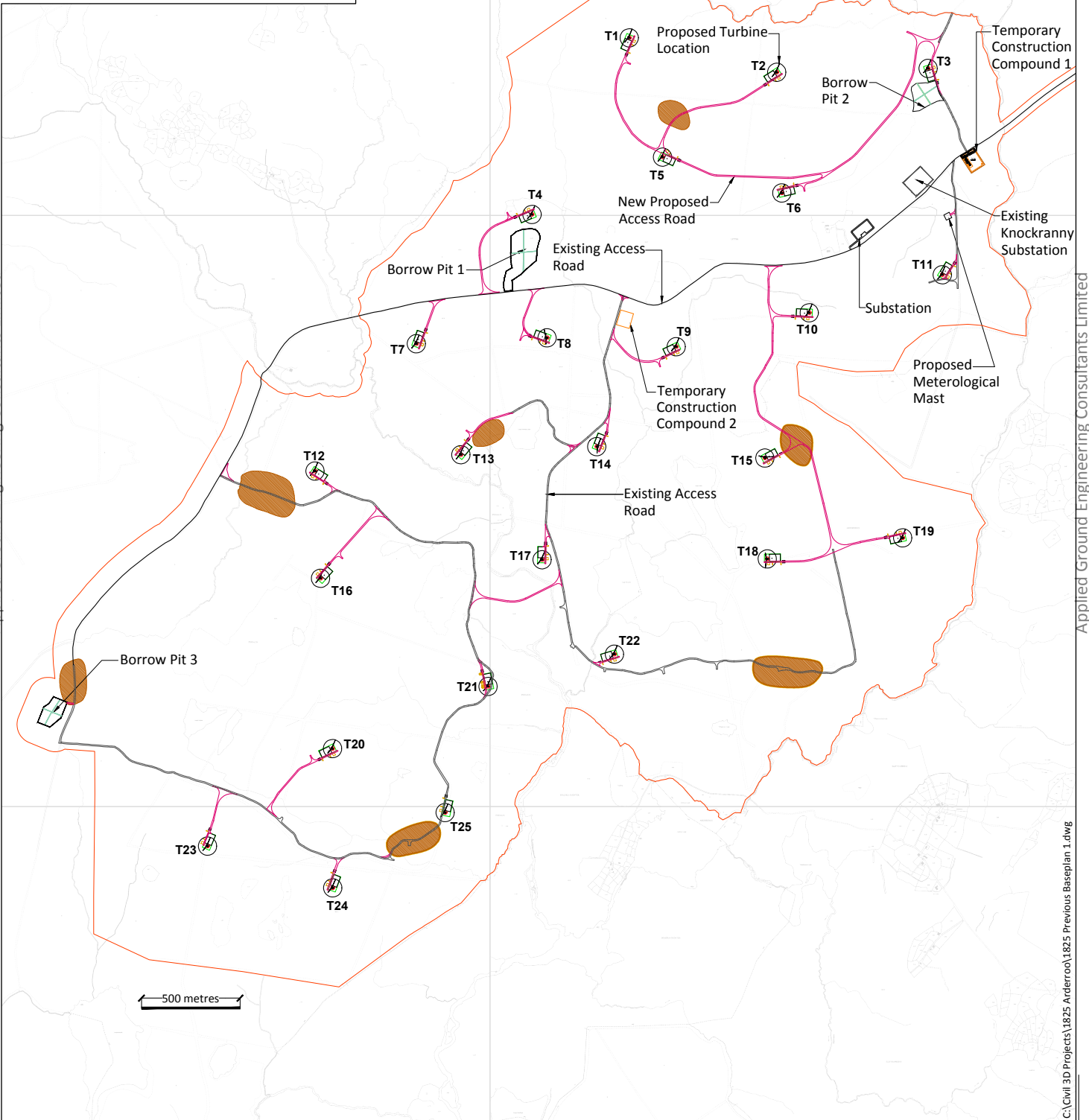
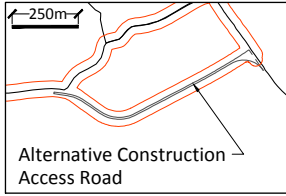
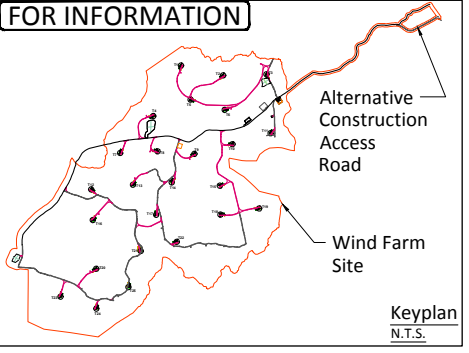
#### **5.4 Findings of Alternative Construction Access Road Site Reconnaissance**

A site reconnaissance of an alternative construction access road was carried out in July 2018. The alternative construction access road involves the construction of an 830m length of access road for the wind farm off the N59 Oughterard to Moycullen national road. The alternative access will serve all construction and turbine delivery traffic during the construction stage of the project. A design of the alternative construction access road was undertaken by Tobin Consulting Engineers (2018) for the planning application.

The main findings of the site reconnaissance are as follows:

- (1) The proposed alternative construction access road is located in a shallow blanket peat area on undulating terrain which is currently used as a pasture area (Appendix A – Photos 8 & 9).
- (2) Peat depths recorded during the site reconnaissance vary from 0 to 1.9m with an average of 0.7m (Figure 4).
- (3) Localised areas of waterlogged peat and surface water are present at a few localised areas along the proposed alternative access route. This is not unexpected given the type of terrain present on site.
- (4) Slope angles along the proposed alternative access route typically range from 1 to 12 degrees with an average of 4 degrees. Localised steeper slopes are present. The slope angle readings are based on site recordings. The elevation across the study area varies from 30 to 60mOD based on ordnance survey maps.
- (5) The peat across the study area has a vegetation cover which is indicative of well drained peat. The land is currently used as a pasture area.
- (6) Numerous rock outcrops were noted along the proposed alternative access route (Photo 10). Ground conditions along the route are typically blanket peat overlying rock or till material.
- (7) The alternative construction access road will be constructed using an excavate & replace construction technique which is deemed suitable for the ground conditions and terrain.

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**NOTES:**  
 1. It should be noted that the areas highlighted on this drawing are indicative only.

**Construction Buffer Zone Legend:**  
 Areas which have an elevated or higher construction risk (areas with deep weak peat). Areas where additional control/mitigation measures are required

Figure 5 Construction Buffer Zone Plan

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## 6 SITE GROUND CONDITIONS

### 6.1 Soils & Subsoils

Peat depths recorded during the site walkovers from over 1,700 no. probes range from 0 to 7.2m with an average of 1.7m. 95 percent of the peat depth readings are 4m or less and all except 2 no. of the 1,700 no. probes are 6m or less.

Based on the site walkover and ground investigation at the site the superficial deposits were typically described as firm brown/black fibrous Peat (in the shallow peat areas) and spongy and plastic black amorphous Peat (in the deeper peat areas), overlying firm and stiff light brown/grey slightly gravelly sandy Clay with cobbles and boulders or silty gravelly Sand overlying weathered bedrock (Photos 6 & 7).

A review of the GSI subsoils maps indicate that the site is underlain by blanket peat, with occasional outcrops of rock at surface.

### 6.2 Bedrock

The underlying bedrock was described by the Geological Survey of Ireland (GSI, 2004) and shown on Sheet 14 (Geology of Galway Bay). In the area of the Ardderroo site, Sheet 14 shows one dominant bedrock formation and numerous localised bedrock formations particularly in the north of the site.

The dominant bedrock type is from the Galway Granite Batholith formation and is megacrystic-porphyritic Granite.

The other bedrock formations are located in localised areas across the site particularly in the north of the site where the geology is quite complex. The localised bedrock types/formations at the Ardderroo site include:

- Shannapheasteen Granite
- Marginal Porphyritic Granite
- Granodiorite
- Metagabbro and related lithologies
- Granite Gneiss
- Quartz diorite gneiss
- Cashel Schist formation
- Paragneiss Migmatite and hornfels
- Zone rich in country rock xenoliths

A number of mapped faults are shown across the site. The fault lines typically have northeast to southwest and northwest to southeast trends.

Numerous rock outcrops were recorded particularly in the north of the site.

No karst features were identified on the site following a review of the GSI database or during the site walkover. From the GSI database, a number of karst features were noted in the general area of the site, the closest been a swallow hole which is located approximately 7km east of the site.

## 7 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. Peat depth probes were carried out at/near to proposed turbine locations and access roads. At turbine locations up to 5 probes were carried out around the turbine location, and an average peat depth was calculated.

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

Peat depths recorded during the site walkovers from over 1,700 no. probes carried out by AGEC and McCarthy Keville O'Sullivan between 2013 and 2018 range from 0 to 7.2m with an average of 1.7m. The peat depth probes carried out on site have been utilised to produce a peat depth contour plan for the site (Figure 4).

A summary of the peat depths at the proposed infrastructure locations is given in Table 1. The data presented in Table 1 is used in the peat stability assessment of the site; see Section 7 of this report.

**Table 1 Peat Depth & Slope Angle at Proposed Infrastructure Locations**

<b>Turbine</b>	<b>Easting</b>	<b>Northing</b>	<b>Peat Depth Range (m) <sup>(1)</sup></b>	<b>Average Peat Depth (m)</b>	<b>Slope Angle (°) <sup>(2)</sup></b>
<b>T1</b>	112712	235902	0.3 to 0.9	0.7	2 to 3
<b>T2</b>	113460	235727	1.0 to 1.3	1.2	2 to 3
<b>T3</b>	114228	235747	0.1 to 0.9	0.3	8 to 10
<b>T4</b>	112219	235006	0.6 to 1.5	0.9	5 to 6
<b>T5</b>	112881	235297	0.5 to 0.7	0.5	3 to 4
<b>T6</b>	113486	235115	0.3 to 0.9	0.6	1 to 2
<b>T7</b>	111632	234350	0.5 to 2.0	1.0	1 to 2
<b>T8</b>	112295	234380	0.7 to 1.6	1.2	3 to 4
<b>T9</b>	112950	234335	0.9 to 1.1	0.95	1 to 2
<b>T10</b>	113625	234507	1 to 1.5	1.25	1 to 2
<b>T11</b>	114300	234700	0.7 to 1.1	0.8	1 to 2
<b>T12</b>	111118	233704	0.7 to 1.2	0.8	3 to 4
<b>T13</b>	111858	233787	3.5 to 3.7	3.6	1 to 2
<b>T14</b>	112547	233828	1 to 3.5	2.25	1 to 2
<b>T15</b>	113400	233770	0.8 to 1.2	1.0	1 to 2



<b>Turbine</b>	<b>Easting</b>	<b>Northing</b>	<b>Peat Depth Range (m) <sup>(1)</sup></b>	<b>Average Peat Depth (m)</b>	<b>Slope Angle (°) <sup>(2)</sup></b>
<b>T16</b>	111146	233160	1.2 to 1.6	1.4	1
<b>T17</b>	112270	233254	0.4 to 1.7	1.0	1 to 2
<b>T18</b>	113412	233258	0.2 to 1.6	0.85	6 to 7
<b>T19</b>	114099	233365	0.5 to 0.8	0.6	4 to 5
<b>T20</b>	111206	232296	0.8 to 3.4	2.2	1 to 2
<b>T21</b>	111996	232611	0.5 to 1.7	1.1	1 to 2
<b>T22</b>	112637	232775	1.0 to 2.8	1.8	1 to 2
<b>T23</b>	110573	231801	0.5 to 1.2	0.9	1 to 2
<b>T24</b>	111208	231589	0.8 to 1.3	1.0	2 to 3
<b>T25</b>	111778	231971	1.0 to 2.1	1.4	3 to 4
<b>Substation</b>	113896	234938	0 to 0.5	0.25	8
<b>Temp Const. Compound 1</b>	114456	235280	0.3 to 2.4	1.2	3
<b>Temp Const. Compound 2</b>	112688	234471	0 to 2.0	0.85	5
<b>Met Mast</b>	114327	234996	0.6 to 2.5	1.7	1
<b>Alt. Const. Access Road</b>	-	-	0 to 1.9	0.7	Varies

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

Note (2) Slope angle obtained during site survey by AGECE using handheld equipment or from slope contour survey data. The slope angle quoted reflects the slope immediately around the infrastructure location.

Note (3) The data presented in the Table above is used in the peat stability assessment of the site; see Section 8 of this report.

Note (4) A number of turbine locations listed above were micro-sited following AGECE's site walkover. Peat depths at the micro-sited turbine locations are typically based on additional probe data carried out by McCarthy Keville O'Sullivan.

In addition to probing, in-situ shear vane testing was carried out as part of the ground investigation. Strength testing was carried out at representative locations, in particular at the main infrastructure locations, across the site to provide representative coverage of indicative peat strengths. The results of the vane testing are presented in Figure 6.

The hand vane results indicate undrained shear strengths in the range 5 to 52kPa, with an average value of about 16kPa. The lower bound strengths recorded are typical of deep weak saturated peat and were recorded in the deeper peat deposits in the flatter areas in the south of the 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 essentially back-analysis, though some testing was carried out, was estimated at 2.5kPa.

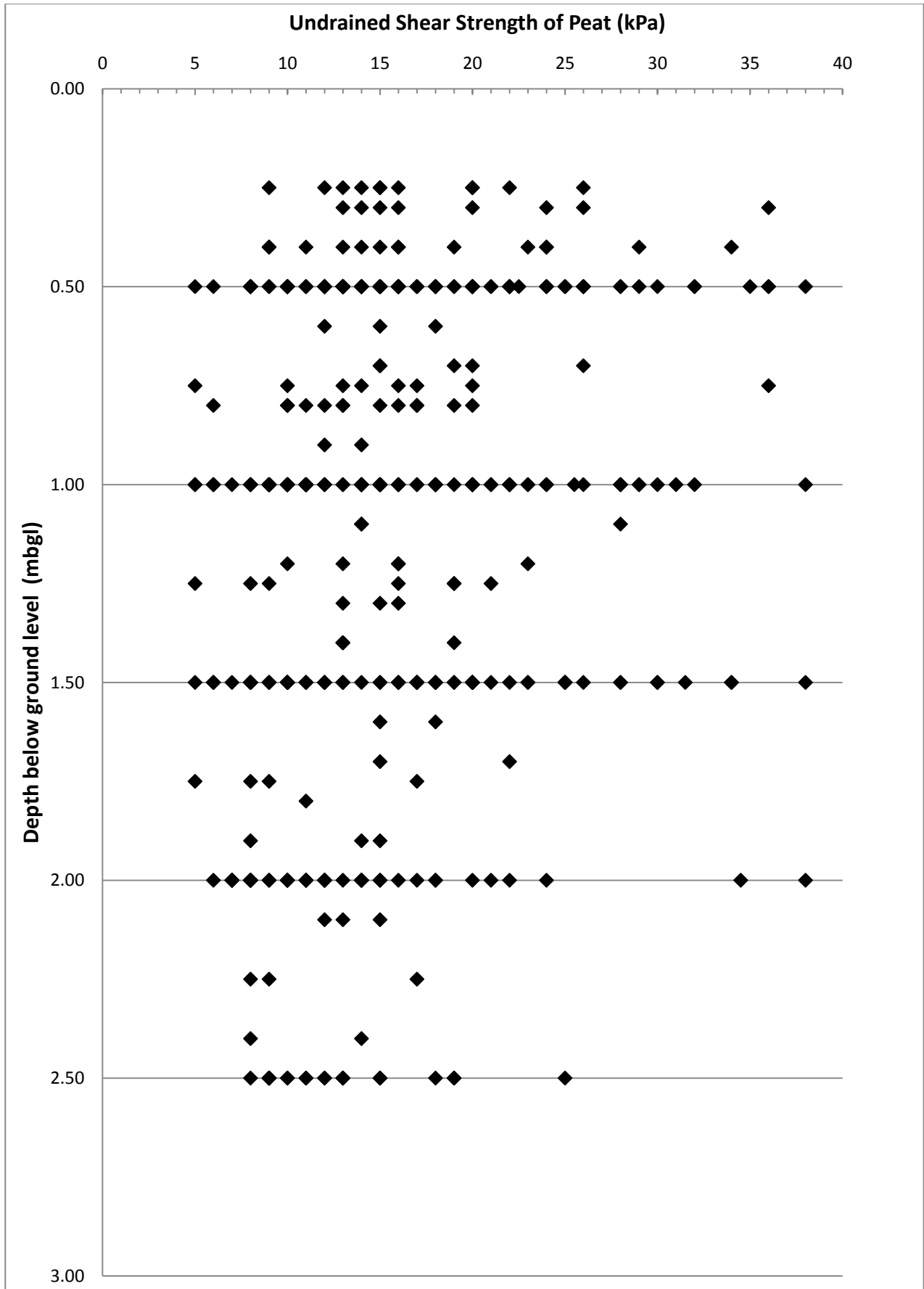


Figure 6 Undrained Shear Strength ( $C_u$ ) Profile for Peat with Depth

## 8 PEAT STABILITY ASSESSMENT

The peat stability assessment analyses the stability of the natural peat slopes for individual parcels across the site including at the turbine locations, along the proposed access roads and along the alternative construction access road (off the N59). 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.

### 8.1 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 in particular, 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 Derrybrien failure, undrained loading during construction was found to be the critical failure mechanism.

A drained analysis requires effective cohesion ( $c'$ ) and effective friction angle ( $\phi'$ ) 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 2 shows a summary of the published information on peat together with drained strength values.

**Table 2 List of Effective Cohesion and Friction Angle Values**

Reference	Cohesion, $c'$ (kPa)	Friction Angle, $\phi'$ (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

From Table 2 the values for  $c'$  ranged from 1.1 to 8.74kPa and  $\phi'$  ranged from 21.6 to 43°. The average  $c'$  and  $\phi'$  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:

$$c' = 4\text{kPa}$$

$$\phi' = 25\text{ degrees}$$

## 8.2 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 acceptable safe range for FoS typically ranges from 1.3 to 1.4. 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 greater than 1.3.

As a general guide the FoS limits for peat slopes in this report are summarised in table 3.

**Table 3 Factor of Safety Limits for Slopes**

Factor of Safety (FoS)	Degree of Stability
Less than 1.0	Unstable (red)
Between 1.0 and 1.3	Marginally stable (yellow)
1.3 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 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 generally 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

- $\gamma$  = Bulk unit weight of material  
 $z$  = Depth to failure plane assumed as depth of peat  
 $\alpha$  = 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  
 $\gamma$  = Bulk unit weight of material  
 $z$  = Depth to failure plane assumed as depth of peat  
 $\gamma_w$  = Unit weight of water  
 $h_w$  = Height of water table above failure plane  
 $\alpha$  = Slope angle  
 $\phi'$  = 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 been 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 survey.
- (2) A lower bound undrained shear strength,  $c_u$  for the peat 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 generally has a higher undrained strength.
- (3) Slope angle on base of sliding assumed to be parallel to ground surface.

For the stability analysis two load conditions were examined, namely

Condition (1): no surcharge loading

Condition (2): surcharge of 10 kPa, equivalent to 1 m of stockpiled peat assumed as a worst case.

## 8.3 Results of Analysis

### 8.3.1 Undrained Analysis for the peat

The results of the undrained analysis for the natural peat slopes are presented in Appendix D and the results of the undrained analysis for the most critical load case (load condition 2) are shown on Figure 7. 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 results from the main infrastructure locations are summarised in Table 4.

The calculated FoS for load condition (1) is in excess of 1.30 for each of the 929 no. locations analysed with a range of FoS of 1.57 to in excess of 10, indicating a low risk of peat instability.

The calculated FoS for load condition (2) for the 929 no. locations analysed, only 2 no. FoS points were less than 1.3 where FoS's of 1.26 and 1.28 were calculated. In relation to the marginally low FoS's one of the points is located alongside an existing floating access road which has been in operation for a number of years in the southwest of the site. The marginally low FoS at this location corresponds to an area of deeper peat which is located in a topographical depression and would not be at risk from a peat slide. The other marginally low FoS location also corresponds to an area of deeper peat which is located in topographical depression in the north of the site. The risk within the deeper peat areas relates to a safety risk during construction.

Consequently these areas have an elevated construction risk and are highlighted on the construction buffer zone plan (Figure 5) and will be subject to additional mitigation/control measures (see Appendix C). The remainder of the locations analysed had acceptable FoS's of greater than 1.3, indicating a low risk of peat instability.

**Table 4 Factor of Safety Results (undrained condition)**

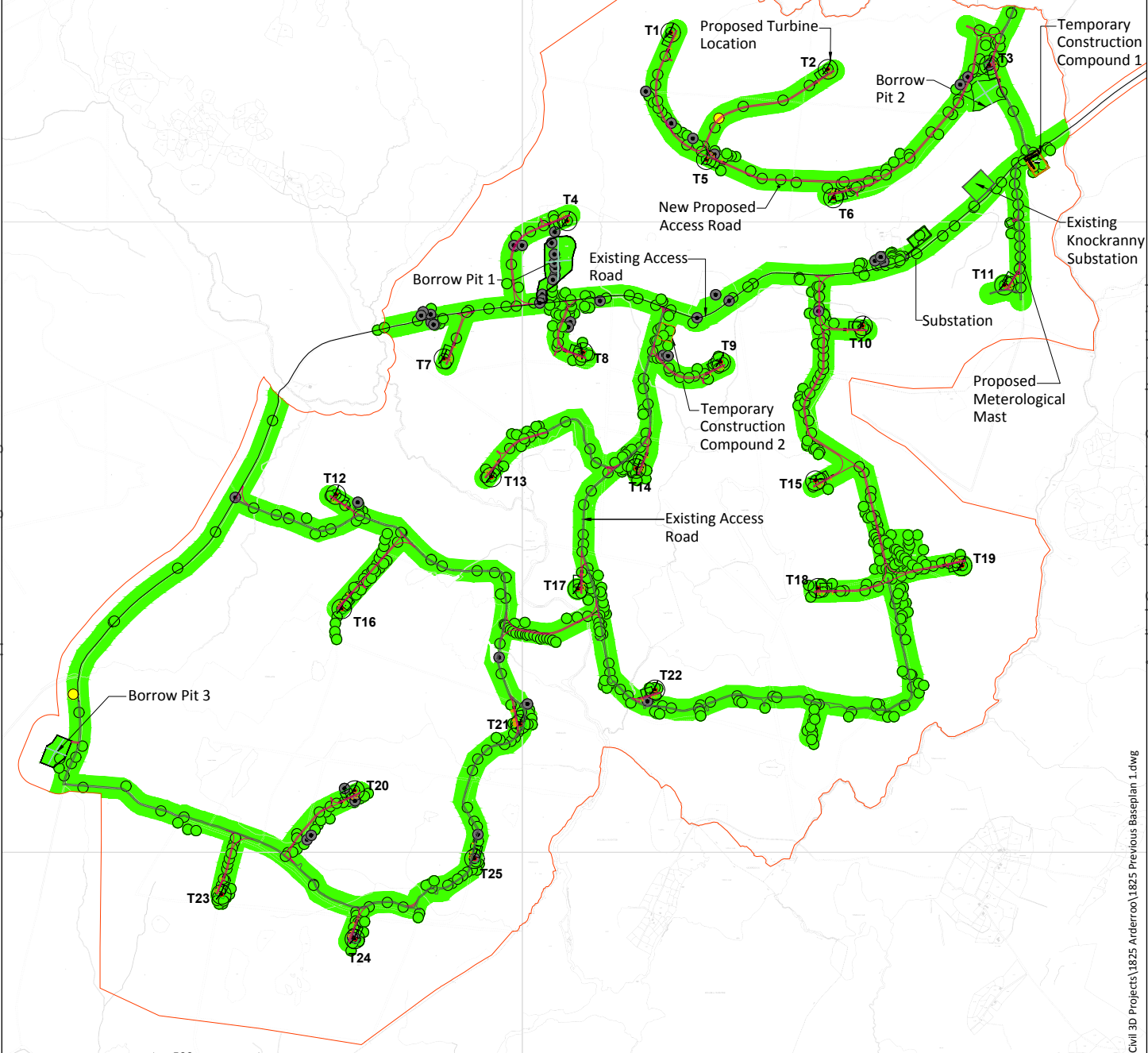
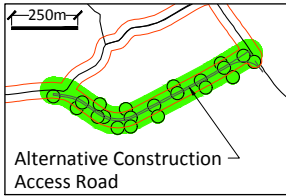
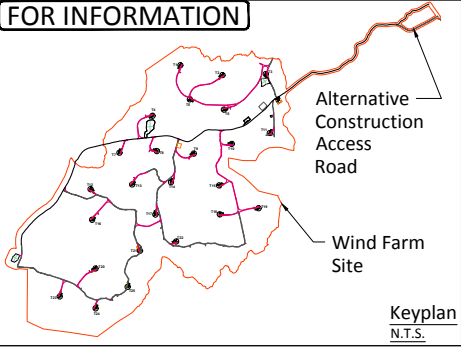
Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition	
			Condition (1)	Condition (2)
T1	112712	235902	12.76	6.04
T2	113460	235727	8.83	4.99
T3	114228	235747	3.90	1.85
T4	112219	235006	3.85	2.31
T5	112881	235297	12.32	5.07
T6	113486	235115	19.11	9.05
T7	111632	234350	8.60	5.73
T8	112295	234380	12.32	5.07
T9	112950	234335	19.11	9.05
T10	113625	234507	11.47	6.88
T11	114300	234700	15.64	8.19
T12	111118	233704	7.19	3.92
T13	111858	233787	4.65	3.66
T14	112547	233828	4.92	3.82
T15	113400	233770	14.34	7.82
T16	111146	233160	21.49	13.22



Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition	
			Condition (1)	Condition (2)
T17	112270	233254	<b>10.12</b>	<b>6.37</b>
T18	113412	233258	<b>3.10</b>	<b>1.91</b>
T19	114099	233365	<b>8.64</b>	<b>3.84</b>
T20	111206	232296	<b>5.06</b>	<b>3.91</b>
T21	111996	232611	<b>10.12</b>	<b>6.37</b>
T22	112637	232775	<b>6.14</b>	<b>4.53</b>
T23	110573	231801	<b>14.34</b>	<b>7.82</b>
T24	111208	231589	<b>8.83</b>	<b>4.99</b>
T25	111778	231971	<b>4.11</b>	<b>2.78</b>
Substation	113896	234938	<b>8.71</b>	<b>2.90</b>
Temp. Const. Compound 1	114456	235280	<b>7.65</b>	<b>4.59</b>
Temp. Const. Compound 2	112688	234471	<b>3.46</b>	<b>2.30</b>
Met Mast	114327	234996	<b>13.75</b>	<b>9.82</b>
Alt. Const. Access Road <sup>(1)</sup>	-	-	<b>5.01 to 81.86</b>	<b>2.41 to 33.71</b>

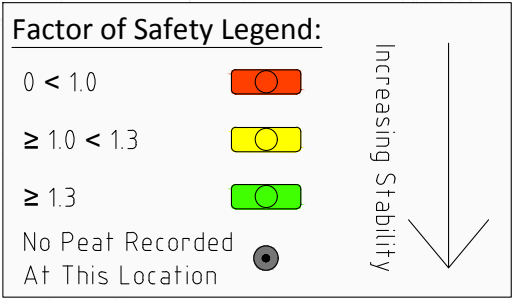
Note (1) A range of FoS is given for the alternative construction access road as the road is 830m in length.

**FOR INFORMATION**



**NOTE:**

- The results of the undrained analysis for the most critical load condition 2 are shown on this figure.
- The FoS contours shown on this drawing are based and have been extrapolated from the FOS dots shown. The FoS dots have been calculated based on data recorded on site and topographical survey data from site.



**Figure 7 Factor of Safety Plan - Short Term Critical Condition (Undrained)**

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### 8.3.2 Drained Analysis for the peat

The results of the drained analysis for the peat are presented in Appendix D. The results from the main infrastructure locations are summarised in Table 5. As stated previously, the drained loading condition examines the effect of in particular, rainfall on the existing stability of the natural peat slopes.

The calculated FoS for load condition (1) for the 929 no. locations analysed, only 5 no. FoS points were less than 1.3 where FoS's of between 1.05 and 1.10 were calculated. In relation to the marginally low FoS's four of the points are located alongside existing floating access roads which has been in operation for a number of years in the south of the site. The marginally low FoS's at these locations correspond to areas of deeper peat which are located in topographical depressions and would not be at risk from a peat slide. The other marginally low FoS location also corresponds to an area of deeper peat which is located in topographical depression in the north of the site. The risk within the deeper peat areas relate to a safety risk during construction, which can be mitigated on site using cautious design and construction practices, and not a risk of a peat slide.

Consequently these areas have an elevated construction risk and are highlighted on the construction buffer zone plan (Figure 5) and will be subject to additional mitigation/control measures (see Appendix C). The remainder of the locations analysed had acceptable FoS's of greater than 1.3, indicating a low risk of peat instability.

The calculated FoS for load condition (2) is in excess of 1.30 for each of the 929 no. locations analysed with a range of FoS of 1.81 to in excess of 10, indicating a low risk of peat instability.

**Table 5 Factor of Safety Results (drained condition)**

Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition	
			Condition (1)	Condition (2)
T1	112712	235902	8.50	8.71
T2	113460	235727	5.89	7.20
T3	114228	235747	2.60	2.62
T4	112219	235006	2.57	3.31
T5	112881	235297	8.21	7.30
T6	113486	235115	12.74	13.39
T7	111632	234350	5.73	8.27
T8	112295	234380	8.21	7.30
T9	112950	234335	12.74	13.06
T10	113625	234507	7.65	10.42
T11	114300	234700	10.43	12.71
T12	111118	233704	4.79	5.64
T13	111858	233787	3.10	5.28
T14	112547	233828	3.28	5.52
T15	113400	233770	9.56	11.28
T16	111146	233160	14.33	19.09
T17	112270	233254	6.75	9.19
T18	113412	233258	2.07	2.73
T19	114099	233365	5.76	5.52
T20	111206	232296	3.37	5.64
T21	111996	232611	6.75	9.19

Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition	
			Condition (1)	Condition (2)
T22	112637	232775	<b>4.10</b>	<b>6.53</b>
T23	110573	231801	<b>9.56</b>	<b>11.28</b>
T24	111208	231589	<b>5.89</b>	<b>7.20</b>
T25	111778	231971	<b>2.74</b>	<b>4.01</b>
Substation	113896	234938	<b>5.80</b>	<b>4.15</b>
Temp. Const. Compound 1	114456	235280	<b>5.10</b>	<b>6.62</b>
Temp. Const. Compound 2	112688	234471	<b>2.30</b>	<b>3.31</b>
Met Mast	114327	234996	<b>9.17</b>	<b>14.18</b>
Alt. Const. Access Road <sup>(1)</sup>	-	-	<b>3.34 to 54.57</b>	<b>3.42 to 48.66</b>

Note (1) A range of FoS is given for the alternative construction access road as the road is 830m in length.

## 9 RISK ASSESSMENT

A risk assessment was carried out for the main infrastructure elements at the proposed wind farm development. This approach follows the guidelines for geotechnical risk management as given in Clayton (2001), as referenced in PHRAG, and takes into account the approach of 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 infrastructure element, a risk rating (product of probability and impact) is calculated and rated as shown in Table 6. Where an infrastructure element is rated 'Substantial' or 'Unacceptable', control measures are required to reduce the risk to at least a 'Tolerable' risk rating. Where an infrastructure element is rated 'Trivial' or 'Tolerable', only routine control measures are required.

**Table 6 Risk Rating Legend**

10 to 20	Unacceptable: re-location or significant control measures required
5 to 9	Substantial: notable control measures required
3 to 4	Tolerable: only routine control measures required
1 to 2	Trivial: none or only routine control measures required

A full methodology for the risk assessment is given in Appendix E.

### 9.1 Summary of Risk Assessment Results

The results of the risk assessment for potential peat failure at the main infrastructure elements is presented as a Geotechnical Risk Register in Appendix C and summarised in Table 7.

The risk rating for each infrastructure element at the Ardderroo wind farm is designated trivial and tolerable following some mitigation/control measures being implemented. Sections of access roads to the nearest infrastructure element should be subject to the same mitigation/control measures that apply to the nearest infrastructure element.

Details of the required mitigation/control measures can be found in the Geotechnical Risk Register for each infrastructure element (Appendix C).

**Table 7 Summary of Geotechnical Risk Register**

<b>Infrastructure</b>	<b>Pre-Control Measure Implementation Risk Rating</b>	<b>Pre-Control Measure Implementation Risk Rating Category</b>	<b>Notable Control Measures Required</b>	<b>Post-Control Measure Implementation Risk Rating</b>	<b>Post-Control Measure Implementation Risk Rating Category</b>
Turbine T1	Trivial	1 to 2	No	Trivial	1 to 2
Turbine T2	Trivial	1 to 2	No	Trivial	1 to 2
Turbine T3	Tolerable	3 to 4	No	Trivial	1 to 2
Turbine T4	Trivial	1 to 2	No	Trivial	1 to 2
Turbine T5	Trivial	1 to 2	No	Trivial	1 to 2
Turbine T6	Trivial	1 to 2	No	Trivial	1 to 2
Turbine T7	Tolerable	3 to 4	No	Trivial	1 to 2
Turbine T8	Trivial	1 to 2	No	Trivial	1 to 2
Turbine T9	Substantial	5 to 9	Yes	Tolerable	3 to 4
Turbine T10	Substantial	5 to 9	Yes	Tolerable	3 to 4
Turbine T11	Trivial	1 to 2	No	Trivial	1 to 2
Turbine T12	Trivial	1 to 2	No	Trivial	1 to 2
Turbine T13	Substantial	5 to 9	Yes	Trivial	1 to 2
Turbine T14	Tolerable	3 to 4	Yes	Trivial	1 to 2
Turbine T15	Trivial	1 to 2	No	Trivial	1 to 2
Turbine T16	Tolerable	3 to 4	No	Trivial	1 to 2
Turbine T17	Substantial	5 to 9	Yes	Tolerable	3 to 4
Turbine T18	Tolerable	3 to 4	No	Tolerable	3 to 4
Turbine T19	Trivial	1 to 2	No	Trivial	1 to 2
Turbine T20	Tolerable	3 to 4	Yes	Trivial	1 to 2
Turbine T21	Trivial	1 to 2	No	Trivial	1 to 2
Turbine T22	Substantial	5 to 9	Yes	Trivial	1 to 2
Turbine T23	Trivial	1 to 2	No	Trivial	1 to 2
Turbine T24	Trivial	1 to 2	No	Trivial	1 to 2
Turbine T25	Trivial	1 to 2	No	Trivial	1 to 2
Met Mast	Substantial	5 to 9	Yes	Tolerable	3 to 4
Substation	Trivial	1 to 2	No	Trivial	1 to 2
Temporary Construction Compound 1	Tolerable	3 to 4	No	Trivial	1 to 2
Temporary Construction Compound 2	Tolerable	3 to 4	No	Tolerable	3 to 4

## 10 SUMMARY AND RECOMMENDATIONS

### 10.1 Summary

The following summary is given.

AGEC was engaged by McCarthy Keville O'Sullivan to undertake an assessment of the proposed wind farm site with respect to peat stability.

The findings of the peat assessment, which involved analysis of over 920 locations, showed that the site has an acceptable margin of safety and is suitable for the proposed wind farm development. The findings include recommendations and control measures for construction work in peat lands to ensure that all works adhere to an acceptable standard of safety.

The northern part of the site (turbines T1 to T6) is located on elevated ground that is situated to the east of Knocknalee Hill and south of Buffy Lough. The southern part of the site (turbines T7 to T25) comprises low-lying undulating generally flat terrain. Most of the proposed site is covered by blanket bog that has been planted with conifer plantations.

Peat depths recorded during the site walkovers from over 1,700 no. probes carried out by AGEC and McCarthy Keville O'Sullivan between 2013 and 2018 range from 0 to 7.2m with an average of 1.7m. 95 percent of the peat depth readings are 4m or less and all except 2 no. of the 1,700 no. probes are 6m or less. The deepest peat was recorded in the south of the site in localised depressions where the topography is typically flatter and where some 16.8km of existing access roads are in place. Based on anecdotal information some of the existing access roads have been in operation for over 50 years. In addition, at the location of the deeper peat deposits on site either existing or proposed floating access roads will be constructed hence no excavation works will take place within the deeper peat deposits.

An analysis of peat sliding was carried out at the main infrastructure locations across site 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 929 no. locations analysed, shows that at 927 no. locations an acceptable FoS of greater than 1.3 was calculated, indicating a low risk of peat instability.

At 2 no. localised locations the undrained analysis showed a FoS of less than 1.3. These 2 no. locations correspond to areas of deeper peat within topographical depressions, and as such would not be at risk from a peat slide. The undrained analysis is considered the most critical condition for the peat slopes.

A drained analysis was carried out, which examines 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) and (2) for the 929 no. locations analysed, shows that at 924 no. locations an acceptable FoS of greater than 1.3 was calculated, indicating a low risk of peat instability.

At 5 no. localised locations the drained analysis showed a FoS of less than 1.3. These 5 no. locations correspond to areas of deeper peat within topographical depressions, and as such would not be at risk from a peat slide. The risk within the deeper peat areas relates to a safety risk during construction which can be mitigated using cautious design and construction practices. All areas with low FoS's are highlighted on the construction buffer zone plan and will be subject to additional mitigation/control measures (see Appendix C).

The risk assessment at each infrastructure location identified a number of mitigation/control measures to reduce the potential risk of peat failure. Sections of access roads to the nearest infrastructure element should be subject to the same mitigation/control measures that apply to the nearest infrastructure element. See Appendix C for details of the required mitigation/control measures for each infrastructure element.

In summary the findings of the peat assessment, which involved analysis of over 920 locations, showed that the proposed Ardderroo wind farm site has an acceptable margin of safety and is suitable for the proposed wind farm development. The findings include recommendations and control measures for construction work in peat lands to ensure that all works adhere to an acceptable standard of safety.

## 10.2 Recommendations

The following general recommendations are given.

Notwithstanding that the site has an acceptable margin of safety a number of mitigation/control measures are given 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 should be taken into account and implemented throughout design and construction works (Appendix C).

Recommendations and guidelines given in AGEC's report 'Peat & Spoil Management Plan for Ardderroo Wind Farm, County Galway' (AGEC 2018) should be taken into consideration during the design and construction stage of the wind farm development.

A construction buffer zone plan has been produced for the site (Figure 5). This Figure shows areas which have an elevated or higher construction risk due to the terrain and features encountered during the site reconnaissance and are areas where additional mitigation/control measures will be required (Appendix C).

To minimise the risk of construction activity causing potential peat instability it is recommended that the Construction Method Statements (CMSs) for the project take into account, but not be limited, to the recommendations above. This will ensure that best practice guidance regarding the management of peat stability will be inherent in the construction phase.



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**APPENDIX A**  
**PHOTOS FROM SITE VISIT**



Photo 1 Overview of site conditions (northern part of site)



Photo 2 Overview of site conditions (southern part of site)



Photo 3 Example of an existing access road on site



Photo 4 Example of an existing floating access road on site



Photo 5 Example of make-up of an existing floating access road on site

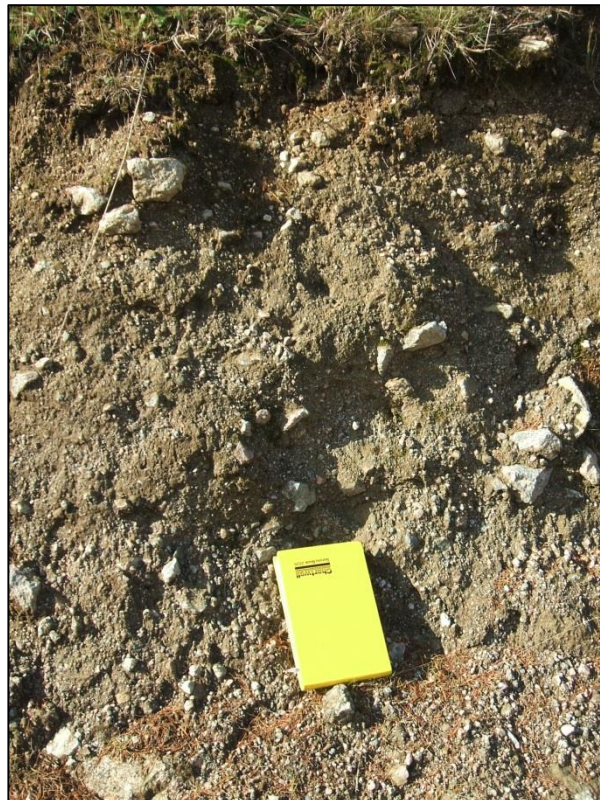


Photo 6 Example of ground conditions on site



Photo 7 Example of ground conditions on site



Photo 8 Overview of site conditions along alternative construction access road (off the N59)



Photo 9 Overview of site conditions along alternative construction access road (off the N59)



Photo 10 Example of a rock outcrop along alternative construction access road (off the N59)



**APPENDIX B**  
**GROUND INVESTIGATION DATA – TRIAL PIT LOGS & PHOTOGRAPHS**



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# Trial Pit Log

TrialPit No  
**TPA**  
Sheet 1 of 1

Project Name:	<b>Ardderroo Wind Farm</b>	Project No.	Coords (E,N):	113771.00 233321.00	Date
		1666	Level:		16/11/2016

Location:	Proposed Borrow Areas	Dimensions (m): <div style="border: 1px solid black; width: 100px; height: 30px; display: inline-block;"></div>	Scale
Client:	McCarthy Keville O'Sullivan		Depth

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results/Sample Ref					
				1.20			Firm and spongy brown / black fibrous and amorphous PEAT	1
				2.59			Medium dense grey / green slightly silty gravelly SAND with frequent cobbles and occasional boulders	2
				2.60			Granite bedrock encountered	3
End of Pit at 2.600m								

Remarks: (1) Excavation terminated at 2.6m bgl  
(2) Trial pit noted as marginally stable.  
(3) No groundwater encountered, surface water only noted.

Plant Used:  
13 TN Tracked Excavator



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# Trial Pit Log

TrialPit No  
**TPB**  
Sheet 1 of 1

Project Name:	<b>Ardderroo Wind Farm</b>	Project No.	Coords (E,N):	113752.00	233343.00	Date
		1666	Level:			16/11/2016

Location:	Proposed Borrow Areas	Dimensions (m):		Scale
Client:	McCarthy Keville O'Sullivan	Depth		3.50

Client:	McCarthy Keville O'Sullivan	Logged	G.K.
---------	-----------------------------	--------	------

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results/Sample Ref				
							Spongy brown / black amorphous PEAT
				2.80			Medium dense grey / green slightly silty gravelly SAND with occasional cobbles and boulders
				3.50			End of Pit at 3.500m

Remarks: (1) Bedrock not encountered during excavation of trial pit. Angular cobbles and boulders were noted at the base of excavation hence bedrock is likely to be close to base of trial pit.  
 (2) Trial pit noted as marginally stable.  
 (3) No groundwater encountered, surface water only noted.  
 (4) Difficult to excavate deeper with 13tN excavator.

Plant Used:  
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# Trial Pit Log

TrialPit No  
**TPC**  
Sheet 1 of 1

Project Name:	<b>Ardderroo Wind Farm</b>	Project No.	Coords (E,N):	113702.00 233446.00	Date
		1666	Level:		16/11/2016

Location:	Proposed Borrow Areas	Dimensions (m): <div style="border: 1px solid black; width: 100px; height: 30px; display: inline-block;"></div>	Scale
Client:	McCarthy Keville O'Sullivan		Depth

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results/Sample Ref					
				1.40			Firm and spongy brown / black fibrous and amorphous PEAT	1
				1.89			Medium dense grey / green slightly silty gravelly SAND with occasional cobbles and boulders	
				1.90			Granite bedrock encountered End of Pit at 1.900m	2
								3

Remarks: (1) Excavation terminated at 1.9m bgl.  
(2) Trial pit noted as stable.  
(3) No groundwater encountered

Plant Used:  
13 TN Tracked Excavator



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# Trial Pit Log

TrialPit No  
**TPD**  
Sheet 1 of 1

Project Name:	<b>Ardderroo Wind Farm</b>	Project No.	Coords (E,N):	113779.00 233183.00	Date
		1666	Level:		16/11/2016

Location:	Proposed Borrow Areas	Dimensions (m):		Scale
Client:	McCarthy Keville O'Sullivan	Depth		2.50

Client:	McCarthy Keville O'Sullivan	Logged	G.K.
---------	-----------------------------	--------	------

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results/Sample Ref					
				0.90			Firm and spongy brown / black fibrous and amorphous PEAT	
							Medium dense grey / green slightly silty gravelly SAND with frequent cobbles and occasional boulders	1
				2.49 2.50			Granite bedrock encountered End of Pit at 2.500m	2
								3



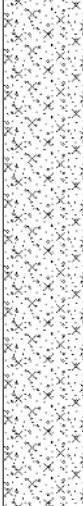
Remarks: (1) Excavation terminated at 2.5m bgl.  
(2) Trial pit noted as stable.  
(3) No groundwater encountered, surface water only noted.

Plant Used:  
13 TN Tracked Excavator

# Trial Pit Log

Project Name: Arderroo Wind Farm      Project No. 1538      Co-ords: 109835.00 - 232363.00      Date 10/07/2015

Location: Borrow Area No.3      Dimensions (m):       Scale 1:25  
Client: McCarthy Keville O'Sullivan      Depth 2.20      Logged SB

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.50		 Soft light brown spongy fibrous PEAT	
				2.20 2.20		 Blue grey silty slightly gravelly SAND with occasional cobbles	
						GRANITE bedrock End of pit at 2.20 m	

Remarks:  
Stability:





# Trial Pit Log

Project Name: Arderroo Wind Farm      Project No. 1538      Co-ords: 112099.00 - 234636.00      Date 10/07/2015

Location: Borrow Area No.1      Dimensions (m):       Scale 1:25

Client: McCarthy Keville O'Sullivan      Depth 2.20      Logged SB

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				1.00		 Soft light brown spongy fibrous PEAT with occasional cobbles	1
				2.20 2.20		 Blue grey silty gravelly SAND	2
						Moderately strong GRANITE End of pit at 2.20 m	3
							4
							5

Remarks:

Stability:







# Trial Pit Log

Project Name: Arderroo Wind Farm		Project No. 1538	Co-ords: 114304.00 - 235652.00 Level:	Date 10/07/2015
Location: Borrow Area No.2			Dimensions (m): Depth 3.40	Scale 1:25 Logged SB
Client: McCarthy Keville O'Sullivan				

Water Strike	Samples and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				1.00		<p>Soft dark brown spongy fibrous PEAT</p> <p>Soft dark brown spongy amorphous PEAT</p>	1
				3.00		Soft dark brown spongy amorphous PEAT with occasional cobbles	3
				3.40 3.40		Moderately strong GRANITE End of pit at 3.40 m	4 5

Remarks:

Stability:





Photo 1 Trial Pit A



Photo 2 Trial Pit B



Photo 3 Trial Pit C



Photo 4 Trial Pit D



Photo 5 Trial Pit 1



Photo 6 Trial Pit 2



Photo 7 Trial Pit 3



Photo 8 Trial Pit 4

**APPENDIX C**  
**GEOTECHNICAL RISK REGISTER**

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T1</b>
------------------	-------------------

<b>Grid Reference (Eastings, Northings):</b>	<b>112712</b>	<b>235902</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.3 to 0.9</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 6.04 (u), 8.50 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	1	1	1	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trivial	No		2	1	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Trivial	No		1	1	1	Trivial
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 <b>Turbine T1</b>	
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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T2</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>113460</b>	<b>235727</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>1.0 to 1.3</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 4.99 (u), 5.89 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	1	1	1	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trivial	No		2	1	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Trivial	No		1	1	1	Trivial
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 T2	
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.



## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T3</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>114228</b>	<b>235747</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.1 to 0.9</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 1.85 (u), 2.60 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	2	1	2	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trivial	No		2	1	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	3	1	3	Tolerable	No		2	1	2	Trivial
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 T3	
i	Maintain hydrology of area as far as possible;
ii	Installation of interceptor drains upslope of works to divert any surface water away from turbine construction area;
iii	Use of experienced geotechnical staff for site investigation;
iv	Use of experienced contractors and trained operators to carry out the work;
v	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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T4</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>112219</b>	<b>235006</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.6 to 1.5</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 2.31 (u), 2.57 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	1	1	1	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trivial	No		2	1	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Trivial	No		1	1	1	Trivial
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 T4	
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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T5</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>112881</b>	<b>235297</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.5 to 0.7</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 5.07 (u), 7.30 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	1	1	1	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trivial	No		2	1	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Trivial	No		1	1	1	Trivial
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 T5	
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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T6</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>113486</b>	<b>235115</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.3 to 0.9</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 9.05 (u), 12.74 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	1	1	1	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trivial	No		2	1	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Trivial	No		1	1	1	Trivial
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 T6	
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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T7</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>111632</b>	<b>234350</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.5 to 2.0</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 5.73 (u), 5.73 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	1	1	1	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	3	1	3	Tolerable	No		2	1	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Trivial	No		1	1	1	Trivial
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 T7	
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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T8</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>112295</b>	<b>234380</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.7 to 1.6</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 5.07 (u), 7.30 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	1	1	1	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trivial	No		2	1	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Trivial	No		1	1	1	Trivial
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 T8	
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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T9</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>112950</b>	<b>234335</b>
<b>Distance to Watercourse (m)</b>	<b>50 - 100</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.9 to 1.1</b>	
<b>Control Required:</b>	<b>Yes</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation					Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating	Prob			Impact	Risk	Risk Rating	
1	FOS = 9.05 (u), 12.74 (d)	1	3	3	Tolerable	No	See Below	1	3	3	Tolerable	
2	Evidence of sub peat water flow	1	3	3	Tolerable	No		1	3	3	Tolerable	
3	Evidence of surface water flow	1	3	3	Tolerable	No		1	3	3	Tolerable	
4	Evidence of previous failures/slips	0	3	0	Not Applicable	No		0	3	0	Not Applicable	
5	Type of vegetation	2	3	6	Substantial	Yes		1	3	3	Tolerable	
6	General slope characteristics upslope/downslope from infrastructure location	1	3	3	Tolerable	No		1	3	3	Tolerable	
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 <b>Turbine T9</b>	
i	Maintain hydrology of area as far as possible;
ii	Installation of interceptor drains upslope of works to divert any surface water away from turbine construction area;
iii	Use of experienced geotechnical staff for site investigation;
iv	Use of experienced contractors and trained operators to carry out the work;
v	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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T10</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>113625</b>	<b>234507</b>
<b>Distance to Watercourse (m)</b>	<b>50 - 100</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>1.0 to 1.5</b>	
<b>Control Required:</b>	<b>Yes</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 6.88 (u), 7.65 (d)	1	3	3	Tolerable	No	See Below	1	3	3	Tolerable
2	Evidence of sub peat water flow	1	3	3	Tolerable	No		1	3	3	Tolerable
3	Evidence of surface water flow	1	3	3	Tolerable	No		1	3	3	Tolerable
4	Evidence of previous failures/slips	0	3	0	Not Applicable	No		0	3	0	Not Applicable
5	Type of vegetation	2	3	6	Substantial	Yes		1	3	3	Tolerable
6	General slope characteristics upslope/downslope from infrastructure location	1	3	3	Tolerable	No		1	3	3	Tolerable
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 <b>Turbine T10</b>	
i	Maintain hydrology of area as far as possible;
ii	Installation of interceptor drains upslope of works to divert any surface water away from turbine construction area;
iii	Use of experienced geotechnical staff for site investigation;
iv	Use of experienced contractors and trained operators to carry out the work;
v	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.



## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T11</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>114300</b>	<b>234700</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.7 to 1.1</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 8.19 (u), 10.43 (d)	1	1	1	Trival	No	See Below	1	1	1	Trival
2	Evidence of sub peat water flow	1	1	1	Trival	No		1	1	1	Trival
3	Evidence of surface water flow	1	1	1	Trival	No		1	1	1	Trival
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trival	No		2	1	2	Trival
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Trival	No		1	1	1	Trival
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 <b>Turbine T11</b>	
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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T12</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>111118</b>	<b>233704</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.7 to 1.2</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 3.92 (u), 4.79 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	1	1	1	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trivial	No		2	1	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Trivial	No		2	1	2	Trivial
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 T12	
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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T13</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>111858</b>	<b>233787</b>
<b>Distance to Watercourse (m)</b>	<b>100 - 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>3.5 to 3.7</b>	
<b>Control Required:</b>	<b>Yes</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 3.66 (u), 3.10 (d)	1	2	2	Trivial	No	See Below	1	2	2	Trivial
2	Evidence of sub peat water flow	1	2	2	Trivial	No		1	2	2	Trivial
3	Evidence of surface water flow	1	2	2	Trivial	No		1	2	2	Trivial
4	Evidence of previous failures/slips	0	2	0	Not Applicable	No		0	2	0	Not Applicable
5	Type of vegetation	2	2	4	Tolerable	No		1	2	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	1	2	2	Trivial	No		1	2	2	Trivial
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		0	2	0	Not Applicable
10	Evidence of bog pools	0	2	0	Not Applicable	No		0	2	0	Not Applicable
11	Relatively deep peat	3	2	6	Substantial	Yes		1	2	2	Trivial

Control Measures to be Implemented Prior to/and During Construction for Turbine T13	
i	<p>Due to relatively deep peat at this turbine location this will require additional construction measures such as :</p> <ul style="list-style-type: none"> <li>- excavation side walls to be supported (eg. boulders, retaining wall units) or excavation face battered to shallow angle</li> <li>- use of a piled foundation may be adopted at this location</li> <li>- temporary works designer may be required to provide excavation support design</li> <li>- daily detailed inspection of excavation faces</li> <li>- potential for greater water inflow into excavation requiring removal of water using pumping</li> <li>- increased exclusion zone around excavation to avoid accidental loading of crest of slope</li> <li>- use of low load bearing plant and machinery during construction and bog mats</li> </ul>
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;
v	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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T14</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>112547</b>	<b>233828</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>1.0 to 3.5</b>	
<b>Control Required:</b>	<b>Yes</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 3.82 (u), 3.28 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	1	1	1	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trivial	No		1	1	1	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Trivial	No		1	1	1	Trivial
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	Relatively deep peat	3	1	3	Tolerable	Yes		1	1	1	Trivial

Control Measures to be Implemented Prior to/and During Construction for Turbine T14	
i	<p>Due to relatively deep peat at this turbine location this will require additional construction measures such as :</p> <ul style="list-style-type: none"> <li>- excavation side walls to be supported (eg. boulders, retaining wall units) or excavation face battered to shallow angle</li> <li>- use of a piled foundation may be adopted at this location</li> <li>- temporary works designer may be required to provide excavation support design</li> <li>- daily detailed inspection of excavation faces</li> <li>- potential for greater water inflow into excavation requiring removal of water using pumping</li> <li>- increased exclusion zone around excavation to avoid accidental loading of crest of slope</li> <li>- use of low load bearing plant and machinery during construction and bog mats</li> </ul>
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;
v	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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T15</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>113400</b>	<b>233770</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.8 to 1.2</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 7.82 (u), 9.56 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	1	1	1	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trivial	No		2	1	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Trivial	No		1	1	1	Trivial
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 <b>Turbine T15</b>	
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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T16</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>111114</b>	<b>233036</b>
<b>Distance to Watercourse (m)</b>	<b>100 - 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>1.2 to 1.6</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 13.22 (u), 14.33 (d)	1	2	2	Trival	No	See Below	1	2	2	Trival
2	Evidence of sub peat water flow	1	2	2	Trival	No		1	2	2	Trival
3	Evidence of surface water flow	1	2	2	Trival	No		1	2	2	Trival
4	Evidence of previous failures/slips	0	2	0	Not Applicable	No		0	2	0	Not Applicable
5	Type of vegetation	2	2	4	Tolerable	No		2	2	4	Tolerable
6	General slope characteristics upslope/downslope from infrastructure location	2	2	4	Tolerable	No		1	2	2	Trival
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	1	2	2	Trival	No		1	2	2	Trival
10	Evidence of bog pools	1	2	2	Trival	No		1	2	2	Trival
11	Other	0	2	0	Not Applicable	No		0	2	0	Not Applicable

Control Measures to be Implemented Prior to/and During Construction for <b>Turbine T16</b>	
i	Maintain hydrology of area as far as possible;
ii	Installation of interceptor drains upslope of works to divert any surface water away from turbine construction area;
iii	Use of experienced geotechnical staff for site investigation;
iv	Use of experienced contractors and trained operators to carry out the work;
v	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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T17</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>112270</b>	<b>233254</b>
<b>Distance to Watercourse (m)</b>	<b>50 - 100</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.4 to 1.7</b>	
<b>Control Required:</b>	<b>Yes</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 6.37 (u), 6.75 (d)	1	3	3	Tolerable	No	See Below	1	3	3	Tolerable
2	Evidence of sub peat water flow	1	3	3	Tolerable	No		1	3	3	Tolerable
3	Evidence of surface water flow	1	3	3	Tolerable	No		1	3	3	Tolerable
4	Evidence of previous failures/slips	0	3	0	Not Applicable	No		0	3	0	Not Applicable
5	Type of vegetation	2	3	6	Substantial	Yes		1	3	3	Tolerable
6	General slope characteristics upslope/downslope from infrastructure location	1	3	3	Tolerable	No		1	3	3	Tolerable
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 T17	
i	Maintain hydrology of area as far as possible;
ii	Installation of interceptor drains upslope of works to divert any surface water away from turbine construction area;
iii	Use of experienced geotechnical staff for site investigation;
iv	Use of experienced contractors and trained operators to carry out the work;
v	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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T18</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>113412</b>	<b>233258</b>
<b>Distance to Watercourse (m)</b>	<b>100 - 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.2 to 1.6</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 1.91 (u), 2.07 (d)	1	2	2	Trivial	No	See Below	1	2	2	Trivial
2	Evidence of sub peat water flow	1	2	2	Trivial	No		1	2	2	Trivial
3	Evidence of surface water flow	1	2	2	Trivial	No		1	2	2	Trivial
4	Evidence of previous failures/slips	0	2	0	Not Applicable	No		0	2	0	Not Applicable
5	Type of vegetation	2	2	4	Tolerable	No		2	2	4	Tolerable
6	General slope characteristics upslope/downslope from infrastructure location	2	2	4	Tolerable	No		2	2	4	Tolerable
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		0	2	0	Not Applicable
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 <b>Turbine T18</b>	
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.



## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T19</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>114099</b>	<b>233365</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.5 to 0.8</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 3.84 (u), 5.52 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	2	1	2	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trivial	No		2	1	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Trivial	No		2	1	2	Trivial
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 T19	
i	Maintain hydrology of area as far as possible;
ii	Installation of interceptor drains upslope of works to divert any surface water away from turbine construction area;
iii	Use of experienced geotechnical staff for site investigation;
iv	Use of experienced contractors and trained operators to carry out the work;
v	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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T20</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>111206</b>	<b>232296</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.8 to 3.4</b>	
<b>Control Required:</b>	<b>Yes</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation					Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating	Prob			Impact	Risk	Risk Rating	
1	FOS = 3.91 (u), 3.37 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial	
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial	
3	Evidence of surface water flow	1	1	1	Trivial	No		1	1	1	Trivial	
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
5	Type of vegetation	2	1	2	Trivial	No		1	1	1	Trivial	
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Trivial	No		1	1	1	Trivial	
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	1	1	1	Trivial	No		1	1	1	Trivial	
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
11	Relatively deep peat	3	1	3	Tolerable	Yes		1	1	1	Trivial	

Control Measures to be Implemented Prior to/and During Construction for Turbine T20	
i	<p>Due to relatively deep peat at this turbine location this will require additional construction measures such as :</p> <ul style="list-style-type: none"> <li>- excavation side walls to be supported (eg. boulders, retaining wall units) or excavation face battered to shallow angle</li> <li>- use of a piled foundation may be adopted at this location</li> <li>- temporary works designer may be required to provide excavation support design</li> <li>- daily detailed inspection of excavation faces</li> <li>- potential for greater water inflow into excavation requiring removal of water using pumping</li> <li>- increased exclusion zone around excavation to avoid accidental loading of crest of slope</li> <li>- use of low load bearing plant and machinery during construction and bog mats</li> </ul>
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;
v	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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T21</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>111996</b>	<b>232611</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.5 to 1.7</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 6.37 (u), 6.75 (d)	1	1	1	Trival	No	See Below	1	1	1	Trival
2	Evidence of sub peat water flow	1	1	1	Trival	No		1	1	1	Trival
3	Evidence of surface water flow	1	1	1	Trival	No		1	1	1	Trival
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trival	No		2	1	2	Trival
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Trival	No		1	1	1	Trival
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	2	1	2	Trival	No		2	1	2	Trival
10	Evidence of bog pools	1	1	1	Trival	No		1	1	1	Trival
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

Control Measures to be Implemented Prior to/and During Construction for <b>Turbine T21</b>	
i	Maintain hydrology of area as far as possible;
ii	Installation of interceptor drains upslope of works to divert any surface water away from turbine construction area;
iii	Use of experienced geotechnical staff for site investigation;
iv	Use of experienced contractors and trained operators to carry out the work;
v	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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T22</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>112637</b>	<b>232775</b>
<b>Distance to Watercourse (m)</b>	<b>100 - 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>1.0 to 2.8</b>	
<b>Control Required:</b>	<b>Yes</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 4.53 (u), 4.10 (d)	1	2	2	Trivial	No	See Below	1	2	2	Trivial
2	Evidence of sub peat water flow	1	2	2	Trivial	No		1	2	2	Trivial
3	Evidence of surface water flow	1	2	2	Trivial	No		1	2	2	Trivial
4	Evidence of previous failures/slips	0	2	0	Not Applicable	No		0	2	0	Not Applicable
5	Type of vegetation	2	2	4	Tolerable	No		1	2	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	1	2	2	Trivial	No		1	2	2	Trivial
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		0	2	0	Not Applicable
10	Evidence of bog pools	0	2	0	Not Applicable	No		0	2	0	Not Applicable
11	Relatively deep peat	3	2	6	Substantial	Yes		1	2	2	Trivial

Control Measures to be Implemented Prior to/and During Construction for <b>Turbine T22</b>	
i	Due to relatively deep peat at this turbine location this will require additional construction measures such as : - excavation side walls to be supported (eg. boulders, retaining wall units) or excavation face battered to shallow angle - temporary works designer may be required to provide excavation support design - daily detailed inspection of excavation faces - potential for greater water inflow into excavation requiring removal of water using pumping - increased exclusion zone around excavation to avoid accidental loading of crest of slope - use of low load bearing plant and machinery during construction and bog mats
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;
v	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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T23</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>110573</b>	<b>231801</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.5 to 1.2</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 7.82 (u), 9.56 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	1	1	1	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trivial	No		2	1	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Trivial	No		1	1	1	Trivial
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 <b>Turbine T24</b>	
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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T24</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>111208</b>	<b>231589</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.8 to 1.3</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 4.99 (u), 5.89 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	1	1	1	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trivial	No		2	1	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Trivial	No		1	1	1	Trivial
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 <b>Turbine T25</b>	
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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Turbine T25</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>111778</b>	<b>231971</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>1.0 to 2.1</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 2.78 (u), 2.74 (d)	1	1	1	Trivial	No	See Below	1	1	1	Trivial
2	Evidence of sub peat water flow	1	1	1	Trivial	No		1	1	1	Trivial
3	Evidence of surface water flow	1	1	1	Trivial	No		1	1	1	Trivial
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trivial	No		2	1	2	Trivial
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Trivial	No		2	1	2	Trivial
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 <b>Turbine T26</b>	
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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Met Mast</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>114327</b>	<b>234996</b>
<b>Distance to Watercourse (m)</b>	<b>50 - 100</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.6 to 2.5</b>	
<b>Control Required:</b>	<b>Yes</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation					Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating	Prob			Impact	Risk	Risk Rating	
1	FOS = 9.82 (u), 9.17 (d)	1	3	3	Tolerable	No	See Below	1	3	3	Tolerable	
2	Evidence of sub peat water flow	1	3	3	Tolerable	No		1	3	3	Tolerable	
3	Evidence of surface water flow	2	3	6	Substantial	Yes		1	3	3	Tolerable	
4	Evidence of previous failures/slips	0	3	0	Not Applicable	No		0	3	0	Not Applicable	
5	Type of vegetation	2	3	6	Substantial	Yes		1	3	3	Tolerable	
6	General slope characteristics upslope/downslope from infrastructure location	1	3	3	Tolerable	No		1	3	3	Tolerable	
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	Relatively deep peat	2	3	6	Substantial	Yes		1	3	3	Tolerable	

Control Measures to be Implemented Prior to/and During Construction for <b>Met Mast</b>	
i	Due to relatively deep peat at the met mast location this will require additional construction measures such as: - excavation side walls to be supported (eg. boulders, retaining wall units) or excavation face battered to shallow angle - temporary works designer may be required to provide excavation support design - daily detailed inspection of excavation faces - potential for greater water inflow into excavation requiring removal of water using pumping - increased exclusion zone around excavation to avoid accidental loading of crest of slope - use of low load bearing plant and machinery during construction and bog mats
ii	Installation of interceptor drains upslope of works to divert any surface water away from turbine construction area;
iii	Maintain hydrology of area as far as possible;
iv	Use of experienced geotechnical staff for site investigation;
v	Use of experienced contractors and trained operators to carry out the work;
vi	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.



## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Substation</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>113896</b>	<b>234938</b>
<b>Distance to Watercourse (m)</b>	<b>&gt; 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0 to 0.5</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 2.90 (u), 4.15 (d)	1	1	1	Trival	No	See Below	1	1	1	Trival
2	Evidence of sub peat water flow	1	1	1	Trival	No		1	1	1	Trival
3	Evidence of surface water flow	1	1	1	Trival	No		1	1	1	Trival
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Trival	No		2	1	2	Trival
6	General slope characteristics upslope/downslope from infrastructure location	2	1	2	Trival	No		2	1	2	Trival
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 <b>Substation</b>
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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Temp. Const. Compound 1</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>114456</b>	<b>235280</b>
<b>Distance to Watercourse (m)</b>	<b>100 - 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0.3 to 2.4</b>	
<b>Control Required:</b>	<b>Yes</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation				Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating			Prob	Impact	Risk	Risk Rating
1	FOS = 4.59 (u), 5.10 (d)	1	2	2	Trivial	No	See Below	1	2	2	Trivial
2	Evidence of sub peat water flow	1	2	2	Trivial	No		1	2	2	Trivial
3	Evidence of surface water flow	1	2	2	Trivial	No		1	2	2	Trivial
4	Evidence of previous failures/slips	0	2	0	Not Applicable	No		0	2	0	Not Applicable
5	Type of vegetation	2	2	4	Tolerable	No		2	2	4	Tolerable
6	General slope characteristics upslope/downslope from infrastructure location	1	2	2	Trivial	No		1	2	2	Trivial
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		0	2	0	Not Applicable
10	Evidence of bog pools	0	2	0	Not Applicable	No		0	2	0	Not Applicable
11	Relatively deep peat	2	2	4	Tolerable	Yes		1	2	2	Trivial

Control Measures to be Implemented Prior to/and During Construction for <b>Temp. Const. Compound 1</b>	
i	Due to relatively deep peat at the compound location this will require additional construction measures such as: - excavation side walls to be supported (eg. boulders, retaining wall units) or excavation face battered to shallow angle - temporary works designer may be required to provide excavation support design - daily detailed inspection of excavation faces - potential for greater water inflow into excavation requiring removal of water using pumping - increased exclusion zone around excavation to avoid accidental loading of crest of slope - use of low load bearing plant and machinery during construction and bog mats
ii	Installation of interceptor drains upslope of works to divert any surface water away from turbine construction area;
iii	Maintain hydrology of area as far as possible;
iv	Use of experienced geotechnical staff for site investigation;
v	Use of experienced contractors and trained operators to carry out the work;
vi	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.

## Ardderroo Wind Farm - Geotechnical Risk Register (Rev 1)

<b>Location:</b>	<b>Temp. Const. Compound 2</b>
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<b>Grid Reference (Eastings, Northings):</b>	<b>110413</b>	<b>232110</b>
<b>Distance to Watercourse (m)</b>	<b>100 - 150</b>	
<b>Min &amp; Max Measured Peat Depth (m):</b>	<b>0 to 2.0</b>	
<b>Control Required:</b>	<b>No</b>	

Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Pre-Control Measure Implementation					Control Required	Control measures to be implemented during construction	Post-Control Measure Implementation			
		Prob	Impact	Risk	Risk Rating	Prob			Impact	Risk	Risk Rating	
1	FOS = 2.30 (u), 2.30 (d)	1	2	2	Trivial	No	See Below	1	2	2	Trivial	
2	Evidence of sub peat water flow	1	2	2	Trivial	No		1	2	2	Trivial	
3	Evidence of surface water flow	1	2	2	Trivial	No		1	2	2	Trivial	
4	Evidence of previous failures/slips	0	2	0	Not Applicable	No		0	2	0	Not Applicable	
5	Type of vegetation	2	2	4	Tolerable	No		2	2	4	Tolerable	
6	General slope characteristics upslope/downslope from infrastructure location	2	2	4	Tolerable	No		2	2	4	Tolerable	
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		0	2	0	Not Applicable	
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 <b>Temp. Const. Compound 2</b>	
i	Maintain hydrology of area as far as possible;
ii	Installation of interceptor drains upslope of works to divert any surface water away from turbine construction area;
iii	Use of experienced geotechnical staff for site investigation;
iv	Use of experienced contractors and trained operators to carry out the work;
v	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.

**APPENDIX D**  
**CALCULATED FOS FOR PEAT SLOPES ON SITE**

### Calculated FoS of Natural Peat Slopes for Ardderro Wind Farm (Undrained Analysis)

Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Depth of In-situ Peat	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety for Load Condition	
								Condition (1)	Condition (2)
			$\beta$ (deg)	$c_u$ (kPa)	$\gamma$ (kN/m <sup>3</sup> )	(m)	Condition (2)	Condition (1)	Condition (2)
T1	112712	235902	3	6	10	0.9	1.9	12.76	6.04
T2	113460	235727	3	6	10	1.3	2.3	8.83	4.99
T3	114228	235747	10	6	10	0.9	1.9	3.90	1.85
T4	112219	235006	6	6	10	1.5	2.5	3.85	2.31
T5	112881	235297	4	6	10	0.7	1.7	12.32	5.07
T6	113486	235115	2	6	10	0.9	1.9	19.11	9.05
T7	111632	234350	2	6	10	2.0	3.0	8.60	5.73
T8	112295	234380	4	6	10	0.7	1.7	12.32	5.07
T9	112950	234335	2	6	10	0.9	1.9	19.11	9.05
T10	113625	234507	2	6	10	1.5	2.5	11.47	6.88
T11	114300	234700	2	6	10	1.1	2.1	15.64	8.19
T12	111118	233704	4	6	10	1.2	2.2	7.19	3.92
T13	111858	233787	2	6	10	3.7	4.7	4.65	3.66
T14	112547	233828	2	6	10	3.5	4.5	4.92	3.82
T15	113400	233770	2	6	10	1.2	2.2	14.34	7.82
T16	111146	233160	1	6	10	1.6	2.6	21.49	13.22
T17	112270	233254	2	6	10	1.7	2.7	10.12	6.37
T18	113412	233258	7	6	10	1.6	2.6	3.10	1.91
T19	114099	233365	5	6	10	0.8	1.8	8.64	3.84
T20	111206	232296	2	6	10	3.4	4.4	5.06	3.91
T21	111996	232611	2	6	10	1.7	2.7	10.12	6.37
T22	112637	232775	2	6	10	2.8	3.8	6.14	4.53
T23	110573	231801	2	6	10	1.2	2.2	14.34	7.82
T24	111208	231589	3	6	10	1.3	2.3	8.83	4.99
T25	111778	231971	4	6	10	2.1	3.1	4.11	2.78
SUB	113896	234938	8	6	10	0.5	1.5	8.71	2.90
TCC1	114456	235280	3	6	10	1.5	2.5	7.65	4.59
TCC2	112688	234471	5	6	10	2.0	3.0	3.46	2.30
MM	114327	234996	1	6	10	2.5	3.5	13.75	9.82
T1 - SS	111208	231589	2.9	6	10	1.3	2.3	9.25	5.23
T5 - SS	111778	231971	2.5	6	10	2.1	3.1	6.51	4.41
T6 - SS	111205	232239	7.9	6	10	1.5	2.5	2.95	1.77
T8 - SS	112818	234520	0.5	6	10	2.0	3.0	33.34	22.22
T10 - SS	114228	235747	9.8	6	10	0.9	1.9	3.99	1.89
T15 - SS	112506	233911	0.7	6	10	3.4	4.4	13.58	10.49
T17 - SS	110573	231801	2.2	6	10	1.2	2.2	12.84	7.00
T18 - SS	111589	234513	2.2	6	10	2.3	3.3	6.70	4.67
T19 - SS	112216	234499	4.6	6	10	2.0	3.0	3.73	2.49
T20 - SS	112616	232751	2.9	6	10	2.0	3.0	5.90	3.93
T21 - SS	112332	233255	0.6	6	10	1.6	2.6	35.81	22.04
T22 - SS	111224	233665	3.7	6	10	1.0	2.0	9.41	4.71
T23 - SS	114099	233365	4.9	6	10	0.8	1.8	8.89	3.95
T24 - SS	113688	232694	1.0	6	10	5.9	6.9	5.98	5.12
MET - SS	114332	234946	0.1	6	10	2.5	3.5	120.00	85.71
WP002	114262	235159	2.5	6	10	3.6	4.6	3.80	2.97
WP003	114153	235069	3.7	6	10	0.4	1.4	23.17	6.62
WP004	114156	235075	3.7	6	10	0.7	1.7	13.24	5.45
WP005	114156	235076	3.7	6	10	1.8	2.8	5.15	3.31
WP006	114062	234982	1.8	6	10	0.3	1.3	64.58	14.90
WP007	114006	234935	5.4	6	10	0.3	1.3	21.24	4.90
WP008	113882	234850	8.8	6	10	0.7	1.7	5.70	2.35
WP009	113791	234808	7.7	6	10	0.4	1.4	11.23	3.21
WP010	113625	234761	2.7	6	10	0.3	1.3	41.76	9.64
WP013	113104	234707	9.3	6	10	0.4	1.4	9.45	2.70
WP014	113103	234707	9.1	6	10	0.2	1.2	19.23	3.21
WP015	112712	234581	3.3	6	10	1.6	2.6	6.60	4.06
WP016	112641	234604	4.5	6	10	0.5	1.5	15.28	5.09
WP017	112555	234636	5.3	6	10	0.3	1.3	21.92	5.06
WP018	112514	234653	6.9	6	10	1.7	2.7	2.96	1.86
WP019	112326	234645	4.6	6	10	1.2	2.2	6.29	3.43
WP020	112305	234649	2.1	6	10	1.2	2.2	13.53	7.38
WP021	112160	234617	1.1	6	10	4.5	5.5	7.02	5.74
WP022	112123	234626	0.8	6	10	2.0	3.0	21.43	14.29
WP023	112113	234622	0.8	6	10	0.5	1.5	85.73	28.58
WP024	112060	234615	3.4	6	10	1.1	2.1	9.12	4.78
WP025	111928	234599	1.1	6	10	2.4	3.4	13.16	9.29
WP026	111928	234599	1.1	6	10	2.6	3.6	12.15	8.78
WP027	111846	234588	2.3	6	10	0.7	1.7	20.94	8.62
WP028	111749	234580	3.0	6	10	2.7	3.7	4.29	3.13
WP029	111506	234531	2.5	6	10	2.3	3.3	6.08	4.24
WP030	111560	234554	2.6	6	10	2.7	3.7	4.95	3.61
WP031	111316	234486	0.6	6	10	1.2	2.2	47.75	26.05
WP032	111349	234498	2.3	6	10	1.0	2.0	15.02	7.51
WP033	112655	234492	3.3	6	10	2.0	3.0	5.28	3.52
WP034	112638	234434	1.1	6	10	3.1	4.1	10.19	7.70
WP035	112582	234256	2.2	6	10	1.6	2.6	9.63	5.93
WP036	112581	234208	2.2	6	10	2.0	3.0	7.91	5.27
WP037	112594	233995	2.1	6	10	0.5	1.5	32.48	10.83
WP038	112567	233929	1.1	6	10	2.0	3.0	15.01	10.00
WP039	112413	233807	0.9	6	10	1.5	2.5	26.67	16.00
WP040	112333	233721	1.1	6	10	3.3	4.3	9.09	6.98
WP041	112296	233654	2.9	6	10	3.8	4.8	3.10	2.46
WP042	112295	233513	2.0	6	10	2.6	3.6	6.60	4.77
WP043	112296	233468	1.2	6	10	2.2	3.2	12.99	8.93
WP044	112317	233354	0.6	6	10	2.2	3.2	26.05	17.91
WP045	112327	233319	0.6	6	10	3.3	4.3	17.36	13.33
WP046	112356	233853	0.5	6	10	3.8	4.8	17.55	13.89
WP047	112356	233854	0.5	6	10	1.6	2.6	41.67	25.64
WP048	112327	233921	1.4	6	10	2.5	3.5	10.01	7.15
WP049	112211	234050	4.1	6	10	3.2	4.2	2.66	2.02
WP050	112027	234004	0.6	6	10	4.1	5.1	14.64	11.77
WP053	112381	233084	2.5	6	10	1.5	2.5	9.32	5.59
WP054	112387	233039	1.8	6	10	2.9	3.9	6.47	4.81
WP055	112416	232900	1.5	6	10	3.0	4.0	7.70	5.77
WP056	112422	232856	0.2	6	10	2.4	3.4	62.50	44.12
WP057	112471	232777	2.9	6	10	2.4	3.4	4.91	3.47
WP058	112509	232745	2.9	6	10	0.8	1.8	14.74	6.55
WP059	112672	232698	0.7	6	10	2.6	3.6	17.75	12.82
WP060	112714	232688	0.9	6	10	3.3	4.3	12.12	9.30
WP061	112853	232702	2.6	6	10	0.9	1.9	14.52	6.88
WP062	112900	232716	1.5	6	10	0.4	1.4	57.73	16.49
WP065	113198	232743	3.0	6	10	2.6	3.6	4.37	3.15
WP066	113216	232739	1.7	6	10	3.3	4.3	6.27	4.82
WP067	113371	232727	3.1	6	10	4.7	5.7	2.37	1.96
WP068	113416	232705	5.0	6	10	0.3	1.3	23.16	5.35

Calculated FoS of Natural Peat Slopes for Ardderreo Wind Farm (Undrained Analysis)										
Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Depth of In-situ Peat	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety for Load Condition		
			$\beta$ (deg)	$c_u$ (kPa)	$\gamma$ (kN/m <sup>3</sup> )	(m)	Condition (2)	Condition (1)	Condition (2)	
WP069	113417	232705	3.0	6	10	7.2	8.2	1.59	1.40	
WP071	113824	232701	5.1	6	10	0.5	1.5	13.44	4.48	
WP072	113863	232788	0.3	6	10	3.1	4.1	38.71	29.27	
WP073	113859	232845	4.2	6	10	4.0	5.0	2.07	1.65	
WP074	113829	233013	3.8	6	10	1.0	2.0	9.00	4.50	
WP075	113829	233014	3.8	6	10	1.5	2.5	6.00	3.60	
WP076	113807	233060	3.1	6	10	1.0	2.0	10.94	5.47	
WP077	113783	233197	3.5	6	10	1.2	2.2	8.10	4.42	
WP078	113840	233328	3.3	6	10	0.5	1.5	21.12	7.04	
WP079	113921	233350	1.3	6	10	1.2	2.2	22.74	12.40	
WP080	114016	233381	3.1	6	10	3.7	4.7	2.96	2.33	
WP081	114035	233377	4.2	6	10	1.5	2.5	5.44	3.26	
WP082	113740	233333	3.3	6	10	2.0	3.0	5.28	3.52	
WP083	113714	233446	1.8	6	10	0.3	1.3	64.58	14.90	
WP084	113696	233559	2.2	6	10	1.1	2.1	14.01	7.34	
WP085	113680	233603	0.7	6	10	2.6	3.6	17.75	12.82	
WP086	113664	233718	1.7	6	10	3.1	4.1	6.68	5.05	
WP087	113663	233719	1.7	6	10	1.5	2.5	13.80	8.28	
WP088	113631	233809	2.9	6	10	0.8	1.8	14.74	6.55	
WP089	113609	233836	0.6	6	10	6.0	7.0	9.55	8.19	
WP090	113346	234093	1.8	6	10	3.0	4.0	6.46	4.84	
WP091	113348	234136	2.8	6	10	2.0	3.0	6.14	4.09	
WP092	114403	235333	3.3	6	10	0.3	1.3	35.20	8.12	
WP093	114403	235343	3.3	6	10	0.2	1.2	52.80	8.80	
WP094	114342	235527	7.5	6	10	0.4	1.4	11.65	3.33	
WP095	114252	235788	5.3	6	10	0.3	1.3	21.69	5.01	
WP096	114260	235843	4.9	6	10	0.5	1.5	14.22	4.74	
WP097	114334	235997	6.1	6	10	0.1	1.1	56.72	5.16	
WP098	114333	235993	5.8	6	10	0.3	1.3	20.00	4.62	
WP099	114447	236154	6.7	6	10	0.1	1.1	51.78	4.71	
WP100	114448	236171	6.7	6	10	0.2	1.2	25.89	4.32	
WP102	114533	236328	No peat recorded at location							
WP109	114052	235513	8.4	6	10	1.8	2.8	2.32	1.49	
WP120	112921	235449	8.6	6	10	0.1	1.1	40.39	3.67	
WP123	112640	235652	8.3	6	10	1.2	2.2	3.50	1.91	
WP143	110834	233607	0.7	6	10	3.6	4.6	12.82	10.04	
WP144	110893	233592	0.7	6	10	3.9	4.9	11.84	9.42	
WP145	111057	233527	2.4	6	10	3.1	4.1	4.62	3.49	
WP146	111093	233539	0.6	6	10	1.7	2.7	33.71	21.22	
WP148	111244	233626	3.1	6	10	2.2	3.2	5.07	3.48	
WP149	111256	233589	0.9	6	10	1.6	2.6	23.44	14.43	
WP150	111432	233522	1.0	6	10	2.4	3.4	13.89	9.81	
WP151	111412	233477	1.2	6	10	2.3	3.3	12.43	8.66	
WP157	111572	233394	2.3	6	10	0.8	1.8	18.32	8.14	
WP158	111571	233393	2.3	6	10	0.9	1.9	16.29	7.72	
WP159	111623	233363	2.7	6	10	4.1	5.1	3.12	2.51	
WP160	111790	233341	0.7	6	10	0.3	1.3	153.87	35.51	
WP161	111928	233309	2.3	6	10	0.1	1.1	150.24	13.66	
WP162	111925	233211	2.1	6	10	0.4	1.4	40.60	11.60	
WP164	111898	232994	3.3	6	10	1.2	2.2	8.65	4.72	
WP165	111905	232851	2.1	6	10	0.1	1.1	162.38	14.76	
WP166	111951	232703	0.6	6	10	2.7	3.7	21.22	15.49	
WP169	110890	231999	2.3	6	10	3.0	4.0	4.89	3.66	
WP170	110932	232089	1.4	6	10	2.7	3.7	9.26	6.76	
WP171	111089	232161	0.7	6	10	1.2	2.2	41.67	22.73	
WP173	111012	231848	0.8	6	10	2.7	3.7	15.88	11.59	
WP174	111012	231844	0.7	6	10	3.5	4.5	13.19	10.26	
WP175	111275	231742	3.0	6	10	0.9	1.9	12.61	5.98	
WP176	111362	231763	2.0	6	10	2.7	3.7	6.36	4.64	
WP177	111438	231741	1.5	6	10	3.9	4.9	5.92	4.71	
WP178	111575	231831	1.3	6	10	5.8	6.8	4.70	4.01	
WP179	111718	231886	0.6	6	10	5.3	6.3	11.32	9.52	
B21	112990	234626	No peat recorded at location							
B22	112837	234545	No peat recorded at location							
B24	112926	234654	No peat recorded at location							
E3	114437	235331	4.5	6	10	0.3	1.3	25.47	5.88	
E95	110639	233690	No peat recorded at location							
P100	111743	232215	2.3	6	10	3.1	4.1	4.85	3.66	
P77	113369	234055	1.1	6	10	4.2	5.2	7.52	6.08	
P79	113382	233996	1.8	6	10	3.1	4.1	6.25	4.73	
P87	113663	233688	1.7	6	10	3.7	4.7	5.60	4.41	
P90	111836	232487	2.6	6	10	1.2	2.2	11.13	6.07	
P92	111793	232445	1.6	6	10	1.5	2.5	14.30	8.58	
P94	111768	232391	1.4	6	10	0.9	1.9	27.79	13.17	
SUB12	114286	235190	4.9	6	10	3.5	4.5	2.01	1.56	
SUB21	113079	234691	8.4	6	10	0.3	1.3	13.81	3.19	
SUB24	113006	234640	8.7	6	10	0.4	1.4	10.03	2.87	
MKOS2	110578	231756	2.3	6	10	1.0	2.0	15.02	7.51	
MKOS3	110562	231756	1.3	6	10	1.0	2.0	26.10	13.05	
MKOS4	110556	231790	1.3	6	10	1.0	2.0	26.10	13.05	
MKOS5	110573	231843	1.8	6	10	1.0	2.0	18.77	9.38	
MKOS6	111800	231946	2.1	6	10	1.0	2.0	16.24	8.12	
MKOS7	110933	232017	4.1	6	10	1.0	2.0	8.49	4.25	
MKOS10	111179	232244	2.4	6	10	1.1	2.1	13.01	6.81	
MKOS11	111783	232029	1.3	6	10	1.2	2.2	21.75	11.86	
MKOS12	110590	231869	1.9	6	10	1.3	2.3	14.00	7.91	
MKOS13	110598	231922	0.9	6	10	1.3	2.3	28.85	16.31	
MKOS14	111232	232257	2.1	6	10	1.3	2.3	12.84	7.26	
MKOS15	110553	231772	1.3	6	10	1.4	2.4	18.64	10.88	
MKOS16	111228	231578	2.5	6	10	1.4	2.4	9.99	5.82	
MKOS17	110596	231786	2.3	6	10	1.6	2.6	9.39	5.78	
MKOS18	110603	231945	0.9	6	10	1.6	2.6	23.44	14.43	
MKOS21	110611	231802	1.6	6	10	1.8	2.8	11.91	7.66	
MKOS23	111071	232193	1.0	6	10	1.8	2.8	18.52	11.91	
MKOS24	110582	231875	1.1	6	10	2.0	3.0	15.01	10.00	
MKOS28	111091	232219	1.0	6	10	2.2	3.2	16.05	11.03	
MKOS31	111272	232282	1.0	6	10	2.3	3.3	14.50	10.10	
MKOS33	111253	232269	1.7	6	10	2.4	3.4	8.34	5.89	
MKOS34	110912	232003	2.5	6	10	2.5	3.5	5.47	3.90	
MKOS35	111033	232132	0.6	6	10	2.5	3.5	22.92	16.37	
MKOS39	110610	231970	0.9	6	10	2.7	3.7	13.89	10.14	
MKOS40	110633	232045	1.6	6	10	2.7	3.7	7.94	5.80	
MKOS42	111790	231917	3.1	6	10	2.7	3.7	4.13	3.01	
MKOS43	111778	231998	2.1	6	10	2.7	3.7	6.01	4.39	
MKOS50	111153	232238	1.1	6	10	2.9	3.9	10.35	7.70	

Calculated FoS of Natural Peat Slopes for Ardderrow Wind Farm (Undrained Analysis)									
Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Depth of In-situ Peat	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety for Load Condition	
			$\beta$ (deg)	$c_u$ (kPa)	$\gamma$ (kN/m <sup>3</sup> )	(m)	Condition (2)	Condition (1)	Condition (2)
MKOS52	111019	232108	0.6	6	10	3.0	4.0	19.10	14.32
MKOS54	110625	232022	1.2	6	10	3.1	4.1	9.22	6.97
MKOS55	110640	232069	3.5	6	10	3.1	4.1	3.13	2.37
MKOS58	111516	231710	1.8	6	10	3.3	4.3	5.69	4.36
MKOS61	111766	231918	3.0	6	10	3.5	4.5	3.31	2.57
MKOS63	110618	231828	1.5	6	10	3.6	4.6	6.41	5.02
MKOS64	111509	231691	1.3	6	10	3.6	4.6	7.58	5.93
MKOS66	111776	232149	1.3	6	10	3.6	4.6	7.58	5.93
MKOS67	111120	232234	1.1	6	10	3.6	4.6	8.34	6.52
MKOS72	111791	232124	1.8	6	10	3.7	4.7	5.24	4.12
MKOS75	111796	232054	1.4	6	10	0.4	1.4	60.04	17.15
MKOS76	110619	231996	1.5	6	10	4.0	5.0	5.56	4.45
MKOS77	111742	231907	0.2	6	10	4.0	5.0	50.00	40.00
MKOS82	111671	231853	0.6	6	10	4.5	5.5	13.33	10.91
MKOS83	111721	231891	0.6	6	10	4.5	5.5	13.33	10.91
MKOS85	111651	231844	1.7	6	10	5.4	6.4	3.71	3.13
MKOS88	111697	231874	0.6	6	10	5.5	6.5	10.91	9.23
MKOS89	110566	231815	2.2	6	10	0.6	1.6	26.35	9.88
MKOS90	110966	232040	3.8	6	10	0.8	1.8	11.24	5.00
MKOS91	111046	232153	0.6	6	10	0.8	1.8	71.62	31.83
MKOS94	110583	231770	2.3	6	10	0.9	1.9	16.69	7.91
MKOS97	111784	231956	2.5	6	10	0.9	1.9	15.53	7.36
MKOS99	111210	231592						No peat recorded at location	
MKOS100	111778	231972						No peat recorded at location	
MKOS101	111794	232086						No peat recorded at location	
MKOS102	110980	232061						No peat recorded at location	
MKOS103	111000	232082						No peat recorded at location	
MKOS104	111209	232246						No peat recorded at location	
MKOS108	111895	232929						No peat recorded at location	
MKOS109	111266	233322	0.9	6	10	2.0	3.0	20.00	13.34
MKOS110	111289	233343	0.9	6	10	3.0	4.0	13.34	10.00
MKOS111	111312	233371	1.0	6	10	2.0	3.0	16.67	11.11
MKOS112	111324	233401	1.4	6	10	2.0	3.0	12.01	8.01
MKOS113	111336	233427	2.7	6	10	2.0	3.0	6.40	4.26
MKOS114	111346	233457	4.4	6	10	2.0	3.0	3.92	2.61
MKOS116	111226	233647	3.8	6	10	1.1	2.1	8.30	4.35
MKOS117	112153	235029	4.2	6	10	1.1	2.1	7.51	3.93
MKOS118	111351	233489	1.0	6	10	1.2	2.2	29.42	16.05
MKOS119	111362	233517	2.1	6	10	1.2	2.2	13.91	7.59
MKOS120	111149	233161	0.7	6	10	1.2	2.2	41.67	22.73
MKOS121	112254	234566	4.0	6	10	1.6	2.6	5.38	3.31
MKOS122	112228	234561	3.1	6	10	1.6	2.6	6.84	4.21
MKOS123	112158	235010	3.7	6	10	1.7	2.7	5.45	3.43
MKOS126	111576	234532	2.5	6	10	1.8	2.8	7.77	4.99
MKOS127	111588	234521	1.7	6	10	1.8	2.8	11.50	7.40
MKOS128	111360	233388	1.9	6	10	1.8	2.8	9.82	6.31
MKOS129	111326	233353	1.6	6	10	1.8	2.8	11.91	7.66
MKOS130	111161	233185	0.7	6	10	1.8	2.8	27.78	17.86
MKOS134	111227	233615	2.9	6	10	2.1	3.1	5.73	3.88
MKOS135	111221	233265	1.0	6	10	2.1	3.1	15.88	10.76
MKOS136	111250	233303	0.9	6	10	2.1	3.1	19.05	12.91
MKOS138	112234	234588	1.9	6	10	2.2	3.2	8.03	5.52
MKOS140	111184	233217	1.7	6	10	2.2	3.2	9.41	6.47
MKOS141	111171	233201	0.8	6	10	2.2	3.2	19.48	13.40
MKOS143	112134	234582	0.8	6	10	2.3	3.3	19.05	13.19
MKOS144	111345	233375	2.0	6	10	2.3	3.3	7.46	5.20
MKOS147	112165	234566	1.8	6	10	2.7	3.7	7.18	5.24
MKOS148	112210	234551	3.0	6	10	2.7	3.7	4.29	3.13
MKOS149	112239	234600	2.2	6	10	2.7	3.7	5.71	4.16
MKOS150	111571	234588	2.4	6	10	2.7	3.7	5.30	3.87
MKOS151	111249	233274	0.9	6	10	2.7	3.7	13.89	10.14
MKOS152	112135	234607	0.8	6	10	2.7	3.7	15.88	11.59
MKOS154	111202	233248	1.3	6	10	2.8	3.8	9.32	6.87
MKOS155	112145	234649	1.3	6	10	2.8	3.8	9.74	7.18
MKOS156	112203	234652	1.1	6	10	2.9	3.9	10.89	8.10
MKOS157	112160	234980	4.4	6	10	0.3	1.3	26.13	6.03
MKOS158	112234	234622	1.1	6	10	3.0	4.0	10.53	7.90
MKOS159	111214	233226	1.5	6	10	3.0	4.0	7.70	5.77
MKOS160	112149	234667	2.7	6	10	3.0	4.0	4.18	3.13
MKOS161	112181	234558	3.0	6	10	3.2	4.2	3.55	2.70
MKOS162	111265	233291	0.9	6	10	3.2	4.2	11.72	8.93
MKOS167	111306	233335	1.4	6	10	3.6	4.6	6.67	5.22
MKOS169	111287	233306	1.3	6	10	3.7	4.7	7.37	5.81
MKOS171	112210	234664	1.0	6	10	3.8	4.8	8.77	6.95
MKOS172	111237	233250	1.1	6	10	3.8	4.8	8.31	6.58
MKOS173	112056	233992	0.7	6	10	4.0	5.0	11.54	9.23
MKOS174	112150	234718	3.7	6	10	0.4	1.4	23.53	6.72
MKOS175	112043	233977	0.7	6	10	4.5	5.5	10.26	8.39
MKOS176	112016	233954	0.7	6	10	4.5	5.5	10.26	8.39
MKOS177	111916	233838	1.8	6	10	4.5	5.5	4.31	3.52
MKOS179	111612	234517	1.6	6	10	4.5	5.5	4.77	3.90
MKOS182	111999	233933	0.1	6	10	5.4	6.4	111.11	93.75
MKOS185	111986	234690	0.2	6	10	0.8	1.8	187.50	83.33
MKOS187	112147	234692	3.4	6	10	0.8	1.8	12.55	5.58
MKOS188	111975	234932	6.6	6	10	0.9	1.9	5.87	2.78
MKOS190	111226	233657	3.7	6	10	0.9	1.9	10.30	4.88
MKOS194	112161	234746						No peat recorded at location	
MKOS200	111965	234889						No peat recorded at location	
MKOS201	112004	234889						No peat recorded at location	
MKOS203	112100	234656						No peat recorded at location	
MKOS204	112100	234631						No peat recorded at location	
MKOS205	112088	234615						No peat recorded at location	
MKOS206	111571	234524						No peat recorded at location	
MKOS207	111585	234514						No peat recorded at location	
MKOS208	111569	234561						No peat recorded at location	
MKOS209	111533	234573						No peat recorded at location	
MKOS210	111524	234556						No peat recorded at location	
MKOS211	111222	233667						No peat recorded at location	
MKOS212	112151	234726						No peat recorded at location	
MKOS213	112162	234781						No peat recorded at location	
MKOS214	112158	234807						No peat recorded at location	
MKOS215	112158	234847						No peat recorded at location	
MKOS216	112145	234901						No peat recorded at location	
MKOS217	112160	234954						No peat recorded at location	
MKOS224	113372	234566	2.9	6	10	1.7	2.7	6.94	4.37

### Calculated FoS of Natural Peat Slopes for Ardderdd Wind Farm (Undrained Analysis)

Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Depth of In-situ Peat	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety for Load Condition	
			β (deg)	c <sub>u</sub> (kPa)	γ (kN/m <sup>3</sup> )	(m)	Condition (2)	Condition (1)	Condition (2)
MKOS231	112319	233202	1.9	6	10	2.0	3.0	9.10	6.07
MKOS232	113382	234668	0.2	6	10	2.0	3.0	100.00	66.67
MKOS235	113419	234639	0.1	6	10	2.7	3.7	111.11	81.08
MKOS242	111955	233992	0.6	6	10	3.6	4.6	15.15	11.86
MKOS244	111977	233988	0.6	6	10	4.1	5.1	14.64	11.77
MKOS245	113408	234693	3.5	6	10	4.3	5.3	2.26	1.83
MKOS250	113396	234565	2.7	6	10	0.9	1.9	14.22	6.73
MKOS253	113415	234577						No peat recorded at location	
MKOS256	112627	234357	0.7	6	10	1.6	2.6	31.25	19.23
MKOS257	112647	234352	0.7	6	10	1.9	2.9	24.30	15.92
MKOS258	112665	234352	0.7	6	10	1.7	2.7	29.42	18.52
MKOS259	112677	234366						No peat recorded at location	
MKOS265	112699	234363						No peat recorded at location	
MKOS276	112890	234252	2.5	6	10	1.6	2.6	8.54	5.25
MKOS277	112873	234278	2.6	6	10	1.0	2.0	13.07	6.54
MKOS278	112838	234302	2.1	6	10	1.0	2.0	16.69	8.34
MKOS282	113020	235312	5.1	6	10	1.0	2.0	6.72	3.36
MKOS283	112766	235426	7.7	6	10	1.0	2.0	4.49	2.25
MKOS284	112690	235498	8.7	6	10	1.0	2.0	4.01	2.01
MKOS286	113721	233433	1.8	6	10	1.0	2.0	18.77	9.38
MKOS288	112844	232685	2.1	6	10	1.1	2.1	15.47	7.92
MKOS289	113696	233558	2.2	6	10	1.1	2.1	14.01	7.34
MKOS290	113706	233508	2.6	6	10	1.1	2.1	12.15	6.36
MKOS292	112865	235341	3.8	6	10	1.2	2.2	7.50	4.09
MKOS293	112669	235522	8.4	6	10	1.2	2.2	3.47	1.90
MKOS294	114112	235679	7.6	6	10	1.3	2.3	3.53	2.00
MKOS298	112608	235600	4.8	6	10	1.4	2.4	5.14	3.00
MKOS305	112737	235445	8.0	6	10	1.8	2.8	2.43	1.56
MKOS306	113688	233580	0.7	6	10	1.8	2.8	25.65	16.49
MKOS308	112850	232671	2.1	6	10	1.8	2.8	9.02	5.80
MKOS312	112629	235569	5.6	6	10	1.9	2.9	3.25	2.13
MKOS320	112854	232651	0.1	6	10	2.0	3.0	300.00	200.00
MKOS321	113384	232579	6.5	6	10	0.2	1.2	26.66	4.44
MKOS322	113392	232516	4.0	6	10	0.2	1.2	43.07	7.18
MKOS329	113637	233615	1.0	6	10	2.3	3.3	14.50	10.10
MKOS331	112353	233244	1.3	6	10	2.4	3.4	10.88	7.68
MKOS335	112945	235309	5.0	6	10	2.5	3.5	2.78	1.99
MKOS337	113388	232625	6.6	6	10	0.3	1.3	21.15	4.23
MKOS338	113386	232558	5.9	6	10	0.3	1.3	23.33	4.67
MKOS341	112790	235412	6.8	6	10	2.6	3.6	1.96	1.42
MKOS342	112391	232796	3.4	6	10	2.6	3.6	3.92	2.83
MKOS344	112999	235315	5.3	6	10	2.7	3.7	2.44	1.78
MKOS348	113727	233403	1.4	6	10	2.8	3.8	8.58	6.32
MKOS349	112578	233800	0.8	6	10	2.9	3.9	14.78	10.99
MKOS350	112869	235360	4.5	6	10	3.0	4.0	2.58	1.93
MKOS351	113703	233526	2.8	6	10	3.0	4.0	4.09	3.07
MKOS354	113736	233371	2.2	6	10	3.2	4.2	4.94	3.76
MKOS355	113830	232852	3.7	6	10	3.2	4.2	2.90	2.21
MKOS359	112480	233812	0.2	6	10	3.4	4.4	58.82	45.45
MKOS360	112419	232798	0.1	6	10	3.4	4.4	88.24	68.18
MKOS361	112499	233847	1.4	6	10	3.4	4.4	7.06	5.46
MKOS362	113744	233351	2.1	6	10	3.4	4.4	4.78	3.69
MKOS363	113830	232850	3.7	6	10	3.4	4.4	2.73	2.11
MKOS364	112543	233816	0.7	6	10	3.5	4.5	14.29	11.11
MKOS370	113853	232847	4.2	6	10	3.5	4.5	2.36	1.84
MKOS371	113815	232862	2.9	6	10	3.5	4.5	3.37	2.62
MKOS372	112484	233822	1.0	6	10	3.5	4.5	9.53	7.41
MKOS374	112532	233845	2.3	6	10	3.5	4.5	4.29	3.34
MKOS376	112593	233779	1.2	6	10	3.5	4.5	8.17	6.35
MKOS377	113704	232706	1.2	6	10	3.5	4.5	8.17	6.35
MKOS379	113709	232679	3.1	6	10	3.5	4.5	3.13	2.43
MKOS381	112408	232783	0.2	6	10	3.5	4.5	57.14	44.44
MKOS383	112397	232819	0.2	6	10	3.5	4.5	57.14	44.44
MKOS384	113650	233593	0.9	6	10	3.5	4.5	10.72	8.34
MKOS385	112371	233253	1.4	6	10	3.5	4.5	6.86	5.34
MKOS386	113666	233598	0.8	6	10	3.5	4.5	12.25	9.53
MKOS398	113394	232648	6.3	6	10	0.4	1.4	13.68	3.91
MKOS399	113382	232538	5.8	6	10	0.4	1.4	15.00	4.29
MKOS401	114234	235756	8.3	6	10	0.5	1.5	8.45	2.82
MKOS402	114070	235632	7.8	6	10	0.5	1.5	8.92	2.97
MKOS403	113713	233485	0.6	6	10	0.5	1.5	114.60	38.20
MKOS406	114207	235735	10.9	6	10	0.6	1.6	5.40	2.03
MKOS407	114172	235718	9.3	6	10	0.6	1.6	6.30	2.36
MKOS408	113716	233461	0.6	6	10	0.6	1.6	95.50	35.81
MKOS410	113377	232597	6.6	6	10	0.6	1.6	8.81	3.30
MKOS411	112860	235342	4.4	6	10	0.7	1.7	11.20	4.61
MKOS413	112982	235315	5.4	6	10	0.8	1.8	8.05	3.58
MKOS414	112841	235367	7.4	6	10	0.8	1.8	5.87	2.61
MKOS417	114191	235728	10.6	6	10	0.9	1.9	3.69	1.75
MKOS419	112651	235542	7.5	6	10	0.9	1.9	5.18	2.45
MKOS420	113832	233188	4.5	6	10	0.9	1.9	8.60	4.07
MKOS425	113403	232706	4.2	6	10	0.9	1.9	9.18	4.35
MKOS427	113394	232681	5.7	6	10	0.9	1.9	6.80	3.22
MKOS428	113817	233183	4.7	6	10	0.9	1.9	8.09	3.83
MKOS429	114228	235747						No peat recorded at location	
MKOS430	114126	235691						No peat recorded at location	
MKOS432	114090	235654						No peat recorded at location	
MKOS433	112920	235323						No peat recorded at location	
MKOS435	112817	235398						No peat recorded at location	
MKOS436	112714	235471						No peat recorded at location	
MKOS437	112593	235622						No peat recorded at location	
MKOS442	114146	235710	7.4	6	10	0.8	1.8	5.91	2.63
MKOS444	112959	235300	5.3	6	10	1.9	2.9	3.46	2.27
MKOS446	113629	233646	1.4	6	10	2.8	3.8	8.93	6.58
MKOS448	112465	233831	0.9	6	10	2.9	3.9	12.93	9.62
MKOS450	112382	233261	1.3	6	10	4.0	5.0	6.82	5.46
MKOS455	113323	234736	7.1	6	10	0.5	1.5	9.75	3.25
MKOS456	113326	234727	5.5	6	10	1.8	2.8	3.50	2.25
MKOS484	112650	234487	3.4	6	10	1.1	2.1	9.28	4.86
MKOS485	112672	234491						No peat recorded at location	
MKOS488	112405	234638	6.2	6	10	0.1	1.1	56.20	5.11
MKOS489	112375	234625						No peat recorded at location	
MKOS490	112326	234620	3.3	6	10	1.2	2.2	8.65	4.72
MKOS491	112307	234591	2.9	6	10	3.8	4.8	3.10	2.46
MKOS492	112325	234593	3.1	6	10	2.7	3.7	4.05	2.96



### Calculated FoS of Natural Peat Slopes for Ardderroo Wind Farm (Undrained Analysis)

Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Depth of In-situ Peat	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety for Load Condition	
			$\beta$ (deg)	$c_u$ (kPa)	$\gamma$ (kN/m <sup>3</sup> )	(m)	Condition (2)	Condition (1)	Condition (2)
MKOS495	112302	234599	2.9	6	10	2.5	3.5	4.72	3.37
MKOS496	112504	233898	0.8	6	10	2.3	3.3	18.64	12.99
MKOS497	112498	233908	0.8	6	10	1.8	2.8	23.81	15.31
MKOS498	112510	233907	0.7	6	10	3.2	4.2	14.43	10.99
MKOS499	112525	233919	0.7	6	10	3.3	4.3	13.99	10.74
MKOS500	112496	233893	0.2	6	10	2.3	3.3	86.96	60.61
MKOS501	112482	233882	0.2	6	10	2.0	3.0	100.00	66.67
MKOS502	112084	234029	1.8	6	10	1.9	2.9	9.88	6.47
MKOS503	112071	234027	1.8	6	10	3.5	4.5	5.36	4.17
MKOS511	112376	233034	1.8	6	10	3.2	4.2	5.87	4.47
MKOS512	112375	233052	2.2	6	10	3.4	4.4	4.53	3.50
MKOS513	112370	233072	2.7	6	10	1.9	2.9	6.59	4.32
MKOS514	112369	233095	2.5	6	10	0.1	1.1	136.63	12.42
MKOS515	112361	233119	2.9	6	10	0.2	1.2	60.15	10.03
MKOS516	112405	233135	0.2	6	10	1.6	2.6	125.00	76.92
MKOS517	112392	233146	0.2	6	10	2.8	3.8	71.43	52.63
MKOS518	112394	233168	1.0	6	10	1.9	2.9	17.55	11.50
MKOS519	112389	233189	1.0	6	10	4.2	5.2	7.94	6.41
MKOS520	112383	233223	1.0	6	10	3.9	4.9	9.05	7.20
MKOS521	112376	233240	1.3	6	10	4.3	5.3	6.07	4.92
MKOS522	112345	233239	1.2	6	10	1.4	2.4	20.42	11.91
MKOS523	112332	233255	0.6	6	10	0.5	1.5	114.60	38.20
MKOS524	112323	233284	0.6	6	10	2.4	3.4	23.87	16.85
MKOS525	112314	233305	0.6	6	10	3.1	4.1	18.48	13.98
MKOS526	112366	233319	1.4	6	10	3.9	4.9	6.41	5.10
MKOS527	112642	232674	0.9	6	10	0.9	1.9	41.68	19.74
MKOS528	112644	232663	0.9	6	10	1.6	2.6	23.44	14.43
MKOS529	112635	232671	0.9	6	10	1.2	2.2	33.34	18.19
MKOS530	112659	232660	0.8	6	10	1.0	2.0	42.87	21.43
MKOS531	113027	232745	2.2	6	10	0.3	1.3	52.71	12.16
MKOS532	113036	232721	1.8	6	10	1.7	2.7	11.04	6.95
MKOS533	113695	233474	0.6	6	10	0.1	1.1	573.00	52.09
MKOS534	113679	233477	1.3	6	10	1.0	2.0	26.10	13.05
MKOS539	113681	233513	2.6	6	10	3.6	4.6	3.71	2.90
MKOS540	113690	233498	2.2	6	10	3.5	4.5	4.40	3.42
MKOS541	113699	233483	0.6	6	10	0.5	1.5	114.60	38.20
MKOS542	113812	233113	3.3	6	10	2.4	3.4	4.32	3.05
MKOS543	113819	233129	3.4	6	10	1.1	2.1	9.28	4.86
MKOS544	113841	233145	4.4	6	10	0.4	1.4	19.60	5.60
MKOS563	113572	232671	1.3	6	10	3.8	4.8	6.87	5.44
MKOS564	113559	232647	1.5	6	10	4.5	5.5	5.13	4.20
MKOS566	113051	232714	1.8	6	10	2.6	3.6	7.45	5.38
MKOS584	111146	233160	0.7	6	10	1.5	2.5	33.34	20.00
MKOS585	111123	233122	0.9	6	10	1.8	2.8	22.23	14.29
MKOS586	111115	233091	1.0	6	10	2.8	3.8	11.91	8.77
MKOS587	111113	233052	1.3	6	10	1.7	2.7	16.05	10.11
MKOS588	111121	233015	1.5	6	10	1.4	2.4	16.49	9.62
MKOS599	112016	232694	2.5	6	10	0.9	1.9	15.18	7.19
MKOS600	112017	232667	1.5	6	10	1.8	2.8	12.35	7.94
MKOS601	112012	232636	1.0	6	10	2.7	3.7	13.08	9.54
MKOS602	112006	232609	0.6	6	10	1.0	2.0	57.30	28.65
MKOS603	111986	232574	0.6	6	10	0.5	1.5	114.60	38.20
MKOS604	111971	232547	3.0	6	10	1.0	2.0	11.35	5.68
MKOS605	111951	232530	3.0	6	10	0.7	1.7	16.53	6.81
MKOS606	111921	232515	2.8	6	10	1.1	2.1	11.16	5.84
MKOS607	111899	232537	1.3	6	10	2.1	3.1	12.43	8.42
MKOS608	111881	232547	1.0	6	10	2.8	3.8	11.91	8.77
MKOS611	111566	231850	0.6	6	10	4.5	5.5	12.73	10.42
MKOS612	111547	231844	0.6	6	10	4.5	5.5	12.73	10.42
MKOS613	111585	231866	1.8	6	10	4.3	5.3	4.36	3.54
MKOS619	111213	231717	3.1	6	10	1.9	2.9	5.87	3.84
MKOS620	111215	231701	2.4	6	10	1.4	2.4	10.22	5.96
MKOS621	111210	231674	2.5	6	10	2.2	3.2	6.35	4.37
MKOS622	111223	231668	2.7	6	10	1.1	2.1	11.39	5.97
MKOS623	111202	231644	1.4	6	10	0.2	1.2	120.08	20.01
MKOS624	111200	231614	1.7	6	10	0.2	1.2	100.09	16.68
MKOS625	111197	231597						No peat recorded at location	
MKOS626	111212	231589	2.8	6	10	0.6	1.6	20.46	7.67
MKOS627	111190	231533	2.0	6	10	2.4	3.4	7.15	5.05
MKOS634	112030	232707						No peat recorded at location	
MKOS635	112039	232680	1.8	6	10	1.8	2.8	10.76	6.92
MKOS636	112038	232662	1.1	6	10	2.8	3.8	10.72	7.90
MKOS637	112050	232638	1.0	6	10	3.8	4.8	8.77	6.95
MKOS638	112052	232609	1.5	6	10	2.7	3.7	8.24	6.01
MKOS642	112234	234525						No peat recorded at location	
MKOS643	112224	234501						No peat recorded at location	
MKOS644	113421	234695	3.2	6	10	4.5	5.5	2.39	1.95
MKOS645	113416	234652	0.1	6	10	3.2	4.2	93.75	71.43
MKOS646	113416	234582	0.1	6	10	0.5	1.5	600.00	200.00
MKOS647	113443	234564	1.5	6	10	1.9	2.9	11.70	7.67
MKOS648	113450	234541	1.4	6	10	3.6	4.6	6.95	5.44
MKOS649	113444	234502	1.5	6	10	4.1	5.1	5.42	4.36
MKOS650	113445	234470	1.8	6	10	4.2	5.2	4.61	3.73
MKOS651	113440	234448	2.9	6	10	3.8	4.8	3.10	2.46
MKOS652	113406	234421	1.4	6	10	4.2	5.2	5.72	4.62
MKOS661	113341	234208	1.3	6	10	3.5	4.5	7.80	6.06
MKOS662	113327	234170	1.9	6	10	3.0	4.0	6.07	4.55
MKOS663	113331	234155	2.6	6	10	2.6	3.6	5.14	3.71
MKOS664	113318	234127	3.4	6	10	1.6	2.6	6.27	3.86
MKOS665	113349	234144	3.1	6	10	1.6	2.6	6.96	4.29

**Calculated FoS of Natural Peat Slopes for Ardderreo Wind Farm (Undrained Analysis)**

Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Depth of In-situ Peat	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety for Load Condition	
			β (deg)	c <sub>u</sub> (kPa)	γ (kN/m <sup>3</sup> )	(m)	Condition (2)	Condition (1)	Condition (2)
MKOS666	113361	234175	4.2	6	10	1.1	2.1	7.41	3.88
MKOS667	113373	234186	2.7	6	10	1.1	2.1	11.39	5.97
MKOS668	113398	234225	3.5	6	10	1.5	2.5	6.48	3.89
MKOS669	113411	234251	3.3	6	10	1.5	2.5	6.92	4.15
MKOS670	113424	234274	3.5	6	10	0.9	1.9	10.97	5.20
MKOS671	113439	234300	3.0	6	10	1.1	2.1	10.32	5.41
MKOS672	113437	234325	3.3	6	10	1.7	2.7	6.11	3.84
MKOS673	113439	234362	2.2	6	10	2.4	3.4	6.59	4.65
MKOS674	113438	234399	4.2	6	10	1.6	2.6	5.16	3.18
MKOS675	113434	234426	3.6	6	10	1.4	2.4	6.83	3.98
MKOS687	113683	233349	3.1	6	10	1.7	2.7	6.44	4.05
MKOS688	113718	233351	3.1	6	10	1.2	2.2	9.29	5.07
MKOS689	113737	233351	2.2	6	10	2.0	3.0	7.91	5.27
MKOS690	113750	233328	3.1	6	10	1.8	2.8	6.08	3.91
MKOS691	113806	233337	2.9	6	10	1.6	2.6	7.37	4.54
MKOS692	113821	233357	3.0	6	10	0.9	1.9	12.61	5.98
MKOS693	113838	233351	2.3	6	10	1.3	2.3	11.28	6.37
MKOS694	113882	233347	1.2	6	10	1.4	2.4	20.42	11.91
MKOS695	113908	233349	1.3	6	10	1.0	2.0	27.29	13.64
MKOS696	113931	233360	1.4	6	10	1.4	2.4	17.15	10.01
MKOS697	113961	233363	1.4	6	10	2.7	3.7	8.89	6.49
MKOS698	114001	233378	2.7	6	10	4.4	5.4	2.91	2.37
MKOS699	114038	233387	4.2	6	10	1.6	2.6	5.10	3.14
MKOS700	114072	233379	5.7	6	10	0.8	1.8	7.65	3.40
MKOS701	114091	233395	5.4	6	10	0.9	1.9	7.08	3.35
MKOS702	114090	233418	6.3	6	10	1.0	2.0	5.52	2.76
MKOS703	111589	234510	2.2	6	10	1.1	2.1	14.37	7.53
MKOS704	111583	234512						No peat recorded at location	
MKOS705	111598	234524	1.6	6	10	2.6	3.6	8.25	5.96
MKOS706	111608	234534	1.3	6	10	2.5	3.5	10.44	7.46
MKOS707	111627	234541	1.7	6	10	2.8	3.8	7.15	5.27
MKOS708	112673	234623	5.7	6	10	0.4	1.4	15.15	4.33
MKOS709	112666	234633	7.2	6	10	0.1	1.1	48.38	4.40
MKOS726	112950	235245	8.4	6	10	1.9	2.9	2.19	1.44
MKOS809	113893	232760	0.5	6	10	4.5	5.5	16.67	13.64
MKOS810	113891	232805	3.4	6	10	4.5	5.5	2.23	1.82
MKOS811	113915	232796	3.3	6	10	3.8	4.8	2.73	2.16
MKOS832	113692	232707	1.0	6	10	4.0	5.0	8.83	7.06
MKOS835	113745	232652	5.0	6	10	0.8	1.8	8.59	3.82
MKOS836	113744	232645	5.0	6	10	1.2	2.2	5.73	3.12
MKOS838	113774	232647	4.1	6	10	1.4	2.4	6.07	3.54
MKOS839	113160	232688	3.1	6	10	2.4	3.4	4.64	3.28
MKOS845	112601	232720						No peat recorded at location	
MKOS846	112608	232727	2.2	6	10	0.9	1.9	17.12	8.11
MKOS847	112609	232733	3.0	6	10	1.4	2.4	8.26	4.82
MKOS848	112620	232735	2.9	6	10	1.7	2.7	6.94	4.37
MKOS849	112627	232743	2.8	6	10	1.7	2.7	7.22	4.55
MKOS850	112620	232763	2.9	6	10	1.7	2.7	7.08	4.46
MKOS851	111198	231569	3.0	6	10	1.6	2.6	7.10	4.37
T9	112702	234554	3.8	6	10	1.4	2.4	6.52	3.80
T10	112171	234406	2.3	6	10	2.2	3.2	6.83	4.70
T12	112446	233855	1.1	6	10	4.6	5.6	6.52	5.36
WP 001	114505	235355	3.1	6	10	0.7	1.7	15.92	6.56
WP 002	114518	235342	2.5	6	10	1.5	2.5	9.32	5.59
WP 004	114427	235304	4.9	6	10	0.6	1.6	11.85	4.44
WP 005	114438	235272	3.7	6	10	0.7	1.7	13.24	5.45
WP 006	113619	234771	2.4	6	10	1.9	2.9	7.53	4.93
WP 007	113622	234804	2.6	6	10	2.1	3.1	6.36	4.31
WP 008	113610	234803	2.3	6	10	2.3	3.3	6.37	4.44
WP 009	113604	234769	2.5	6	10	1.9	2.9	7.36	4.82
WP 010	112594	234098	0.9	6	10	4.1	5.1	9.76	7.84
WP 011	112583	234110	0.9	6	10	3.6	4.6	10.42	8.15
WP 012	113703	233470	0.6	6	10	0.6	1.6	95.50	35.81
WP 013	113917	233350	1.3	6	10	0.9	1.9	30.32	14.36
WP 014	112135	234605	0.8	6	10	2.2	3.2	19.48	13.40
WP 018	110816	234056	1.3	6	10	1.4	2.4	19.49	11.37
WP 019	110545	233526	8.6	6	10	0.3	1.3	13.46	3.11
WP 020	110365	233353	5.8	6	10	1.2	2.2	4.95	2.70
WP 021	110058	233098	2.9	6	10	0.4	1.4	29.49	8.43
WP 022	110063	233101	3.1	6	10	0.5	1.5	21.88	7.29
WP 024	109868	232753	5.5	6	10	4.0	5.0	1.57	1.26
WP 025	109895	232667	3.0	6	10	7.2	8.2	1.59	1.40
WP 026	109914	232310	1.8	6	10	5.2	6.2	3.61	3.03
WP 027	110119	232316	1.3	6	10	3.4	4.4	7.68	5.93
WP 028	110285	232198	1.1	6	10	2.3	3.3	13.05	9.09
WP 029	110395	232169	2.4	6	10	1.5	2.5	9.54	5.72
WP 030	109823	232366	6.4	6	10	0.2	1.2	27.12	4.52
WP 031	109800	232403	7.6	6	10	0.6	1.6	7.60	2.85
WP 032	109858	232424	4.2	6	10	5.2	6.2	1.57	1.31
WP 034	110894	233589	0.7	6	10	4.1	5.1	11.26	9.05
WP 035	111020	233516	1.7	6	10	4.0	5.0	5.18	4.14
WP 036	111215	233578	0.9	6	10	3.0	4.0	13.34	10.00
WP 039	111873	233332	1.1	6	10	4.5	5.5	7.02	5.74
WP 040	111902	233230	1.4	6	10	4.0	5.0	6.25	5.00
WP 043	110365	232142	1.5	6	10	1.6	2.6	13.90	8.55
WP 050	110453	232105	1.3	6	10	1.8	2.8	15.16	9.74
WP 051	111252	231719	3.5	6	10	0.7	1.7	13.88	5.71
WP 052	111254	231671	3.4	6	10	2.7	3.7	3.78	2.76
S 24	112603	234134	0.9	6	10	3.4	4.4	11.03	8.52
S2_4A	112580	234086	0.9	6	10	3.8	4.8	10.53	8.34
P22	113707	233389	1.5	6	10	2.5	3.5	9.24	6.60
P 13	113848	233337	2.2	6	10	0.7	1.7	22.59	9.30
P1_3A	113839	233376	2.5	6	10	0.9	1.9	15.18	7.19
WP 013A	113908	233389	1.9	6	10	0.8	1.8	22.08	9.82
WP 014A	112149	234506	3.7	6	10	0.6	1.6	15.45	5.79
WP 032A	109803	232447	8.9	6	10	0.5	1.5	7.88	2.63
R 48	110727	233640	0.5	6	10	4.7	5.7	14.19	11.70
WP 052A	111249	231621	2.9	6	10	1.8	2.8	6.68	4.30
T6	112978	235326	5.2	6	10	2.1	3.1	3.17	2.14

**Calculated FoS of Natural Peat Slopes for Ardderreo Wind Farm (Undrained Analysis)**

Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Depth of In-situ Peat	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety for Load Condition	
			$\beta$ (deg)	$c_u$ (kPa)	$\gamma$ (kN/m <sup>3</sup> )	(m)	Condition (2)	Condition (1)	Condition (2)
T27	113486	235115	13.4	6	10	1.0	2.0	2.66	1.33
T28	113413	234488	1.0	6	10	4.0	5.0	8.34	6.67
T29	114356	234688	0.6	6	10	0.7	1.7	81.86	33.71
31	113418	234694	3.2	6	10	3.5	4.5	3.07	2.39
32	113420	234644	0.1	6	10	2.5	3.5	120.00	85.71
33	113418	234594	0.1	6	10	2.2	3.2	136.36	93.75
34	113443	234560	1.5	6	10	2.0	3.0	11.12	7.41
35	113448	234511	1.5	6	10	3.3	4.3	6.74	5.17
37	114358	235281	2.7	6	10	0.6	1.6	20.88	7.83
38	114353	235231	3.8	6	10	0.2	1.2	44.98	7.50
39	114348	235181	3.4	6	10	1.2	2.2	8.36	4.56
40	114360	235133	4.5	6	10	0.3	1.3	25.47	5.88
41	114365	235083	2.1	6	10	0.4	1.4	41.72	11.92
42	114367	235034	0.1	6	10	0.1	1.1	3000.01	272.73
43	114370	234984	1.7	6	10	0.6	1.6	33.36	12.51
44	114371	234934	2.7	6	10	0.2	1.2	85.29	11.13
45	114373	234884	1.8	6	10	0.5	1.5	43.05	13.36
46	114375	234834	2.7	6	10	0.5	1.5	27.84	8.64
47	114375	234784	3.8	6	10	1.2	2.2	7.50	4.09
48	114375	234734	2.6	6	10	1.0	2.0	13.07	6.54
49	114378	234687	1.9	6	10	0.2	1.2	117.78	15.36
55	113802	235326	10.1	6	10	0.7	1.7	4.94	2.03
56	113773	235286	12.0	6	10	0.1	1.1	29.45	2.68
57	113737	235251	13.1	6	10	0.2	1.2	13.57	2.26
58	113696	235223	11.3	6	10	0.9	1.9	3.69	1.69
59	113654	235196	10.9	6	10	1.0	2.0	3.24	1.62
60	113610	235172	11.9	6	10	0.4	1.4	7.46	2.13
61	113567	235147	15.3	6	10	0.2	1.2	11.81	1.97
62	113511	235123	17.2	6	10	0.3	1.3	7.09	1.64
PB1	114212	235875	1.8	6	10	1.4	2.4	13.41	7.82
PB4	114269	235858	4.1	6	10	1.7	2.7	4.93	3.10
WP004	114251	235902	2.0	6	10	1.8	2.8	9.54	6.13
81	114549	236392	0.6	6	10	1.7	2.7	33.71	21.22
1	113693	234794	3.0	6	10	0.1	1.1	113.53	10.32
2	113708	234798	2.9	6	10	0.1	1.1	117.95	10.72
3	113689	234820	9.3	6	10	0.1	1.1	37.79	3.44
4	113699	234824	11.3	6	10	0.2	1.2	20.90	2.73
5	113726	234812						No peat recorded at location	
6	113709	234825						No peat recorded at location	
7	113684	234816						No peat recorded at location	
8	113711	234835						No peat recorded at location	
9	113720	234835	10.5	6	10	0.1	1.1	67.08	3.19
19	113765	234856	9.5	6	10	0.1	1.1	33.57	3.33
20	113759	234852	9.7	6	10	0.1	1.1	32.83	3.25
21	113766	234839	9.5	6	10	0.3	1.3	14.77	2.95
22	113764	234832	0.6	6	10	0.2	1.2	382.00	49.83
23	113763	234816	7.7	6	10	0.2	1.2	22.63	3.77
24	113739	234815	7.5	6	10	0.2	1.2	23.12	3.85
25	113821	234837	8.1	6	10	0.3	1.3	17.13	3.43
26	113805	234838	7.7	6	10	0.7	1.7	6.42	2.64
27	113799	234824	8.6	6	10	0.5	1.5	8.13	2.71
28	113784	234815	8.2	6	10	0.3	1.3	14.18	3.27
29	113734	234795	4.4	6	10	0.9	1.9	8.71	4.13
30	113759	234805	7.1	6	10	0.2	1.2	24.57	4.09
31	113803	234817	8.8	6	10	0.3	1.3	13.21	3.05
7B	114287	235619	9.3	6	10	0.9	1.9	4.20	1.99
9B	114288	235764	4.1	6	10	0.4	1.4	20.94	5.98
10B	114278	235835	4.1	6	10	1.2	2.2	6.98	3.81
11B	114210	235842	0.2	6	10	1.2	2.2	125.00	68.18
12B	114183	235776	11.3	6	10	0.4	1.4	7.84	2.24
13B	114119	235643	8.6	6	10	0.1	1.1	40.39	3.67
14B	114080	235581	8.3	6	10	1.0	2.0	4.20	2.10
16B	114032	235523	9.8	6	10	0.6	1.6	5.99	2.24
24B	113951	235429	7.0	6	10	0.3	1.3	16.64	3.84
26B	113847	235322	11.2	6	10	0.2	1.2	15.75	2.62
28B	113736	235225	13.7	6	10	1.0	2.0	2.61	1.30
30B	113588	235159	12.5	6	10	1.0	2.0	2.84	1.42
47B	113456	235162	12.0	6	10	0.1	1.1	29.45	2.68
49B	113309	235189	9.3	6	10	0.2	1.2	18.78	3.13
50B	113235	235202	8.1	6	10	1.7	2.7	2.54	1.60
52B	113092	235243	8.1	6	10	0.9	1.9	4.76	2.25
60B	113761	233512	2.9	6	10	0.3	1.3	40.10	9.25
61B	113786	233419	0.2	6	10	2.5	3.5	60.00	42.86
62B	113842	233469	3.0	6	10	0.9	1.9	12.86	6.09
72B	109911	232506	2.3	6	10	1.0	2.0	15.02	7.51
WP001B	113524	235182	12.5	6	10	0.1	1.1	28.36	2.58
WP006B	110978	233591	1.4	6	10	3.8	4.8	6.58	5.21
WP008B	109880	232455	3.8	6	10	1.5	2.5	6.09	3.65
WP001	113813	233127	3.3	6	10	1.6	2.6	6.49	3.99
WP002	113816	233222	4.3	6	10	0.7	1.7	11.34	4.67
WP003	113836	233332	3.3	6	10	0.6	1.6	17.60	6.60
WP004	113771	233321	2.8	6	10	1.2	2.2	10.23	5.58
WP005	113752	233343	2.0	6	10	2.8	3.8	6.13	4.52
WP006	113702	233446	1.7	6	10	1.4	2.4	14.79	8.63
WP007	113779	233183	3.3	6	10	0.9	1.9	11.73	5.56
B13	113886	233511	3.2	6	10	1.6	2.6	6.72	4.13
B14	113914	233441	2.2	6	10	2.5	3.5	6.32	4.52
B15	113926	233370	1.4	6	10	2.3	3.3	10.44	7.28
B18	113741	233421	1.7	6	10	2.4	3.4	8.63	6.09
B21	113765	233303	3.3	6	10	0.8	1.8	13.20	5.87
B22	113810	233315	3.2	6	10	0.7	1.7	15.35	6.32
B23	113854	233327	1.8	6	10	0.7	1.7	27.68	11.40
B28	113806	233113	2.9	6	10	2.3	3.3	5.13	3.57
B29	113786	233208	3.3	6	10	0.8	1.8	12.97	5.77
R1	111918	233085	0.2	6	10	2.6	3.6	57.69	41.67
R10	112374	233130	2.6	6	10	1.4	2.4	9.54	5.57
R2	111968	233090	0.6	6	10	3.1	4.1	18.48	13.98
R3	112017	233095	1.1	6	10	2.6	3.6	11.54	8.34
R7	112216	233114	2.5	6	10	3.8	4.8	3.68	2.91

**Calculated FoS of Natural Peat Slopes for Ardderroo Wind Farm (Undrained Analysis)**

Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Depth of In-situ Peat	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety for Load Condition	
								Condition (1)	Condition (2)
			$\beta$ (deg)	$c_u$ (kPa)	$\gamma$ (kN/m <sup>3</sup> )	(m)	Condition (2)	Condition (1)	Condition (2)
R8	112266	233119	2.6	6	10	0.9	1.9	14.52	6.88
R9	112316	233124	0.1	6	10	0.6	1.6	1000.00	375.00
SUB5	113896	234936	7.6	6	10	0.5	1.5	9.12	3.04
MKOSA-1	113760	233350	2.0	6	10	2.1	3.1	8.17	5.54
MKOSA-2	113769	233360	2.0	6	10	2.2	3.2	7.80	5.36
MKOSA-3	113778	233370	1.8	6	10	2.0	3.0	9.69	6.46
MKOSA-4	113801	233386	2.5	6	10	1.0	2.0	13.66	6.83
MKOSA-5	113811	233403	2.2	6	10	1.0	2.0	15.81	7.91
MKOSA-6	113832	233415	2.6	6	10	1.1	2.1	12.15	6.36
MKOSA-7	113842	233441	2.9	6	10	1.0	2.0	12.03	6.02
MKOSA-8	113849	233463	3.0	6	10	0.8	1.8	14.46	6.43
MKOSA-9	113844	233487	3.8	6	10	1.2	2.2	7.50	4.09
MKOSA-10	113841	233510	3.8	6	10	0.4	1.4	22.83	6.52
MKOSA-11	113730	233485	0.6	6	10	1.2	2.2	47.75	26.05
MKOSA-12	113747	233472	2.2	6	10	0.4	1.4	38.52	11.01
MKOSA-13	113777	233443	0.1	6	10	3.6	4.6	83.33	65.22
MKOSA-14	113784	233442	0.2	6	10	4.0	5.0	50.00	40.00
MKOSA-15	113799	233431	2.2	6	10	2.4	3.4	6.42	4.53
MKOSA-16	113809	233413	2.2	6	10	0.5	1.5	31.62	10.54
MKOSA-17	113826	233402	2.5	6	10	0.5	1.5	27.33	9.11
MKOSA-18	113838	233385	2.5	6	10	1.2	2.2	11.65	6.35
MKOSA-19	113862	233368	0.6	6	10	1.0	2.0	57.30	28.65
MKOSA-20	113887	233353	1.3	6	10	1.0	2.0	27.29	13.64
MKOSA-30	113819	233261	3.7	6	10	1.0	2.0	9.27	4.63
MKOSA-31	113805	233255	3.2	6	10	1.0	2.0	10.75	5.37
MKOSA-32	113794	233232	3.4	6	10	1.0	2.0	10.20	5.10
MKOSA-33	112361	233119	2.9	6	10	0.2	1.2	60.15	10.03
MKOSA-34	112369	233095	2.5	6	10	0.1	1.1	136.63	12.42
MKOSA-35	112370	233072	2.7	6	10	1.9	2.9	6.59	4.32
MKOSA-36	112375	233052	2.2	6	10	3.4	4.4	4.53	3.50
MKOSA-39	112319	233202	1.9	6	10	2.0	3.0	9.10	6.07
MKOSA-40	111921	233082	0.9	6	10	4.0	5.0	9.38	7.50
MKOSA-41	111926	233081	0.7	6	10	3.5	4.5	14.29	11.11
MKOSA-42	111937	233068	1.7	6	10	3.2	4.2	6.26	4.77
MKOSA-43	111948	233060	1.8	6	10	3.5	4.5	5.54	4.31
MKOSA-44	111960	233053	1.9	6	10	3.5	4.5	5.05	3.93
MKOSA-45	111975	233045	1.9	6	10	2.5	3.5	7.28	5.20
MKOSA-46	111994	233041	2.2	6	10	2.6	3.6	5.93	4.28
MKOSA-47	112005	233041	2.3	6	10	3.2	4.2	4.58	3.49
MKOSA-48	112021	233037	2.3	6	10	1.7	2.7	8.84	5.56
MKOSA-49	112030	233034	2.6	6	10	1.0	2.0	13.36	6.68
MKOSA-50	112041	233036	2.6	6	10	1.7	2.7	7.86	4.95
MKOSA-51	112060	233034	2.3	6	10	1.3	2.3	11.28	6.37
MKOSA-52	112076	233026	1.8	6	10	1.7	2.7	11.04	6.95
MKOSA-53	112092	233017	1.4	6	10	0.5	1.5	48.03	16.01
MKOSA-54	112107	233021	1.3	6	10	0.9	1.9	29.00	13.74
MKOSA-55	112121	233020	1.1	6	10	1.1	2.1	27.28	14.29
MKOSA-56	112135	233015	0.1	6	10	1.8	2.8	333.33	214.29
MKOSA-57	112150	233009	0.1	6	10	1.8	2.8	166.67	107.14
MKOSA-58	112165	233001	0.1	6	10	1.8	2.8	166.67	107.14
MKOSA-85	111193	232259	7.1	6	10	2.0	3.0	2.46	1.64
MKOSA-86	112641	232746	2.6	6	10	2.4	3.4	5.57	3.93
MKOSA-88	112649	232780	2.3	6	10	2.8	3.8	5.37	3.95
MKOSA-89	112636	232785	2.0	6	10	1.8	2.8	9.54	6.13
MKOSA-91	112610	232783	2.3	6	10	1.0	2.0	15.02	7.51
MKOSA-92	111845	233804	0.8	6	10	3.5	4.5	12.25	9.53
MKOSA-93	111831	233824	0.8	6	10	3.8	4.8	11.28	8.93
MKOSA-99	111159	232305						No peat recorded at location	
1	114278	235873	3.5	6	10	0.8	1.8	12.14	5.40
2	114181	235913	2.7	6	10	1.0	2.0	12.53	6.26
3	114152	235728	8.3	6	10	0.7	1.7	6.04	2.49
4	114081	235568	8.6	6	10	2.0	3.0	2.03	1.35
5	113849	235306	12.0	6	10	0.2	1.2	14.72	2.45
6	113734	235226	13.7	6	10	0.4	1.4	6.51	1.86
7	113595	235165	12.5	6	10	0.3	1.3	9.45	2.18
8	113536	235192	11.6	6	10	0.9	1.9	3.39	1.61
9	113146	235208	11.0	6	10	1.0	2.0	3.21	1.60
10	112858	235336	3.5	6	10	0.1	1.1	98.73	8.98
11	112941	235494	6.0	6	10	3.5	4.5	1.65	1.28
12	113057	235550	7.0	6	10	2.1	3.1	2.38	1.61
13	113246	235580	4.5	6	10	0.6	1.6	12.90	4.84
14	113371	235650	4.7	6	10	2.1	3.1	3.51	2.38
15	112789	235367	11.7	6	10	0.7	1.7	4.32	1.78
16	112648	235577	6.4	6	10	0.4	1.4	13.56	3.87
17	112649	235703	7.0	6	10	0.4	1.4	12.38	3.54
18	112685	235789	3.6	6	10	0.3	1.3	31.87	7.36
21	114371	234777	3.7	6	10	1.2	2.2	7.72	4.21
22	114333	234716	3.2	6	10	1.1	2.1	9.77	5.12
27	113424	234533	1.8	6	10	2.4	3.4	7.82	5.52
28	113488	234518	1.2	6	10	2.6	3.6	10.99	7.94
68	113380	233936	2.2	6	10	4.0	5.0	3.85	3.08
69	113745	233307	3.8	6	10	0.7	1.7	13.04	5.37
70	113643	233277	5.9	6	10	0.7	1.7	8.41	3.46
71	113537	233246	7.1	6	10	0.4	1.4	12.28	3.51
72	113480	233280	5.7	6	10	0.6	1.6	10.10	3.79
74	113397	232635	6.6	6	10	0.7	1.7	7.55	3.11
77	112521	232712	0.4	6	10	0.3	1.3	285.73	65.94
78	112434	232818	0.2	6	10	0.3	1.3	666.67	153.85
79	112286	233234	2.2	6	10	1.7	2.7	9.30	5.86
80	112288	233333	1.3	6	10	3.0	4.0	8.70	6.53
81	112290	233432	0.7	6	10	3.4	4.4	13.58	10.49
82	112530	233806	1.8	6	10	4.7	5.7	3.99	3.29
84	112593	233955	1.6	6	10	2.5	3.5	8.58	6.13
85	112934	234318	1.6	6	10	0.9	1.9	23.83	11.29
86	112826	234267	3.5	6	10	0.7	1.7	13.88	5.71
87	112754	234261	3.6	6	10	1.0	2.0	9.56	4.78
88	112707	234291	2.6	6	10	1.1	2.1	11.88	6.22

**Calculated FoS of Natural Peat Slopes for Ardderrog Wind Farm (Undrained Analysis)**

Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Depth of In-situ Peat	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety for Load Condition	
			β (deg)	c <sub>u</sub> (kPa)	γ (kN/m <sup>3</sup> )	(m)	Condition (2)	Condition (1)	Condition (2)
89	112625	234385	0.6	6	10	1.9	2.9	28.71	18.81
90	112235	234630	1.1	6	10	2.7	3.7	11.70	8.54
91	112209	234559	3.0	6	10	2.6	3.6	4.45	3.21
92	112177	234464	3.7	6	10	0.7	1.7	13.45	5.54
93	112245	234342	0.1	6	10	0.7	1.7	428.57	176.47
94	111976	234600	2.1	6	10	2.7	3.7	6.01	4.39
95	111953	234799	2.2	6	10	2.0	3.0	7.91	5.27
96	111968	234884	5.4	6	10	0.8	1.8	8.05	3.58
97	112044	234955	4.8	6	10	0.3	1.3	23.98	5.53
98	112106	234983	4.2	6	10	0.2	1.2	41.31	6.89
99	111740	234571	2.9	6	10	1.5	2.5	7.86	4.72
100	111691	234448	2.8	6	10	0.6	1.6	20.46	7.67
101	111642	234325	3.9	6	10	2.0	3.0	4.37	2.91
102	111829	233785	0.8	6	10	3.7	4.7	11.59	9.12
103	111945	233923	2.2	6	10	5.4	6.4	2.85	2.41
104	112013	233969	0.6	6	10	0.4	1.4	150.02	42.86
105	112102	233995	1.6	6	10	2.5	3.5	8.58	6.13
106	111090	233697	4.1	6	10	1.2	2.2	7.08	3.86
107	111161	233652	3.0	6	10	1.6	2.6	7.23	4.45
108	111230	233603	0.8	6	10	1.7	2.7	25.22	15.88
109	111427	233524	1.0	6	10	0.5	1.5	66.69	22.23
110	111296	233349	0.9	6	10	3.5	4.5	10.72	8.34
111	111165	233174	0.6	6	10	1.6	2.6	34.10	20.98
125	111039	232193	0.6	6	10	0.9	1.9	63.67	30.16
126	110932	232069	2.7	6	10	2.1	3.1	5.97	4.04
127	110877	231982	0.6	6	10	1.7	2.7	33.71	21.22
wp005	111204	233261	1.1	6	10	1.8	2.8	17.55	11.28
wp006	111932	234707	0.2	6	10	3.5	4.5	42.86	33.33
wp007	113986	235417	13.5	6	10	0.8	1.8	3.29	1.46
wp010	112922	235339	4.0	6	10	0.1	1.1	86.13	7.83
DB3	117295	236738	1.8	6	10	1.6	2.6	12.23	7.52
DB5	117169	236733	4.8	6	10	0.8	1.8	8.99	4.00
DB6	117181	236715	0.6	6	10	0.7	1.7	81.86	33.71
DB7	117214	236680	3.6	6	10	0.7	1.7	13.66	5.62
DB10	117093	236667	7.7	6	10	0.3	1.3	15.08	3.48
DB11	117111	236641	10.3	6	10	0.2	1.2	17.03	2.84
DB14	116990	236645	8.6	6	10	0.6	1.6	6.73	2.52
DB15	117005	236620	7.0	6	10	0.4	1.4	12.48	3.57
DB20	116917	236573	4.3	6	10	0.8	1.8	9.93	4.41
DB21	116931	236532	8.1	6	10	0.2	1.2	21.55	3.59
DB24	116810	236559	6.1	6	10	0.6	1.6	9.54	3.58
DB25	116828	236527	5.3	6	10	1.3	2.3	5.01	2.83
DB30	116779	236489	2.3	6	10	1.9	2.9	7.91	5.18
DB32	116728	236530	5.0	6	10	0.8	1.8	8.69	3.86
DB33	116712	236578	9.7	6	10	0.5	1.5	7.22	2.41
DB34	116625	236563	2.9	6	10	1.0	2.0	12.03	6.02
DB35	116645	236585	4.8	6	10	0.6	1.6	11.99	4.50
DB37	116536	236608	5.3	6	10	0.4	1.4	16.27	4.65
wp001	116704	236530	0.6	6	10	0.9	1.9	63.67	30.16
wp002	116828	236494	2.1	6	10	1.8	2.8	9.02	5.80
wp003	117254	236761	2.5	6	10	1.8	2.8	7.77	4.99
T14	112557	233817	0.7	6	10	3.0	4.0	16.67	12.50
T14-1	112537	233828	0.9	6	10	1.9	2.9	21.06	13.80
T14-2	112521	233830	2.1	6	10	3.2	4.2	5.07	3.87
T14-3	112506	233837	1.3	6	10	3.5	4.5	7.80	6.06
T14-4	112579	233828	0.9	6	10	4.9	5.9	8.25	6.84
T14-5	112597	233818	0.9	6	10	5.0	6.0	8.00	6.67
T14-7	112546	233805	0.8	6	10	4.0	5.0	10.72	8.57
T14-8	112549	233777	1.4	6	10	5.0	6.0	5.00	4.17
T14-9	112551	233771	1.4	6	10	4.0	5.0	6.25	5.00
T14-10	112556	233832	0.9	6	10	1.0	2.0	40.01	20.00
T14-11	112557	233858	2.3	6	10	1.0	2.0	14.66	7.33
T14-12	112557	233872	2.3	6	10	1.5	2.5	10.02	6.01
T15-1	113360	233936	2.3	6	10	2.0	3.0	7.51	5.01
T15-2	113360	233940	2.3	6	10	2.6	3.6	5.64	4.07
T15-3	113362	233960	2.2	6	10	1.2	2.2	12.84	7.00
T15-11	113392	233919	1.8	6	10	3.0	4.0	6.26	4.69
T15-12	113414	233919	1.7	6	10	0.6	1.6	34.51	12.94
T21	111986	232610	0.6	6	10	1.7	2.7	35.30	22.22
T21-1	111961	232614	0.6	6	10	5.0	6.0	12.00	10.00
T21-4	111996	232611	0.6	6	10	0.5	1.5	120.01	40.00
T21-5	112022	232610	0.6	6	10	1.8	2.8	33.34	21.43
T21-6	112032	232610	1.8	6	10	2.8	3.8	6.92	5.10
T21-7	111977	232602	0.6	6	10	1.5	2.5	40.00	24.00
T21-8	111974	232586	0.6	6	10	1.1	2.1	54.55	28.57
T21-9	111964	232567	0.6	6	10	1.7	2.7	35.30	22.22
T21-10	111987	232628	0.6	6	10	2.0	3.0	30.00	20.00
T21-11	111992	232648	0.6	6	10	2.4	3.4	25.00	17.65
T21-12	112001	232668	0.6	6	10	2.0	3.0	30.00	20.00
T10 route	113599	234505	4.0	6	10	1.0	2.0	8.61	4.31
T101	113638	234492	0.1	6	10	1.3	2.3	230.77	130.44
T102	113628	234496	0.3	6	10	1.5	2.5	80.00	48.00
T103	113616	234472	1.2	6	10	3.0	4.0	9.53	7.15
T104	113632	234747	2.9	6	10	2.2	3.2	5.47	3.76
T15	113400	233922	1.8	6	10	2.7	3.7	11.04	6.95
T151	113421	233905	1.4	6	10	4.2	5.2	5.72	4.62
T1510	113389	233740	2.9	6	10	0.8	1.8	15.04	6.68
T152	113414	233895	1.4	6	10	4.5	5.5	5.34	4.37
T156	113428	233782	2.1	6	10	0.9	1.9	18.54	8.78
T157	113427	233755	3.7	6	10	1.2	2.2	7.72	4.21
T159	113461	233729	1.7	6	10	2.5	3.5	8.28	5.92
MCKOS 1.1	113519	233243	6.8	6	10	1.0	2.0	5.11	2.56
MCKOS 1.2	112665	234497	4.6	6	10	1.1	2.1	6.86	3.59
MCKOS 1.3	112708	234483	5.7	6	10	0.4	1.4	15.15	4.33
MCKOS 1.4	112698	234413	5.8	6	10	0.2	1.2	29.72	4.95
MCKOS 1.5	112677	234460	4.1	6	10	0.9	1.9	9.31	4.41
MCKOS 1.6	112645	234437	1.1	6	10	4.7	5.7	6.39	5.27
MCKOS 1.7	114481	235273	1.6	6	10	1.5	2.5	14.30	8.58
MCKOS 1.8	114437	235315	4.9	6	10	0.8	1.8	8.89	3.95
MCKOS 1.9	114437	235237	2.2	6	10	2.4	3.4	6.42	4.53
MCKOS 1.10	114440	235263	3.4	6	10	2.1	3.1	4.78	3.24
MCKOS 1.11	114390	235292	3.4	6	10	1.5	2.5	6.69	4.01
MCKOS 1.12	113700	233265	3.1	6	10	1.0	2.0	10.94	5.47
MCKOS 1.13	113636	233246	5.7	6	10	0.5	1.5	12.24	4.08
MCKOS 1.14	113445	233251	6.4	6	10	0.9	1.9	6.03	2.85

### Calculated FoS of Natural Peat Slopes for Ardderreo Wind Farm (Undrained Analysis)

Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Depth of In-situ Peat	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety for Load Condition	
								Condition (1)	Condition (2)
			$\beta$ (deg)	$c_u$ (kPa)	$\gamma$ (kN/m <sup>3</sup> )	(m)	Condition (2)		
MCKOS 1.15	113396	233244	4.8	6	10	0.5	1.5	14.39	4.80
MCKOS 1.16	113378	233216	1.4	6	10	3.5	4.5	6.86	5.34
MCKOS 1.17	113368	233272	5.6	6	10	1.6	2.6	3.86	2.38
MCKOS 1.18	113431	233279	6.1	6	10	0.2	1.2	28.62	4.77
MCKOS 1.19	113437	233240	5.8	6	10	0.7	1.7	8.49	3.50
MCKOS 1.20	112195	234502	4.7	6	10	1.3	2.3	5.60	3.16
MCKOS 1.21	112176	234425	3.4	6	10	1.8	2.8	5.58	3.58
MCKOS 1.22	112270	234374	1.3	6	10	1.4	2.4	19.49	11.37
MCKOS 1.23	112298	234370	1.5	6	10	1.5	2.5	14.83	8.90
MCKOS 1.24	112292	234427	2.0	6	10	1.8	2.8	9.54	6.13
MCKOS 1.25	112324	234366	1.9	6	10	0.9	1.9	20.22	9.58
MCKOS 1.26	112283	234342	1.2	6	10	1.6	2.6	17.87	10.99
MCKOS 1.27	112703	234305	3.7	6	10	0.9	1.9	10.46	4.95
MCKOS 1.28	112798	234259	4.4	6	10	0.2	1.2	39.19	6.53
MCKOS 1.29	112915	234326	1.8	6	10	0.9	1.9	20.85	9.88
MCKOS 1.30	112935	234328	1.5	6	10	0.9	1.9	24.71	11.70
MCKOS 1.31	112939	234361	1.8	6	10	1.1	2.1	17.61	9.23
MCKOS 1.32	112961	234331	2.1	6	10	0.9	1.9	18.54	8.78
MCKOS 1.33	112940	234305	1.6	6	10	0.9	1.9	23.83	11.29

Minimum = 1.57 1.26  
Maximum = 3000.01 375.00  
Average = 27.55 11.10

**Notes:**

- (1) Assuming a bulk unit weight for peat of 10kN/m<sup>3</sup>
- (2) Assuming a surcharge equivalent to fill depth of 1m of peat.
- (3) Slope inclination ( $\beta$ ) based on site readings and site contour plans.
- (4) A lower bound undrained shear strength,  $c_u$  for the peat of 6kPa was selected for the analysis 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 generally has a higher undrained strength.
- (5) Peat depths based on peat depth probes.
- (6) For load conditions see Report text.

### Calculated FoS of Natural Peat Slopes for Ardderreo Wind Farm (Drained Analysis)

Turbine No./Waypoint	Slope	Design c'	Bulk unit weight of Peat	Unit weight of Water	100% Water to height of Peat	Depth of In-situ Peat	Friction Angle	Equivalent Total Depth of Peat (m)	Factor of Safety for Load Condition	
	$\alpha$ (deg)	c' (kPa)	$\gamma$ (kN/m <sup>3</sup> )	$\gamma_w$ (kN/m <sup>3</sup> )	(m)	(m)	$\phi'$ (deg)	Condition (2)	Condition (1)	Condition (2)
									100% Water	100% Water
T1	3	4	10.0	10.0	0.9	0.9	25	1.90	8.50	8.71
T2	3	4	10.0	10.0	1.3	1.3	25	2.30	5.89	7.20
T3	10	4	10.0	10.0	0.9	0.9	25	1.90	2.60	2.62
T4	6	4	10.0	10.0	1.5	1.5	25	2.50	2.57	3.31
T5	4	4	10.0	10.0	0.7	0.7	25	1.70	8.21	7.30
T6	2	4	10.0	10.0	0.9	0.9	26	1.90	12.74	13.39
T7	2	4	10.0	10.0	2.0	2.0	25	3.00	5.73	8.27
T8	4	4	10.0	10.0	0.7	0.7	25	1.70	8.21	7.30
T9	2	4	10.0	10.0	0.9	0.9	25	1.90	12.74	13.06
T10	2	4	10.0	10.0	1.5	1.5	27	2.50	7.65	10.42
T11	2	4	10.0	10.0	1.1	1.1	28	2.10	10.43	12.71
T12	4	4	10.0	10.0	1.2	1.2	25	2.20	4.79	5.64
T13	2	4	10.0	10.0	3.7	3.7	25	4.70	3.10	5.28
T14	2	4	10.0	10.0	3.5	3.5	25	4.50	3.28	5.52
T15	2	4	10.0	10.0	1.2	1.2	25	2.20	9.56	11.28
T16	1	4	10.0	10.0	1.6	1.6	25	2.60	14.33	19.09
T17	2	4	10.0	10.0	1.7	1.7	25	2.70	6.75	9.19
T18	7	4	10.0	10.0	1.6	1.6	25	2.60	2.07	2.73
T19	5	4	10.0	10.0	0.8	0.8	25	1.80	5.76	5.52
T20	2	4	10.0	10.0	3.4	3.4	25	4.40	3.37	5.64
T21	2	4	10.0	10.0	1.7	1.7	25	2.70	6.75	9.19
T22	2	4	10.0	10.0	2.8	2.8	25	3.80	4.10	6.53
T23	2	4	10.0	10.0	1.2	1.2	25	2.20	9.56	11.28
T24	3	4	10.0	10.0	1.3	1.3	25	2.30	5.89	7.20
T25	4	4	10.0	10.0	2.1	2.1	25	3.10	2.74	4.01
SUB	8	4	10.0	10.0	0.5	0.5	25	1.50	5.80	4.15
TCC1	3	4	10.0	10.0	1.5	1.5	25	2.50	5.10	6.62
TCC2	5	4	10.0	10.0	2.0	2.0	25	3.00	2.30	3.31
MM	1	4	10.0	10.0	2.5	2.5	25	3.50	9.17	14.18
T1 - SS	2.9	4	10.0	10.0	1.3	1.3	25	2.30	6.17	7.54
T5 - SS	2.5	4	10.0	10.0	2.1	2.1	25	3.10	4.34	6.36
T6 - SS	7.9	4	10.0	10.0	1.5	1.5	25	2.50	1.97	2.53
T8 - SS	0.5	4	10.0	10.0	2.0	2.0	25	3.00	22.22	32.09
T10 - SS	9.8	4	10.0	10.0	0.9	0.9	25	1.90	2.66	2.69
T15 - SS	0.7	4	10.0	10.0	3.4	3.4	25	4.40	9.05	15.15
T17 - SS	2.2	4	10.0	10.0	1.2	1.2	25	2.20	8.56	10.10
T18 - SS	2.2	4	10.0	10.0	2.3	2.3	25	3.30	4.47	6.74
T19 - SS	4.6	4	10.0	10.0	2.0	2.0	25	3.00	2.49	3.58
T20 - SS	2.9	4	10.0	10.0	2.0	2.0	25	3.00	3.93	5.67
T21 - SS	0.6	4	10.0	10.0	1.6	1.6	25	2.60	23.87	31.82
T22 - SS	3.7	4	10.0	10.0	1.0	1.0	25	2.00	6.28	6.78
T23 - SS	4.9	4	10.0	10.0	0.8	0.8	25	1.80	5.92	5.68
T24 - SS	1.0	4	10.0	10.0	5.9	5.9	25	6.90	3.99	7.39
MET - SS	0.1	4	10.0	10.0	2.5	2.5	25	3.50	80.00	123.76
WP002	2.5	4	10.0	10.0	3.6	3.6	25	4.60	2.53	4.28
WP003	3.7	4	10.0	10.0	0.4	0.4	25	1.40	15.45	9.54
WP004	3.7	4	10.0	10.0	0.7	0.7	25	1.70	8.83	7.86
WP005	3.7	4	10.0	10.0	1.8	1.8	25	2.80	3.43	4.77
WP006	1.8	4	10.0	10.0	0.3	0.3	25	1.30	43.05	21.51
WP007	5.4	4	10.0	10.0	0.3	0.3	25	1.30	14.16	7.04
WP008	8.8	4	10.0	10.0	0.7	0.7	25	1.70	3.80	3.35
WP009	7.7	4	10.0	10.0	0.4	0.4	25	1.40	7.49	4.59
WP010	2.7	4	10.0	10.0	0.3	0.3	25	1.30	27.84	13.90
WP013	9.3	4	10.0	10.0	0.4	0.4	25	1.40	6.30	3.84
WP014	9.1	4	10.0	10.0	0.2	0.2	25	1.20	12.82	4.57
WP015	3.3	4	10.0	10.0	1.6	1.6	25	2.60	4.40	5.85
WP016	4.5	4	10.0	10.0	0.5	0.5	25	1.50	10.19	7.33
WP017	5.3	4	10.0	10.0	0.3	0.3	25	1.30	14.62	7.27
WP018	6.9	4	10.0	10.0	1.7	1.7	25	2.70	1.97	2.67
WP019	4.6	4	10.0	10.0	1.2	1.2	25	2.20	4.19	4.94
WP020	2.1	4	10.0	10.0	1.2	1.2	25	2.20	9.02	10.65
WP021	1.1	4	10.0	10.0	4.5	4.5	25	5.50	4.68	8.29
WP022	0.8	4	10.0	10.0	2.0	2.0	25	3.00	14.29	20.63
WP023	0.8	4	10.0	10.0	0.5	0.5	25	1.50	57.15	41.26
WP024	3.4	4	10.0	10.0	1.1	1.1	25	2.10	6.08	6.89
WP025	1.1	4	10.0	10.0	2.4	2.4	25	3.40	8.78	13.41
WP026	1.1	4	10.0	10.0	2.6	2.6	25	3.60	8.10	12.67
WP027	2.3	4	10.0	10.0	0.7	0.7	25	1.70	13.96	12.44
WP028	3.0	4	10.0	10.0	2.7	2.7	25	3.70	2.86	4.51
WP029	2.5	4	10.0	10.0	2.3	2.3	25	3.30	4.05	6.11
WP030	2.6	4	10.0	10.0	2.7	2.7	25	3.70	3.30	5.21
WP031	0.6	4	10.0	10.0	1.2	1.2	25	2.20	31.83	37.60
WP032	2.3	4	10.0	10.0	1.0	1.0	25	2.00	10.02	10.84
WP033	3.3	4	10.0	10.0	2.0	2.0	25	3.00	3.52	5.07
WP034	1.1	4	10.0	10.0	3.1	3.1	25	4.10	6.79	11.12
WP035	2.2	4	10.0	10.0	1.6	1.6	25	2.60	6.42	8.55
WP036	2.2	4	10.0	10.0	2.0	2.0	25	3.00	5.27	7.60
WP037	2.1	4	10.0	10.0	0.5	0.5	25	1.50	21.65	15.62
WP038	1.1	4	10.0	10.0	2.0	2.0	25	3.00	10.00	14.44
WP039	0.9	4	10.0	10.0	1.5	1.5	25	2.50	17.78	23.10
WP040	1.1	4	10.0	10.0	3.3	3.3	25	4.30	6.06	10.08
WP041	2.9	4	10.0	10.0	3.8	3.8	25	4.80	2.07	3.54
WP042	2.0	4	10.0	10.0	2.6	2.6	25	3.60	4.40	6.88
WP043	1.2	4	10.0	10.0	2.2	2.2	25	3.20	8.66	12.89
WP044	0.6	4	10.0	10.0	2.2	2.2	25	3.20	17.36	25.85
WP045	0.6	4	10.0	10.0	3.3	3.3	25	4.30	11.58	19.24
WP046	0.5	4	10.0	10.0	3.8	3.8	25	4.80	11.70	20.05
WP047	0.5	4	10.0	10.0	1.6	1.6	25	2.60	27.78	37.02
WP048	1.4	4	10.0	10.0	2.5	2.5	25	3.50	6.67	10.32
WP049	4.1	4	10.0	10.0	3.2	3.2	25	4.15	1.77	2.91
WP050	0.6	4	10.0	10.0	4.1	4.1	25	5.10	9.76	16.99
WP053	2.5	4	10.0	10.0	1.5	1.5	25	2.50	6.21	8.07

### Calculated FoS of Natural Peat Slopes for Ardderroo Wind Farm (Drained Analysis)

Turbine No./Waypoint	Slope	Design c'	Bulk unit weight of Peat	Unit weight of Water	100% Water to height of Peat	Depth of In-situ Peat	Friction Angle	Equivalent Total Depth of Peat (m)	Factor of Safety for Load Condition	
	α (deg)	c' (kPa)	γ (kN/m <sup>3</sup> )	γ <sub>w</sub> (kN/m <sup>3</sup> )	(m)	(m)	φ' (deg)	Condition (2)	Condition (1)	Condition (2)
									100% Water	100% Water
WP054	1.8	4	10.0	10.0	2.9	2.9	25	3.90	4.31	6.94
WP055	1.5	4	10.0	10.0	3.0	3.0	25	4.00	5.13	8.33
WP056	0.2	4	10.0	10.0	2.4	2.4	25	3.40	41.67	63.70
WP057	2.9	4	10.0	10.0	2.4	2.4	25	3.40	3.28	5.00
WP058	2.9	4	10.0	10.0	0.8	0.8	25	1.80	9.83	9.45
WP059	0.7	4	10.0	10.0	2.6	2.6	25	3.60	11.84	18.51
WP060	0.9	4	10.0	10.0	3.3	3.3	25	4.30	8.08	13.43
WP061	2.6	4	10.0	10.0	0.9	0.9	25	1.90	9.68	9.92
WP062	1.5	4	10.0	10.0	0.4	0.4	25	1.40	38.49	23.81
WP065	3.0	4	10.0	10.0	2.6	2.6	25	3.60	2.91	4.55
WP066	1.7	4	10.0	10.0	3.3	3.3	25	4.30	4.18	6.95
WP067	3.1	4	10.0	10.0	4.7	4.7	25	5.70	1.58	2.82
WP068	5.0	4	10.0	10.0	0.3	0.3	25	1.30	15.44	7.69
WP069	3.0	4	10.0	10.0	7.2	7.2	25	8.20	1.06	2.02
WP071	5.1	4	10.0	10.0	0.5	0.5	25	1.50	8.96	6.44
WP072	0.3	4	10.0	10.0	3.1	3.1	25	4.10	25.81	42.26
WP073	4.2	4	10.0	10.0	4.0	4.0	25	5.00	1.38	2.38
WP074	3.8	4	10.0	10.0	1.0	1.0	25	2.00	6.00	6.48
WP075	3.8	4	10.0	10.0	1.5	1.5	25	2.50	4.00	5.18
WP076	3.1	4	10.0	10.0	1.0	1.0	25	2.00	7.29	7.89
WP077	3.5	4	10.0	10.0	1.2	1.2	25	2.20	5.40	6.36
WP078	3.3	4	10.0	10.0	0.5	0.5	25	1.50	14.08	10.15
WP079	1.3	4	10.0	10.0	1.2	1.2	25	2.20	15.16	17.90
WP080	3.1	4	10.0	10.0	3.7	3.7	25	4.70	1.97	3.36
WP081	4.2	4	10.0	10.0	1.5	1.5	25	2.50	3.62	4.69
WP082	3.3	4	10.0	10.0	2.0	2.0	25	3.00	3.52	5.07
WP083	1.8	4	10.0	10.0	0.3	0.3	25	1.30	43.05	21.51
WP084	2.2	4	10.0	10.0	1.1	1.1	25	2.10	9.34	10.59
WP085	0.7	4	10.0	10.0	2.6	2.6	25	3.60	11.84	18.51
WP086	1.7	4	10.0	10.0	3.1	3.1	25	4.10	4.45	7.29
WP087	1.7	4	10.0	10.0	1.5	1.5	25	2.50	9.20	11.95
WP088	2.9	4	10.0	10.0	0.8	0.8	25	1.80	9.83	9.45
WP089	0.6	4	10.0	10.0	6.0	6.0	25	7.00	6.37	11.82
WP090	1.8	4	10.0	10.0	3.0	3.0	25	4.00	4.31	6.99
WP091	2.8	4	10.0	10.0	2.0	2.0	25	3.00	4.09	5.90
WP092	3.3	4	10.0	10.0	0.3	0.3	25	1.30	23.47	11.71
WP093	3.3	4	10.0	10.0	0.2	0.2	25	1.20	35.20	12.68
WP094	7.5	4	10.0	10.0	0.4	0.4	25	1.40	7.76	4.76
WP095	5.3	4	10.0	10.0	0.3	0.3	25	1.30	14.46	7.19
WP096	4.9	4	10.0	10.0	0.5	0.5	25	1.50	9.48	6.82
WP097	6.1	4	10.0	10.0	0.1	0.1	25	1.10	37.81	7.40
WP098	5.8	4	10.0	10.0	0.3	0.3	25	1.30	13.34	6.63
WP099	6.7	4	10.0	10.0	0.1	0.1	25	1.10	34.52	6.75
WP100	6.7	4	10.0	10.0	0.2	0.2	25	1.20	17.26	6.18
WP102									No peat recorded at location	
WP109	8.4	4	10.0	10.0	1.8	1.8	25	2.80	1.54	2.13
WP120	8.6	4	10.0	10.0	0.1	0.1	25	1.10	26.92	5.24
WP123	8.3	4	10.0	10.0	1.2	1.2	25	2.20	2.33	2.72
WP143	0.7	4	10.0	10.0	3.6	3.6	25	4.60	8.55	14.49
WP144	0.7	4	10.0	10.0	3.9	3.9	25	4.90	7.89	13.60
WP145	2.4	4	10.0	10.0	3.1	3.1	25	4.10	3.08	5.03
WP146	0.6	4	10.0	10.0	1.7	1.7	25	2.70	22.47	30.64
WP148	3.1	4	10.0	10.0	2.2	2.2	25	3.20	3.38	5.02
WP149	0.9	4	10.0	10.0	1.6	1.6	25	2.60	15.63	20.83
WP150	1.0	4	10.0	10.0	2.4	2.4	25	3.40	9.26	14.16
WP151	1.2	4	10.0	10.0	2.3	2.3	25	3.30	8.29	12.50
WP157	2.3	4	10.0	10.0	0.8	0.8	25	1.80	12.22	11.75
WP158	2.3	4	10.0	10.0	0.9	0.9	25	1.90	10.86	11.13
WP159	2.7	4	10.0	10.0	4.1	4.1	25	5.10	2.08	3.62
WP160	0.7	4	10.0	10.0	0.3	0.3	25	1.30	102.58	51.26
WP161	2.3	4	10.0	10.0	0.1	0.1	25	1.10	100.16	19.70
WP162	2.1	4	10.0	10.0	0.4	0.4	25	1.40	27.06	16.73
WP164	3.3	4	10.0	10.0	1.2	1.2	25	2.20	5.77	6.80
WP165	2.1	4	10.0	10.0	0.1	0.1	25	1.10	108.26	21.30
WP166	0.6	4	10.0	10.0	2.7	2.7	25	3.70	14.15	22.36
WP169	2.3	4	10.0	10.0	3.0	3.0	25	4.00	3.26	5.29
WP170	1.4	4	10.0	10.0	2.7	2.7	25	3.70	6.18	9.76
WP171	0.7	4	10.0	10.0	1.2	1.2	25	2.20	27.78	32.82
WP173	0.8	4	10.0	10.0	2.7	2.7	25	3.70	10.58	16.73
WP174	0.7	4	10.0	10.0	3.5	3.5	25	4.50	8.79	14.81
WP175	3.0	4	10.0	10.0	0.9	0.9	25	1.90	8.41	8.61
WP176	2.0	4	10.0	10.0	2.7	2.7	25	3.70	4.24	6.69
WP177	1.5	4	10.0	10.0	3.9	3.9	25	4.90	3.95	6.80
WP178	1.3	4	10.0	10.0	5.8	5.8	25	6.80	3.14	5.79
WP179	0.6	4	10.0	10.0	5.3	5.3	25	6.30	7.55	13.75
B21									No peat recorded at location	
B22									No peat recorded at location	
B24									No peat recorded at location	
E3	4.5	4	10.0	10.0	0.3	0.3	25	1.30	16.98	8.46
E95									No peat recorded at location	
P100	2.3	4	10.0	10.0	3.1	3.1	25	4.10	3.23	5.29
P77	1.1	4	10.0	10.0	4.2	4.2	25	5.20	5.01	8.77
P79	1.8	4	10.0	10.0	3.1	3.1	25	4.10	4.17	6.82
P87	1.7	4	10.0	10.0	3.7	3.7	25	4.70	3.73	6.36
P90	2.6	4	10.0	10.0	1.2	1.2	25	2.20	7.42	8.76
P92	1.6	4	10.0	10.0	1.5	1.5	25	2.50	9.53	12.38
P94	1.4	4	10.0	10.0	0.9	0.9	25	1.90	18.53	19.00
SUB12	4.9	4	10.0	10.0	3.5	3.5	25	4.50	1.34	2.25
SUB21	8.4	4	10.0	10.0	0.3	0.3	25	1.30	9.21	4.55
SUB24	8.7	4	10.0	10.0	0.4	0.4	25	1.40	6.69	4.09
MKOS2	2.3	4	10.0	10.0	1.0	1.0	25	2.00	10.02	10.84
MKOS3	1.3	4	10.0	10.0	1.0	1.0	25	2.00	17.40	18.84
MKOS4	1.3	4	10.0	10.0	1.0	1.0	25	2.00	17.40	18.84
MKOS5	1.8	4	10.0	10.0	1.0	1.0	25	2.00	12.51	13.54



### Calculated FoS of Natural Peat Slopes for Ardderroo Wind Farm (Drained Analysis)

Turbine No./Waypoint	Slope	Design c'	Bulk unit weight of Peat	Unit weight of Water	100% Water to height of Peat	Depth of In-situ Peat	Friction Angle	Equivalent Total Depth of Peat (m)	Factor of Safety for Load Condition	
	$\alpha$ (deg)	c' (kPa)	$\gamma$ (kN/m <sup>3</sup> )	$\gamma_w$ (kN/m <sup>3</sup> )	(m)	(m)	$\phi'$ (deg)	Condition (2)	Condition (1)	Condition (2)
									100% Water	100% Water
MKOS6	2.1	4	10.0	10.0	1.0	1.0	25	2.00	10.83	11.71
MKOS7	4.1	4	10.0	10.0	1.0	1.0	25	2.00	5.66	6.11
MKOS10	2.4	4	10.0	10.0	1.1	1.1	25	2.10	8.67	9.83
MKOS11	1.3	4	10.0	10.0	1.2	1.2	25	2.20	14.50	17.12
MKOS12	1.9	4	10.0	10.0	1.3	1.3	25	2.30	9.33	11.42
MKOS13	0.9	4	10.0	10.0	1.3	1.3	25	2.30	19.24	23.54
MKOS14	2.1	4	10.0	10.0	1.3	1.3	25	2.30	8.56	10.47
MKOS15	1.3	4	10.0	10.0	1.4	1.4	25	2.40	12.43	15.70
MKOS16	2.5	4	10.0	10.0	1.4	1.4	25	2.40	6.66	8.40
MKOS17	2.3	4	10.0	10.0	1.6	1.6	25	2.60	6.26	8.34
MKOS18	0.9	4	10.0	10.0	1.6	1.6	25	2.60	15.63	20.83
MKOS21	1.6	4	10.0	10.0	1.8	1.8	25	2.80	7.94	11.05
MKOS23	1.0	4	10.0	10.0	1.8	1.8	25	2.80	12.35	17.19
MKOS24	1.1	4	10.0	10.0	2.0	2.0	25	3.00	10.00	14.44
MKOS28	1.0	4	10.0	10.0	2.2	2.2	25	3.20	10.70	15.93
MKOS31	1.0	4	10.0	10.0	2.3	2.3	25	3.30	9.66	14.59
MKOS33	1.7	4	10.0	10.0	2.4	2.4	25	3.40	5.56	8.50
MKOS34	2.5	4	10.0	10.0	2.5	2.5	25	3.50	3.64	5.63
MKOS35	0.6	4	10.0	10.0	2.5	2.5	25	3.50	15.28	23.64
MKOS39	0.9	4	10.0	10.0	2.7	2.7	25	3.70	9.26	14.64
MKOS40	1.6	4	10.0	10.0	2.7	2.7	25	3.70	5.30	8.37
MKOS42	3.1	4	10.0	10.0	2.7	2.7	25	3.70	2.75	4.34
MKOS43	2.1	4	10.0	10.0	2.7	2.7	25	3.70	4.01	6.33
MKOS50	1.1	4	10.0	10.0	2.9	2.9	25	3.90	6.90	11.11
MKOS52	0.6	4	10.0	10.0	3.0	3.0	25	4.00	12.73	20.68
MKOS54	1.2	4	10.0	10.0	3.1	3.1	25	4.10	6.15	10.06
MKOS55	3.5	4	10.0	10.0	3.1	3.1	25	4.10	2.09	3.41
MKOS58	1.8	4	10.0	10.0	3.3	3.3	25	4.30	3.79	6.30
MKOS61	3.0	4	10.0	10.0	3.5	3.5	25	4.50	2.20	3.71
MKOS63	1.5	4	10.0	10.0	3.6	3.6	25	4.60	4.28	7.25
MKOS64	1.3	4	10.0	10.0	3.6	3.6	25	4.60	5.05	8.56
MKOS66	1.3	4	10.0	10.0	3.6	3.6	25	4.60	5.05	8.56
MKOS67	1.1	4	10.0	10.0	3.6	3.6	25	4.60	5.56	9.42
MKOS72	1.8	4	10.0	10.0	3.7	3.7	25	4.70	3.49	5.95
MKOS75	1.4	4	10.0	10.0	0.4	0.4	25	1.40	40.03	24.76
MKOS76	1.5	4	10.0	10.0	4.0	4.0	25	5.00	3.71	6.42
MKOS77	0.2	4	10.0	10.0	4.0	4.0	25	5.00	33.33	57.75
MKOS82	0.6	4	10.0	10.0	4.5	4.5	25	5.50	8.89	15.75
MKOS83	0.6	4	10.0	10.0	4.5	4.5	25	5.50	8.89	15.75
MKOS85	1.7	4	10.0	10.0	5.4	5.4	25	6.40	2.47	4.51
MKOS88	0.6	4	10.0	10.0	5.5	5.5	25	6.50	7.27	13.33
MKOS89	2.2	4	10.0	10.0	0.6	0.6	25	1.60	17.57	14.26
MKOS90	3.8	4	10.0	10.0	0.8	0.8	25	1.80	7.50	7.20
MKOS91	0.6	4	10.0	10.0	0.8	0.8	25	1.80	47.75	45.96
MKOS94	2.3	4	10.0	10.0	0.9	0.9	25	1.90	11.13	11.41
MKOS97	2.5	4	10.0	10.0	0.9	0.9	25	1.90	10.36	10.61
MKOS99	No peat recorded at location									
MKOS100	No peat recorded at location									
MKOS101	No peat recorded at location									
MKOS102	No peat recorded at location									
MKOS103	No peat recorded at location									
MKOS104	No peat recorded at location									
MKOS108	No peat recorded at location									
MKOS109	0.9	4	10.0	10.0	2.0	2.0	25	3.00	13.34	19.25
MKOS110	0.9	4	10.0	10.0	3.0	3.0	25	4.00	8.89	14.44
MKOS111	1.0	4	10.0	10.0	2.0	2.0	25	3.00	11.11	16.05
MKOS112	1.4	4	10.0	10.0	2.0	2.0	25	3.00	8.01	11.55
MKOS113	2.7	4	10.0	10.0	2.0	2.0	25	3.00	4.26	6.15
MKOS114	4.4	4	10.0	10.0	2.0	2.0	25	3.00	2.61	3.76
MKOS116	3.8	4	10.0	10.0	1.1	1.1	25	2.10	5.53	6.26
MKOS117	4.2	4	10.0	10.0	1.1	1.1	25	2.10	5.01	5.66
MKOS118	1.0	4	10.0	10.0	1.2	1.2	25	2.20	19.61	23.17
MKOS119	2.1	4	10.0	10.0	1.2	1.2	25	2.20	9.27	10.94
MKOS120	0.7	4	10.0	10.0	1.2	1.2	25	2.20	27.78	32.82
MKOS121	4.0	4	10.0	10.0	1.6	1.6	25	2.60	3.59	4.77
MKOS122	3.1	4	10.0	10.0	1.6	1.6	25	2.60	4.56	6.07
MKOS123	3.7	4	10.0	10.0	1.7	1.7	25	2.70	3.64	4.95
MKOS126	2.5	4	10.0	10.0	1.8	1.8	25	2.80	5.18	7.20
MKOS127	1.7	4	10.0	10.0	1.8	1.8	25	2.80	7.67	10.67
MKOS128	1.9	4	10.0	10.0	1.8	1.8	25	2.80	6.54	9.10
MKOS129	1.6	4	10.0	10.0	1.8	1.8	25	2.80	7.94	11.05
MKOS130	0.7	4	10.0	10.0	1.8	1.8	25	2.80	18.52	25.78
MKOS134	2.9	4	10.0	10.0	2.1	2.1	25	3.10	3.82	5.60
MKOS135	1.0	4	10.0	10.0	2.1	2.1	25	3.10	10.59	15.53
MKOS136	0.9	4	10.0	10.0	2.1	2.1	25	3.10	12.70	18.63
MKOS138	1.9	4	10.0	10.0	2.2	2.2	25	3.20	5.35	7.97
MKOS140	1.7	4	10.0	10.0	2.2	2.2	25	3.20	6.27	9.34
MKOS141	0.8	4	10.0	10.0	2.2	2.2	25	3.20	12.99	19.34
MKOS143	0.8	4	10.0	10.0	2.3	2.3	25	3.25	12.70	19.04
MKOS144	2.0	4	10.0	10.0	2.3	2.3	25	3.30	4.98	7.50
MKOS147	1.8	4	10.0	10.0	2.7	2.7	25	3.70	4.78	7.56
MKOS148	3.0	4	10.0	10.0	2.7	2.7	25	3.70	2.86	4.51
MKOS149	2.2	4	10.0	10.0	2.7	2.7	25	3.70	3.80	6.01
MKOS150	2.4	4	10.0	10.0	2.7	2.7	25	3.70	3.53	5.58
MKOS151	0.9	4	10.0	10.0	2.7	2.7	25	3.70	9.26	14.64
MKOS152	0.8	4	10.0	10.0	2.7	2.7	25	3.70	16.73	16.73
MKOS154	1.3	4	10.0	10.0	2.8	2.8	25	3.80	6.21	9.91
MKOS155	1.3	4	10.0	10.0	2.8	2.8	25	3.80	6.50	10.36
MKOS156	1.1	4	10.0	10.0	2.9	2.9	25	3.90	7.26	11.69
MKOS157	4.4	4	10.0	10.0	0.3	0.3	25	1.30	17.42	8.68
MKOS158	1.1	4	10.0	10.0	3.0	3.0	25	4.00	7.02	11.40
MKOS159	1.5	4	10.0	10.0	3.0	3.0	25	4.00	5.13	8.33
MKOS160	2.7	4	10.0	10.0	3.0	3.0	25	4.00	2.78	4.52
MKOS161	3.0	4	10.0	10.0	3.2	3.2	25	4.20	2.37	3.90

### Calculated FoS of Natural Peat Slopes for Ardderroo Wind Farm (Drained Analysis)

Turbine No./Waypoint	Slope	Design c'	Bulk unit weight of Peat	Unit weight of Water	100% Water to height of Peat	Depth of In-situ Peat	Friction Angle	Equivalent Total Depth of Peat (m)	Factor of Safety for Load Condition	
									Condition (1)	Condition (2)
	$\alpha$ (deg)	c' (kPa)	$\gamma$ (kN/m <sup>3</sup> )	$\gamma_w$ (kN/m <sup>3</sup> )	(m)	(m)	$\phi'$ (deg)	Condition (2)	100% Water	100% Water
MKOS162	0.9	4	10.0	10.0	3.2	3.2	25	4.20	7.81	12.89
MKOS167	1.4	4	10.0	10.0	3.6	3.6	25	4.60	4.45	7.54
MKOS169	1.3	4	10.0	10.0	3.7	3.7	25	4.70	4.92	8.38
MKOS171	1.0	4	10.0	10.0	3.8	3.8	25	4.80	5.85	10.03
MKOS172	1.1	4	10.0	10.0	3.8	3.8	25	4.80	5.54	9.50
MKOS173	0.7	4	10.0	10.0	4.0	4.0	25	5.00	7.69	13.33
MKOS174	3.7	4	10.0	10.0	0.4	0.4	25	1.40	15.69	9.69
MKOS175	0.7	4	10.0	10.0	4.5	4.5	25	5.50	6.84	12.12
MKOS176	0.7	4	10.0	10.0	4.5	4.5	25	5.50	6.84	12.12
MKOS177	1.8	4	10.0	10.0	4.5	4.5	25	5.50	2.87	5.08
MKOS179	1.6	4	10.0	10.0	4.5	4.5	25	5.50	3.18	5.63
MKOS182	0.1	4	10.0	10.0	5.4	5.4	25	6.40	74.07	135.36
MKOS185	0.2	4	10.0	10.0	0.8	0.8	25	1.80	125.00	120.32
MKOS187	3.4	4	10.0	10.0	0.8	0.8	25	1.80	8.36	8.03
MKOS188	6.6	4	10.0	10.0	0.9	0.9	25	1.90	3.92	3.99
MKOS190	3.7	4	10.0	10.0	0.9	0.9	25	1.90	6.87	7.03
MKOS194	No peat recorded at location									
MKOS200	No peat recorded at location									
MKOS201	No peat recorded at location									
MKOS203	No peat recorded at location									
MKOS204	No peat recorded at location									
MKOS205	No peat recorded at location									
MKOS206	No peat recorded at location									
MKOS207	No peat recorded at location									
MKOS208	No peat recorded at location									
MKOS209	No peat recorded at location									
MKOS210	No peat recorded at location									
MKOS211	No peat recorded at location									
MKOS212	No peat recorded at location									
MKOS213	No peat recorded at location									
MKOS214	No peat recorded at location									
MKOS215	No peat recorded at location									
MKOS216	No peat recorded at location									
MKOS217	No peat recorded at location									
MKOS224	2.9	4	10.0	10.0	1.7	1.7	25	2.70	4.63	6.30
MKOS231	1.9	4	10.0	10.0	2.0	2.0	25	3.00	6.07	8.75
MKOS232	0.2	4	10.0	10.0	2.0	2.0	25	3.00	66.67	96.26
MKOS235	0.1	4	10.0	10.0	2.7	2.7	25	3.70	74.07	117.07
MKOS242	0.6	4	10.0	10.0	3.6	3.6	25	4.60	10.10	17.12
MKOS244	0.6	4	10.0	10.0	4.1	4.1	25	5.10	9.76	16.99
MKOS245	3.5	4	10.0	10.0	4.3	4.3	25	5.30	1.51	2.64
MKOS250	2.7	4	10.0	10.0	0.9	0.9	25	1.90	9.48	9.71
MKOS253	No peat recorded at location									
MKOS256	0.7	4	10.0	10.0	1.6	1.6	25	2.60	20.84	27.77
MKOS257	0.7	4	10.0	10.0	1.9	1.9	25	2.90	16.20	22.98
MKOS258	0.7	4	10.0	10.0	1.7	1.7	25	2.70	19.61	26.74
MKOS259	No peat recorded at location									
MKOS265	No peat recorded at location									
MKOS276	2.5	4	10.0	10.0	1.6	1.6	25	2.60	5.69	7.58
MKOS277	2.6	4	10.0	10.0	1.0	1.0	25	2.00	8.71	9.43
MKOS278	2.1	4	10.0	10.0	1.0	1.0	25	2.00	11.13	12.04
MKOS282	5.1	4	10.0	10.0	1.0	1.0	25	2.00	4.48	4.83
MKOS283	7.7	4	10.0	10.0	1.0	1.0	25	2.00	3.00	3.21
MKOS284	8.7	4	10.0	10.0	1.0	1.0	25	2.00	2.68	2.86
MKOS286	1.8	4	10.0	10.0	1.0	1.0	25	2.00	12.51	13.54
MKOS288	2.1	4	10.0	10.0	1.1	1.1	25	2.05	10.31	11.43
MKOS289	2.2	4	10.0	10.0	1.1	1.1	25	2.10	9.34	10.59
MKOS290	2.6	4	10.0	10.0	1.1	1.1	25	2.10	8.10	9.18
MKOS292	3.8	4	10.0	10.0	1.2	1.2	25	2.20	5.00	5.89
MKOS293	8.4	4	10.0	10.0	1.2	1.2	25	2.20	2.32	2.71
MKOS294	7.6	4	10.0	10.0	1.3	1.3	25	2.30	2.35	2.86
MKOS298	4.8	4	10.0	10.0	1.4	1.4	25	2.40	3.43	4.31
MKOS305	8.0	4	10.0	10.0	1.8	1.8	25	2.80	1.62	2.23
MKOS306	0.7	4	10.0	10.0	1.8	1.8	25	2.80	17.10	23.80
MKOS308	2.1	4	10.0	10.0	1.8	1.8	25	2.80	6.01	8.37
MKOS312	5.6	4	10.0	10.0	1.9	1.9	25	2.90	2.17	3.06
MKOS320	0.1	4	10.0	10.0	2.0	2.0	25	3.00	200.00	288.77
MKOS321	6.5	4	10.0	10.0	0.2	0.2	25	1.20	17.77	6.37
MKOS322	4.0	4	10.0	10.0	0.2	0.2	25	1.20	28.71	10.34
MKOS329	1.0	4	10.0	10.0	2.3	2.3	25	3.30	9.66	14.59
MKOS331	1.3	4	10.0	10.0	2.4	2.4	25	3.40	7.25	11.08
MKOS335	5.0	4	10.0	10.0	2.5	2.5	25	3.50	1.85	2.85
MKOS337	6.6	4	10.0	10.0	0.3	0.3	25	1.25	14.10	6.06
MKOS338	5.9	4	10.0	10.0	0.3	0.3	25	1.25	15.55	6.70
MKOS341	6.8	4	10.0	10.0	2.6	2.6	25	3.60	1.31	2.03
MKOS342	3.4	4	10.0	10.0	2.6	2.6	25	3.60	2.62	4.09
MKOS344	5.3	4	10.0	10.0	2.7	2.7	25	3.70	1.62	2.55
MKOS348	1.4	4	10.0	10.0	2.8	2.8	25	3.80	5.72	9.12
MKOS349	0.8	4	10.0	10.0	2.9	2.9	25	3.90	9.85	15.87
MKOS350	4.5	4	10.0	10.0	3.0	3.0	25	4.00	1.72	2.78
MKOS351	2.8	4	10.0	10.0	3.0	3.0	25	4.00	2.73	4.42
MKOS354	2.2	4	10.0	10.0	3.2	3.2	25	4.20	3.29	5.43
MKOS355	3.7	4	10.0	10.0	3.2	3.2	25	4.20	1.93	3.18
MKOS359	0.2	4	10.0	10.0	3.4	3.4	25	4.40	39.22	65.63
MKOS360	0.1	4	10.0	10.0	3.4	3.4	25	4.40	58.82	98.44
MKOS361	1.4	4	10.0	10.0	3.4	3.4	25	4.40	4.71	7.88
MKOS362	2.1	4	10.0	10.0	3.4	3.4	25	4.40	3.18	5.32
MKOS363	3.7	4	10.0	10.0	3.4	3.4	25	4.40	1.82	3.03
MKOS364	0.7	4	10.0	10.0	3.5	3.5	25	4.50	9.53	16.04
MKOS370	4.2	4	10.0	10.0	3.5	3.5	25	4.50	1.57	2.64
MKOS371	2.9	4	10.0	10.0	3.5	3.5	25	4.50	2.25	3.78
MKOS372	1.0	4	10.0	10.0	3.5	3.5	25	4.50	6.35	10.70
MKOS374	2.3	4	10.0	10.0	3.5	3.5	25	4.50	2.86	4.82
MKOS376	1.2	4	10.0	10.0	3.5	3.5	25	4.50	5.44	9.17

### Calculated FoS of Natural Peat Slopes for Ardderroo Wind Farm (Drained Analysis)

Turbine No./Waypoint	Slope	Design c'	Bulk unit weight of Peat	Unit weight of Water	100% Water to height of Peat	Depth of In-situ Peat	Friction Angle	Equivalent Total Depth of Peat (m)	Factor of Safety for Load Condition	
	$\alpha$ (deg)	c' (kPa)	$\gamma$ (kN/m <sup>3</sup> )	$\gamma_w$ (kN/m <sup>3</sup> )	(m)	(m)	$\phi'$ (deg)	Condition (2)	Condition (1)	Condition (2)
									100% Water	100% Water
MKOS377	1.2	4	10.0	10.0	3.5	3.5	25	4.50	5.44	9.17
MKOS379	3.1	4	10.0	10.0	3.5	3.5	25	4.50	2.08	3.51
MKOS381	0.2	4	10.0	10.0	3.5	3.5	25	4.50	38.10	64.17
MKOS383	0.2	4	10.0	10.0	3.5	3.5	25	4.50	38.10	64.17
MKOS384	0.9	4	10.0	10.0	3.5	3.5	25	4.50	7.14	12.03
MKOS385	1.4	4	10.0	10.0	3.5	3.5	25	4.50	4.57	7.70
MKOS386	0.8	4	10.0	10.0	3.5	3.5	25	4.50	8.16	13.75
MKOS398	6.3	4	10.0	10.0	0.4	0.4	25	1.40	9.12	5.61
MKOS399	5.8	4	10.0	10.0	0.4	0.4	25	1.40	10.00	6.16
MKOS401	8.3	4	10.0	10.0	0.5	0.5	25	1.50	5.63	4.02
MKOS402	7.8	4	10.0	10.0	0.5	0.5	25	1.50	5.95	4.25
MKOS403	0.6	4	10.0	10.0	0.5	0.5	25	1.50	76.40	55.15
MKOS406	10.9	4	10.0	10.0	0.6	0.6	25	1.60	3.60	2.87
MKOS407	9.3	4	10.0	10.0	0.6	0.6	25	1.60	4.20	3.36
MKOS408	0.6	4	10.0	10.0	0.6	0.6	25	1.60	63.67	51.70
MKOS410	6.6	4	10.0	10.0	0.6	0.6	25	1.60	5.87	4.74
MKOS411	4.4	4	10.0	10.0	0.7	0.7	25	1.70	7.47	6.64
MKOS413	5.4	4	10.0	10.0	0.8	0.8	25	1.80	5.37	5.14
MKOS414	7.4	4	10.0	10.0	0.8	0.8	25	1.80	3.91	3.73
MKOS417	10.6	4	10.0	10.0	0.9	0.9	25	1.90	2.46	2.48
MKOS419	7.5	4	10.0	10.0	0.9	0.9	25	1.90	3.45	3.51
MKOS420	4.5	4	10.0	10.0	0.9	0.9	25	1.90	5.73	5.86
MKOS425	4.2	4	10.0	10.0	0.9	0.9	25	1.90	6.12	6.26
MKOS427	5.7	4	10.0	10.0	0.9	0.9	25	1.90	4.53	4.63
MKOS428	4.7	4	10.0	10.0	0.9	0.9	25	1.90	5.39	5.51
MKOS429	No peat recorded at location									
MKOS430	No peat recorded at location									
MKOS432	No peat recorded at location									
MKOS433	No peat recorded at location									
MKOS435	No peat recorded at location									
MKOS436	No peat recorded at location									
MKOS437	No peat recorded at location									
MKOS442	7.4	4	10.0	10.0	0.8	0.8	25	1.80	3.94	3.76
MKOS444	5.3	4	10.0	10.0	1.9	1.9	25	2.90	2.31	3.26
MKOS446	1.4	4	10.0	10.0	2.8	2.8	25	3.80	5.96	9.50
MKOS448	0.9	4	10.0	10.0	2.9	2.9	25	3.90	8.62	13.88
MKOS450	1.3	4	10.0	10.0	4.0	4.0	25	5.00	4.55	7.88
MKOS455	7.1	4	10.0	10.0	0.5	0.5	25	1.50	6.50	4.65
MKOS456	5.5	4	10.0	10.0	1.8	1.8	25	2.80	2.34	3.24
MKOS484	3.4	4	10.0	10.0	1.1	1.1	25	2.10	6.18	7.00
MKOS485	No peat recorded at location									
MKOS488	6.2	4	10.0	10.0	0.1	0.1	25	1.10	37.47	7.33
MKOS489	No peat recorded at location									
MKOS490	3.3	4	10.0	10.0	1.2	1.2	25	2.20	5.77	6.80
MKOS491	2.9	4	10.0	10.0	3.8	3.8	25	4.80	2.07	3.54
MKOS492	3.1	4	10.0	10.0	2.7	2.7	25	3.70	2.70	4.26
MKOS495	2.9	4	10.0	10.0	2.5	2.5	25	3.50	3.15	4.86
MKOS496	0.8	4	10.0	10.0	2.3	2.3	25	3.30	12.42	18.75
MKOS497	0.8	4	10.0	10.0	1.8	1.8	25	2.80	15.88	22.10
MKOS498	0.7	4	10.0	10.0	3.2	3.2	25	4.20	9.62	15.87
MKOS499	0.7	4	10.0	10.0	3.3	3.3	25	4.30	9.33	15.50
MKOS500	0.2	4	10.0	10.0	2.3	2.3	25	3.30	57.97	87.51
MKOS501	0.2	4	10.0	10.0	2.0	2.0	25	3.00	66.67	96.26
MKOS502	1.8	4	10.0	10.0	1.9	1.9	25	2.90	6.59	9.34
MKOS503	1.8	4	10.0	10.0	3.5	3.5	25	4.50	3.58	6.02
MKOS511	1.8	4	10.0	10.0	3.2	3.2	25	4.20	3.91	6.45
MKOS512	2.2	4	10.0	10.0	3.4	3.4	25	4.40	3.02	5.05
MKOS513	2.7	4	10.0	10.0	1.9	1.9	25	2.90	4.40	6.23
MKOS514	2.5	4	10.0	10.0	0.1	0.1	25	1.10	91.09	17.91
MKOS515	2.9	4	10.0	10.0	0.2	0.2	25	1.20	40.10	14.46
MKOS516	0.2	4	10.0	10.0	1.6	1.6	25	2.60	83.33	111.07
MKOS517	0.2	4	10.0	10.0	2.8	2.8	25	3.80	47.62	75.99
MKOS518	1.0	4	10.0	10.0	1.9	1.9	25	2.90	11.70	16.60
MKOS519	1.0	4	10.0	10.0	4.2	4.2	25	5.20	5.29	9.26
MKOS520	1.0	4	10.0	10.0	3.9	3.9	25	4.90	6.03	10.40
MKOS521	1.3	4	10.0	10.0	4.3	4.3	25	5.30	4.05	7.11
MKOS522	1.2	4	10.0	10.0	1.4	1.4	25	2.40	13.61	17.19
MKOS523	0.6	4	10.0	10.0	0.5	0.5	25	1.50	76.40	55.15
MKOS524	0.6	4	10.0	10.0	2.4	2.4	25	3.40	15.92	24.33
MKOS525	0.6	4	10.0	10.0	3.1	3.1	25	4.10	12.32	20.18
MKOS526	1.4	4	10.0	10.0	3.9	3.9	25	4.90	4.28	7.37
MKOS527	0.9	4	10.0	10.0	0.9	0.9	25	1.90	27.78	28.50
MKOS528	0.9	4	10.0	10.0	1.6	1.6	25	2.60	15.63	20.83
MKOS529	0.9	4	10.0	10.0	1.2	1.2	25	2.20	22.23	26.25
MKOS530	0.8	4	10.0	10.0	1.0	1.0	25	2.00	28.58	30.94
MKOS531	2.2	4	10.0	10.0	0.3	0.3	25	1.30	35.14	17.55
MKOS532	1.8	4	10.0	10.0	1.7	1.7	25	2.70	7.36	10.03
MKOS533	0.6	4	10.0	10.0	0.1	0.1	25	1.10	382.00	75.21
MKOS534	1.3	4	10.0	10.0	1.0	1.0	25	2.00	17.40	18.84
MKOS539	2.6	4	10.0	10.0	3.6	3.6	25	4.60	2.47	4.19
MKOS540	2.2	4	10.0	10.0	3.5	3.5	25	4.50	2.93	4.94
MKOS541	0.6	4	10.0	10.0	0.5	0.5	25	1.50	76.40	55.15
MKOS542	3.3	4	10.0	10.0	2.4	2.4	25	3.40	2.88	4.40
MKOS543	3.4	4	10.0	10.0	1.1	1.1	25	2.10	6.18	7.00
MKOS544	4.4	4	10.0	10.0	0.4	0.4	25	1.40	13.06	8.06
MKOS563	1.3	4	10.0	10.0	3.8	3.8	25	4.80	4.58	7.85
MKOS564	1.5	4	10.0	10.0	4.5	4.5	25	5.50	3.42	6.06
MKOS566	1.8	4	10.0	10.0	2.6	2.6	25	3.60	4.97	7.77
MKOS584	0.7	4	10.0	10.0	1.5	1.5	25	2.50	22.23	28.88
MKOS585	0.9	4	10.0	10.0	1.8	1.8	25	2.80	14.82	20.63
MKOS586	1.0	4	10.0	10.0	2.8	2.8	25	3.80	7.94	12.67
MKOS587	1.3	4	10.0	10.0	1.7	1.7	25	2.70	10.70	14.59
MKOS588	1.5	4	10.0	10.0	1.4	1.4	25	2.40	11.00	13.89
MKOS599	2.5	4	10.0	10.0	0.9	0.9	25	1.90	10.12	10.37

### Calculated FoS of Natural Peat Slopes for Ardderroo Wind Farm (Drained Analysis)

Turbine No./Waypoint	Slope	Design c'	Bulk unit weight of Peat	Unit weight of Water	100% Water to height of Peat	Depth of In-situ Peat	Friction Angle	Equivalent Total Depth of Peat (m)	Factor of Safety for Load Condition	
	$\alpha$ (deg)	c' (kPa)	$\gamma$ (kN/m <sup>3</sup> )	$\gamma_w$ (kN/m <sup>3</sup> )	(m)	(m)	$\phi'$ (deg)	Condition (2)	Condition (1)	Condition (2)
									100% Water	100% Water
MKOS600	1.5	4	10.0	10.0	1.8	1.8	25	2.80	8.24	11.46
MKOS601	1.0	4	10.0	10.0	2.7	2.7	25	3.70	8.72	13.77
MKOS602	0.6	4	10.0	10.0	1.0	1.0	25	2.00	38.20	41.36
MKOS603	0.6	4	10.0	10.0	0.5	0.5	25	1.50	76.40	55.15
MKOS604	3.0	4	10.0	10.0	1.0	1.0	25	2.00	7.57	8.18
MKOS605	3.0	4	10.0	10.0	0.7	0.7	25	1.70	11.02	9.81
MKOS606	2.8	4	10.0	10.0	1.1	1.1	25	2.10	7.44	8.43
MKOS607	1.3	4	10.0	10.0	2.1	2.1	25	3.10	8.29	12.15
MKOS608	1.0	4	10.0	10.0	2.8	2.8	25	3.80	7.94	12.67
MKOS611	0.6	4	10.0	10.0	4.5	4.5	25	5.50	8.49	15.04
MKOS612	0.6	4	10.0	10.0	4.5	4.5	25	5.50	8.49	15.04
MKOS613	1.8	4	10.0	10.0	4.3	4.3	25	5.30	2.91	5.11
MKOS619	3.1	4	10.0	10.0	1.9	1.9	25	2.90	3.91	5.54
MKOS620	2.4	4	10.0	10.0	1.4	1.4	25	2.40	6.81	8.60
MKOS621	2.5	4	10.0	10.0	2.2	2.2	25	3.20	4.24	6.30
MKOS622	2.7	4	10.0	10.0	1.1	1.1	25	2.10	7.59	8.60
MKOS623	1.4	4	10.0	10.0	0.2	0.2	25	1.20	80.05	28.89
MKOS624	1.7	4	10.0	10.0	0.2	0.2	25	1.20	66.73	24.07
MKOS625	No peat recorded at location									
MKOS626	2.8	4	10.0	10.0	0.6	0.6	25	1.60	13.64	11.06
MKOS627	2.0	4	10.0	10.0	2.4	2.4	25	3.40	4.77	7.28
MKOS634	No peat recorded at location									
MKOS635	1.8	4	10.0	10.0	1.8	1.8	25	2.80	7.18	9.98
MKOS636	1.1	4	10.0	10.0	2.8	2.8	25	3.80	7.15	11.40
MKOS637	1.0	4	10.0	10.0	3.8	3.8	25	4.80	5.85	10.03
MKOS638	1.5	4	10.0	10.0	2.7	2.7	25	3.70	5.49	8.67
MKOS642	No peat recorded at location									
MKOS643	No peat recorded at location									
MKOS644	3.2	4	10.0	10.0	4.5	4.5	25	5.50	1.59	2.82
MKOS645	0.1	4	10.0	10.0	3.2	3.2	25	4.20	62.50	103.13
MKOS646	0.1	4	10.0	10.0	0.5	0.5	25	1.50	400.00	288.77
MKOS647	1.5	4	10.0	10.0	1.9	1.9	25	2.90	7.80	11.07
MKOS648	1.4	4	10.0	10.0	3.6	3.6	25	4.60	4.63	7.85
MKOS649	1.5	4	10.0	10.0	4.1	4.1	25	5.10	3.62	6.29
MKOS650	1.8	4	10.0	10.0	4.2	4.2	25	5.20	3.08	5.38
MKOS651	2.9	4	10.0	10.0	3.8	3.8	25	4.80	2.07	3.54
MKOS652	1.4	4	10.0	10.0	4.2	4.2	25	5.20	3.81	6.67
MKOS661	1.3	4	10.0	10.0	3.5	3.5	25	4.50	5.20	8.75
MKOS662	1.9	4	10.0	10.0	3.0	3.0	25	4.00	4.04	6.57
MKOS663	2.6	4	10.0	10.0	2.6	2.6	25	3.60	3.43	5.35
MKOS664	3.4	4	10.0	10.0	1.6	1.6	25	2.60	4.18	5.56
MKOS665	3.1	4	10.0	10.0	1.6	1.6	25	2.60	4.64	6.18
MKOS666	4.2	4	10.0	10.0	1.1	1.1	25	2.10	4.94	5.59
MKOS667	2.7	4	10.0	10.0	1.1	1.1	25	2.10	7.59	8.60
MKOS668	3.5	4	10.0	10.0	1.5	1.5	25	2.50	4.32	5.60
MKOS669	3.3	4	10.0	10.0	1.5	1.5	25	2.50	4.61	5.98
MKOS670	3.5	4	10.0	10.0	0.9	0.9	25	1.90	7.31	7.49
MKOS671	3.0	4	10.0	10.0	1.1	1.1	25	2.10	6.88	7.79
MKOS672	3.3	4	10.0	10.0	1.7	1.7	25	2.70	4.07	5.54
MKOS673	2.2	4	10.0	10.0	2.4	2.4	25	3.40	4.39	6.71
MKOS674	4.2	4	10.0	10.0	1.6	1.6	25	2.60	3.44	4.58
MKOS675	3.6	4	10.0	10.0	1.4	1.4	25	2.40	4.55	5.74
MKOS687	3.1	4	10.0	10.0	1.7	1.7	25	2.70	4.29	5.84
MKOS688	3.1	4	10.0	10.0	1.2	1.2	25	2.20	6.19	7.30
MKOS689	2.2	4	10.0	10.0	2.0	2.0	25	3.00	5.27	7.60
MKOS690	3.1	4	10.0	10.0	1.8	1.8	25	2.80	4.05	5.63
MKOS691	2.9	4	10.0	10.0	1.6	1.6	25	2.60	4.91	6.54
MKOS692	3.0	4	10.0	10.0	0.9	0.9	25	1.90	8.41	8.61
MKOS693	2.3	4	10.0	10.0	1.3	1.3	25	2.30	7.52	9.19
MKOS694	1.2	4	10.0	10.0	1.4	1.4	25	2.40	13.61	17.19
MKOS695	1.3	4	10.0	10.0	1.0	1.0	25	2.00	18.19	19.69
MKOS696	1.4	4	10.0	10.0	1.4	1.4	25	2.40	11.44	14.44
MKOS697	1.4	4	10.0	10.0	2.7	2.7	25	3.70	5.93	9.37
MKOS698	2.7	4	10.0	10.0	4.4	4.4	25	5.40	1.94	3.42
MKOS699	4.2	4	10.0	10.0	1.6	1.6	25	2.60	3.40	4.51
MKOS700	5.7	4	10.0	10.0	0.8	0.8	25	1.80	5.10	4.88
MKOS701	5.4	4	10.0	10.0	0.9	0.9	25	1.90	4.72	4.82
MKOS702	6.3	4	10.0	10.0	1.0	1.0	25	2.00	3.68	3.96
MKOS703	2.2	4	10.0	10.0	1.1	1.1	25	2.10	9.58	10.86
MKOS704	No peat recorded at location									
MKOS705	1.6	4	10.0	10.0	2.6	2.6	25	3.60	5.50	8.60
MKOS706	1.3	4	10.0	10.0	2.5	2.5	25	3.50	6.96	10.76
MKOS707	1.7	4	10.0	10.0	2.8	2.8	25	3.80	4.77	7.60
MKOS708	5.7	4	10.0	10.0	0.4	0.4	25	1.40	10.10	6.22
MKOS709	7.2	4	10.0	10.0	0.1	0.1	25	1.10	32.25	6.30
MKOS726	8.4	4	10.0	10.0	1.9	1.9	25	2.90	1.46	2.05
MKOS809	0.5	4	10.0	10.0	4.5	4.5	25	5.50	11.11	19.69
MKOS810	3.4	4	10.0	10.0	4.5	4.5	25	5.50	1.49	2.63
MKOS811	3.3	4	10.0	10.0	3.8	3.8	25	4.80	1.82	3.12
MKOS832	1.0	4	10.0	10.0	4.0	4.0	25	5.00	5.88	10.19
MKOS835	5.0	4	10.0	10.0	0.8	0.8	25	1.80	5.73	5.49
MKOS836	5.0	4	10.0	10.0	1.2	1.2	25	2.20	3.82	4.49
MKOS838	4.1	4	10.0	10.0	1.4	1.4	25	2.40	4.04	5.10
MKOS839	3.1	4	10.0	10.0	2.4	2.4	25	3.40	3.10	4.72
MKOS845	No peat recorded at location									
MKOS846	2.2	4	10.0	10.0	0.9	0.9	25	1.90	11.41	11.70
MKOS847	3.0	4	10.0	10.0	1.4	1.4	25	2.40	5.51	6.95
MKOS848	2.9	4	10.0	10.0	1.7	1.7	25	2.70	4.63	6.30
MKOS849	2.8	4	10.0	10.0	1.7	1.7	25	2.70	4.81	6.56
MKOS850	2.9	4	10.0	10.0	1.7	1.7	25	2.70	4.72	6.42
MKOS851	3.0	4	10.0	10.0	1.6	1.6	25	2.60	4.73	6.29
T9	3.8	4	10.0	10.0	1.4	1.4	25	2.40	4.35	5.48
T10	2.3	4	10.0	10.0	2.2	2.2	25	3.20	4.55	6.77
T12	1.1	4	10.0	10.0	4.6	4.6	25	5.60	4.35	7.74

### Calculated FoS of Natural Peat Slopes for Ardderroo Wind Farm (Drained Analysis)

Turbine No./Waypoint	Slope	Design c'	Bulk unit weight of Peat	Unit weight of Water	100% Water to height of Peat	Depth of In-situ Peat	Friction Angle	Equivalent Total Depth of Peat (m)	Factor of Safety for Load Condition	
	$\alpha$ (deg)	c' (kPa)	$\gamma$ (kN/m <sup>3</sup> )	$\gamma_w$ (kN/m <sup>3</sup> )	(m)	(m)	$\phi'$ (deg)	Condition (2)	Condition (1)	Condition (2)
									100% Water	100% Water
WP 001	3.1	4	10.0	10.0	0.7	0.7	25	1.70	10.61	9.45
WP 002	2.5	4	10.0	10.0	1.5	1.5	25	2.50	6.21	8.07
WP 004	4.9	4	10.0	10.0	0.6	0.6	25	1.60	7.90	6.39
WP 005	3.7	4	10.0	10.0	0.7	0.7	25	1.70	8.83	7.86
WP 006	2.4	4	10.0	10.0	1.9	1.9	25	2.90	5.02	7.12
WP 007	2.6	4	10.0	10.0	2.1	2.1	25	3.10	4.24	6.22
WP 008	2.3	4	10.0	10.0	2.3	2.3	25	3.30	4.25	6.41
WP 009	2.5	4	10.0	10.0	1.9	1.9	25	2.90	4.91	6.95
WP 010	0.9	4	10.0	10.0	4.1	4.1	25	5.10	6.51	11.33
WP 011	0.9	4	10.0	10.0	3.6	3.6	25	4.60	6.95	11.77
WP 012	0.6	4	10.0	10.0	0.6	0.6	25	1.60	63.67	51.70
WP 013	1.3	4	10.0	10.0	0.9	0.9	25	1.90	20.21	20.73
WP 014	0.8	4	10.0	10.0	2.2	2.2	25	3.20	12.99	19.34
WP 018	1.3	4	10.0	10.0	1.4	1.4	25	2.40	12.99	16.41
WP 019	8.6	4	10.0	10.0	0.3	0.3	25	1.30	8.97	4.43
WP 020	5.8	4	10.0	10.0	1.2	1.2	25	2.20	3.30	3.88
WP 021	2.9	4	10.0	10.0	0.4	0.4	25	1.40	19.66	12.15
WP 022	3.1	4	10.0	10.0	0.5	0.5	25	1.50	14.59	10.52
WP 024	5.5	4	10.0	10.0	4.0	4.0	25	5.00	1.05	1.81
WP 025	3.0	4	10.0	10.0	7.2	7.2	25	8.20	1.06	2.02
WP 026	1.8	4	10.0	10.0	5.2	5.2	25	6.20	2.41	4.37
WP 027	1.3	4	10.0	10.0	3.4	3.4	25	4.40	5.12	8.56
WP 028	1.1	4	10.0	10.0	2.3	2.3	25	3.30	8.70	13.13
WP 029	2.4	4	10.0	10.0	1.5	1.5	25	2.50	6.36	8.26
WP 030	6.4	4	10.0	10.0	0.2	0.2	25	1.20	18.08	6.48
WP 031	7.6	4	10.0	10.0	0.6	0.6	25	1.60	5.06	4.07
WP 032	4.2	4	10.0	10.0	5.2	5.2	25	6.20	1.05	1.89
WP 034	0.7	4	10.0	10.0	4.1	4.1	25	5.10	7.51	13.07
WP 035	1.7	4	10.0	10.0	4.0	4.0	25	5.00	3.45	5.98
WP 036	0.9	4	10.0	10.0	3.0	3.0	25	4.00	8.89	14.44
WP 039	1.1	4	10.0	10.0	4.5	4.5	25	5.50	4.68	8.29
WP 040	1.4	4	10.0	10.0	4.0	4.0	25	5.00	4.17	7.22
WP 043	1.5	4	10.0	10.0	1.6	1.6	25	2.60	9.27	12.34
WP 050	1.3	4	10.0	10.0	1.8	1.8	25	2.80	10.11	14.07
WP 051	3.5	4	10.0	10.0	0.7	0.7	25	1.70	9.25	8.23
WP 052	3.4	4	10.0	10.0	2.7	2.7	25	3.70	2.52	3.97
S 24	0.9	4	10.0	10.0	3.4	3.4	25	4.40	7.35	12.31
S2_4A	0.9	4	10.0	10.0	3.8	3.8	25	4.80	7.02	12.03
P22	1.5	4	10.0	10.0	2.5	2.5	25	3.50	6.16	9.52
P 13	2.2	4	10.0	10.0	0.7	0.7	25	1.70	15.06	13.42
P1_3A	2.5	4	10.0	10.0	0.9	0.9	25	1.90	10.12	10.37
WP 013A	1.9	4	10.0	10.0	0.8	0.8	25	1.80	14.72	14.16
WP 014A	3.7	4	10.0	10.0	0.6	0.6	25	1.60	10.30	8.35
WP 032A	8.9	4	10.0	10.0	0.5	0.5	25	1.50	5.25	3.74
R 48	0.5	4	10.0	10.0	4.7	4.7	25	5.70	9.46	16.89
WP 052A	2.9	4	10.0	10.0	1.8	1.8	25	2.80	4.46	6.20
T6	5.2	4	10.0	10.0	2.1	2.1	25	3.10	2.11	3.08
T27	13.4	4	10.0	10.0	1.0	1.0	25	2.00	1.78	1.87
T28	1.0	4	10.0	10.0	4.0	4.0	25	5.00	5.56	9.63
T29	0.6	4	10.0	10.0	0.7	0.7	25	1.70	54.57	48.66
31	3.2	4	10.0	10.0	3.5	3.5	25	4.50	2.05	3.44
32	0.1	4	10.0	10.0	2.5	2.5	25	3.50	80.00	123.76
33	0.1	4	10.0	10.0	2.2	2.2	25	3.20	90.91	135.36
34	1.5	4	10.0	10.0	2.0	2.0	25	3.00	7.41	10.70
35	1.5	4	10.0	10.0	3.3	3.3	25	4.30	4.49	7.46
37	2.7	4	10.0	10.0	0.6	0.6	25	1.60	13.92	11.29
38	3.8	4	10.0	10.0	0.2	0.2	25	1.20	29.98	10.80
39	3.4	4	10.0	10.0	1.2	1.2	25	2.20	5.58	6.57
40	4.5	4	10.0	10.0	0.3	0.3	25	1.30	16.98	8.46
41	2.1	4	10.0	10.0	0.4	0.4	25	1.40	27.81	17.20
42	0.1	4	10.0	10.0	0.1	0.1	25	1.10	2000.01	393.78
43	1.7	4	10.0	10.0	0.6	0.6	25	1.60	22.24	18.06
44	2.7	4	10.0	10.0	0.2	0.2	25	1.15	56.86	16.04
45	1.8	4	10.0	10.0	0.5	0.5	25	1.45	28.70	19.28
46	2.7	4	10.0	10.0	0.5	0.5	25	1.45	18.56	12.46
47	3.8	4	10.0	10.0	1.2	1.2	25	2.20	5.00	5.89
48	2.6	4	10.0	10.0	1.0	1.0	25	2.00	8.71	9.43
49	1.9	4	10.0	10.0	0.2	0.2	25	1.15	78.52	22.17
55	10.1	4	10.0	10.0	0.7	0.7	25	1.70	3.29	2.89
56	12.0	4	10.0	10.0	0.1	0.1	25	1.10	19.63	3.77
57	13.1	4	10.0	10.0	0.2	0.2	25	1.20	9.05	3.18
58	11.3	4	10.0	10.0	0.9	0.9	25	1.85	2.46	2.40
59	10.9	4	10.0	10.0	1.0	1.0	25	2.00	2.16	2.29
60	11.9	4	10.0	10.0	0.4	0.4	25	1.40	4.97	3.01
61	15.3	4	10.0	10.0	0.2	0.2	25	1.20	7.87	2.74
62	17.2	4	10.0	10.0	0.3	0.3	25	1.30	4.73	2.25
PB1	1.8	4	10.0	10.0	1.4	1.4	25	2.40	8.94	11.29
PB4	4.1	4	10.0	10.0	1.7	1.7	25	2.70	3.28	4.47
WP004	2.0	4	10.0	10.0	1.8	1.8	25	2.80	6.36	8.84
B1	0.6	4	10.0	10.0	1.7	1.7	25	2.70	22.47	30.64
1	3.0	4	10.0	10.0	0.1	0.1	25	1.10	75.68	14.88
2	2.9	4	10.0	10.0	0.1	0.1	25	1.10	78.64	15.46
3	9.3	4	10.0	10.0	0.1	0.1	25	1.10	25.19	4.89
4	11.3	4	10.0	10.0	0.2	0.2	25	1.15	13.93	3.85
5	No peat recorded at location									
6	No peat recorded at location									
7	No peat recorded at location									
8	No peat recorded at location									
9	10.5	4	10.0	10.0	0.1	0.1	25	1.05	44.72	4.53
19	9.5	4	10.0	10.0	0.1	0.1	25	1.11	22.38	4.73
20	9.7	4	10.0	10.0	0.1	0.1	25	1.11	21.89	4.63
21	9.5	4	10.0	10.0	0.3	0.3	25	1.25	9.85	4.20
22	0.6	4	10.0	10.0	0.2	0.2	25	1.15	254.67	71.94
23	7.7	4	10.0	10.0	0.2	0.2	25	1.20	15.08	5.39
24	7.5	4	10.0	10.0	0.2	0.2	25	1.20	15.42	5.51

### Calculated FoS of Natural Peat Slopes for Ardderroo Wind Farm (Drained Analysis)

Turbine No./Waypoint	Slope	Design c'	Bulk unit weight of Peat	Unit weight of Water	100% Water to height of Peat	Depth of In-situ Peat	Friction Angle	Equivalent Total Depth of Peat (m)	Factor of Safety for Load Condition	
	$\alpha$ (deg)	c' (kPa)	$\gamma$ (kN/m <sup>3</sup> )	$\gamma_w$ (kN/m <sup>3</sup> )	(m)	(m)	$\phi'$ (deg)	Condition (2)	Condition (1)	Condition (2)
									100% Water	100% Water
25	8.1	4	10.0	10.0	0.3	0.3	25	1.25	11.42	4.89
26	7.7	4	10.0	10.0	0.7	0.7	25	1.70	4.28	3.78
27	8.6	4	10.0	10.0	0.5	0.5	25	1.50	5.42	3.87
28	8.2	4	10.0	10.0	0.3	0.3	25	1.30	9.45	4.67
29	4.4	4	10.0	10.0	0.9	0.9	25	1.90	5.81	5.94
30	7.1	4	10.0	10.0	0.2	0.2	25	1.20	16.38	5.86
31	8.8	4	10.0	10.0	0.3	0.3	25	1.30	8.81	4.35
7B	9.3	4	10.0	10.0	0.9	0.9	25	1.90	2.80	2.83
9B	4.1	4	10.0	10.0	0.4	0.4	25	1.40	13.96	8.61
10B	4.1	4	10.0	10.0	1.2	1.2	25	2.20	4.65	5.48
11B	0.2	4	10.0	10.0	1.2	1.2	25	2.20	83.33	98.44
12B	11.3	4	10.0	10.0	0.4	0.4	25	1.40	5.22	3.17
13B	8.6	4	10.0	10.0	0.1	0.1	25	1.10	26.92	5.24
14B	8.3	4	10.0	10.0	1.0	1.0	25	2.00	2.80	3.00
16B	9.8	4	10.0	10.0	0.6	0.6	25	1.60	3.99	3.19
24B	7.0	4	10.0	10.0	0.3	0.3	25	1.30	11.09	5.50
26B	11.2	4	10.0	10.0	0.2	0.2	25	1.20	10.50	3.71
28B	13.7	4	10.0	10.0	1.0	1.0	25	2.00	1.74	1.82
30B	12.5	4	10.0	10.0	1.0	1.0	25	2.00	1.89	2.00
47B	12.0	4	10.0	10.0	0.1	0.1	25	1.10	19.63	3.77
49B	9.3	4	10.0	10.0	0.2	0.2	25	1.20	12.52	4.46
50B	8.1	4	10.0	10.0	1.7	1.7	25	2.70	1.69	2.28
52B	8.1	4	10.0	10.0	0.9	0.9	25	1.90	3.17	3.22
60B	2.9	4	10.0	10.0	0.3	0.3	25	1.30	26.73	13.34
61B	0.2	4	10.0	10.0	2.5	2.5	25	3.50	40.00	61.88
62B	3.0	4	10.0	10.0	0.9	0.9	25	1.90	8.57	8.78
72B	2.3	4	10.0	10.0	1.0	1.0	25	2.00	10.02	10.84
WP001B	12.5	4	10.0	10.0	0.1	0.1	25	1.10	18.91	3.63
WP006B	1.4	4	10.0	10.0	3.8	3.8	25	4.80	4.39	7.52
WP008B	3.8	4	10.0	10.0	1.5	1.5	25	2.50	4.06	5.26
WP001	3.3	4	10.0	10.0	1.6	1.6	25	2.60	4.32	5.75
WP002	4.3	4	10.0	10.0	0.7	0.7	25	1.70	7.56	6.72
WP003	3.3	4	10.0	10.0	0.6	0.6	25	1.60	11.73	9.51
WP004	2.8	4	10.0	10.0	1.2	1.2	25	2.20	6.82	8.05
WP005	2.0	4	10.0	10.0	2.8	2.8	25	3.80	4.09	6.52
WP006	1.7	4	10.0	10.0	1.4	1.4	25	2.40	9.86	12.45
WP007	3.3	4	10.0	10.0	0.9	0.9	25	1.90	7.82	8.01
B13	3.2	4	10.0	10.0	1.6	1.6	25	2.60	4.48	5.96
B14	2.2	4	10.0	10.0	2.5	2.5	25	3.50	4.22	6.52
B15	1.4	4	10.0	10.0	2.3	2.3	25	3.30	6.96	10.50
B18	1.7	4	10.0	10.0	2.4	2.4	25	3.40	5.75	8.79
B21	3.3	4	10.0	10.0	0.8	0.8	25	1.80	8.80	8.46
B22	3.2	4	10.0	10.0	0.7	0.7	25	1.70	10.24	9.11
B23	1.8	4	10.0	10.0	0.7	0.7	25	1.70	18.45	16.45
B28	2.9	4	10.0	10.0	2.3	2.3	25	3.30	3.42	5.15
B29	3.3	4	10.0	10.0	0.8	0.8	25	1.80	8.65	8.31
R1	0.2	4	10.0	10.0	2.6	2.6	25	3.60	38.46	60.16
R10	2.6	4	10.0	10.0	1.4	1.4	25	2.40	6.36	8.03
R2	0.6	4	10.0	10.0	3.1	3.1	25	4.10	12.32	20.18
R3	1.1	4	10.0	10.0	2.6	2.6	25	3.60	7.70	12.03
R7	2.5	4	10.0	10.0	3.8	3.8	25	4.80	2.45	4.20
R8	2.6	4	10.0	10.0	0.9	0.9	25	1.90	9.68	9.92
R9	0.1	4	10.0	10.0	0.6	0.6	25	1.60	666.67	541.44
SUB5	7.6	4	10.0	10.0	0.5	0.5	25	1.50	6.08	4.35
MKOSA-1	2.0	4	10.0	10.0	2.1	2.1	25	3.10	5.45	7.99
MKOSA-2	2.0	4	10.0	10.0	2.2	2.2	25	3.20	5.20	7.74
MKOSA-3	1.8	4	10.0	10.0	2.0	2.0	25	3.00	6.46	9.32
MKOSA-4	2.5	4	10.0	10.0	1.0	1.0	25	2.00	9.11	9.85
MKOSA-5	2.2	4	10.0	10.0	1.0	1.0	25	2.00	10.54	11.41
MKOSA-6	2.6	4	10.0	10.0	1.1	1.1	25	2.10	8.10	9.18
MKOSA-7	2.9	4	10.0	10.0	1.0	1.0	25	2.00	8.02	8.67
MKOSA-8	3.0	4	10.0	10.0	0.8	0.8	25	1.80	9.64	9.27
MKOSA-9	3.8	4	10.0	10.0	1.2	1.2	25	2.20	5.00	5.89
MKOSA-10	3.8	4	10.0	10.0	0.4	0.4	25	1.40	15.22	9.39
MKOSA-11	0.6	4	10.0	10.0	1.2	1.2	25	2.20	31.83	37.60
MKOSA-12	2.2	4	10.0	10.0	0.4	0.4	25	1.40	25.68	15.88
MKOSA-13	0.1	4	10.0	10.0	3.6	3.6	25	4.60	55.56	94.16
MKOSA-14	0.2	4	10.0	10.0	4.0	4.0	25	5.00	33.33	57.75
MKOSA-15	2.2	4	10.0	10.0	2.4	2.4	25	3.40	4.28	6.54
MKOSA-16	2.2	4	10.0	10.0	0.5	0.5	25	1.50	21.08	15.21
MKOSA-17	2.5	4	10.0	10.0	0.5	0.5	25	1.50	18.22	13.14
MKOSA-18	2.5	4	10.0	10.0	1.2	1.2	25	2.20	7.77	9.17
MKOSA-19	0.6	4	10.0	10.0	1.0	1.0	25	2.00	38.20	41.36
MKOSA-20	1.3	4	10.0	10.0	1.0	1.0	25	2.00	18.19	19.69
MKOSA-30	3.7	4	10.0	10.0	1.0	1.0	25	2.00	6.18	6.68
MKOSA-31	3.2	4	10.0	10.0	1.0	1.0	25	2.00	7.17	7.75
MKOSA-32	3.4	4	10.0	10.0	1.0	1.0	25	2.00	6.80	7.35
MKOSA-33	2.9	4	10.0	10.0	0.2	0.2	25	1.20	40.10	14.46
MKOSA-34	2.5	4	10.0	10.0	0.1	0.1	25	1.10	91.09	17.91
MKOSA-35	2.7	4	10.0	10.0	1.9	1.9	25	2.90	4.40	6.23
MKOSA-36	2.2	4	10.0	10.0	3.4	3.4	25	4.40	3.02	5.05
MKOSA-39	1.9	4	10.0	10.0	2.0	2.0	25	3.00	6.07	8.75
MKOSA-40	0.9	4	10.0	10.0	4.0	4.0	25	5.00	6.25	10.83
MKOSA-41	0.7	4	10.0	10.0	3.5	3.5	25	4.50	9.53	16.04
MKOSA-42	1.7	4	10.0	10.0	3.2	3.2	25	4.20	4.17	6.88
MKOSA-43	1.8	4	10.0	10.0	3.5	3.5	25	4.50	3.69	6.21
MKOSA-44	1.9	4	10.0	10.0	3.5	3.5	25	4.50	3.37	5.67
MKOSA-45	1.9	4	10.0	10.0	2.5	2.5	25	3.50	4.85	7.50
MKOSA-46	2.2	4	10.0	10.0	2.6	2.6	25	3.60	3.95	6.17
MKOSA-47	2.3	4	10.0	10.0	3.2	3.2	25	4.20	3.05	5.03
MKOSA-48	2.3	4	10.0	10.0	1.7	1.7	25	2.70	5.89	8.03
MKOSA-49	2.6	4	10.0	10.0	1.0	1.0	25	2.00	8.91	9.63
MKOSA-50	2.6	4	10.0	10.0	1.7	1.7	25	2.70	5.24	7.14
MKOSA-51	2.3	4	10.0	10.0	1.3	1.3	25	2.30	7.52	9.19

### Calculated FoS of Natural Peat Slopes for Ardderroo Wind Farm (Drained Analysis)

Turbine No./Waypoint	Slope	Design c'	Bulk unit weight of Peat	Unit weight of Water	100% Water to height of Peat	Depth of In-situ Peat	Friction Angle	Equivalent Total Depth of Peat (m)	Factor of Safety for Load Condition	
	$\alpha$ (deg)	c' (kPa)	$\gamma$ (kN/m <sup>3</sup> )	$\gamma_w$ (kN/m <sup>3</sup> )	(m)	(m)	$\phi'$ (deg)	Condition (2)	Condition (1)	Condition (2)
									100% Water	100% Water
MKOSA-52	1.8	4	10.0	10.0	1.7	1.7	25	2.70	7.36	10.03
MKOSA-53	1.4	4	10.0	10.0	0.5	0.5	25	1.50	32.02	23.11
MKOSA-54	1.3	4	10.0	10.0	0.9	0.9	25	1.90	19.33	19.83
MKOSA-55	1.1	4	10.0	10.0	1.1	1.1	25	2.10	18.19	20.63
MKOSA-56	0.1	4	10.0	10.0	1.8	1.8	25	2.80	222.22	309.40
MKOSA-57	0.1	4	10.0	10.0	1.8	1.8	25	2.80	111.11	154.70
MKOSA-58	0.1	4	10.0	10.0	1.8	1.8	25	2.80	111.11	154.70
MKOSA-85	7.1	4	10.0	10.0	2.0	2.0	25	3.00	1.64	2.35
MKOSA-86	2.6	4	10.0	10.0	2.4	2.4	25	3.40	3.71	5.67
MKOSA-88	2.3	4	10.0	10.0	2.8	2.8	25	3.80	3.58	5.70
MKOSA-89	2.0	4	10.0	10.0	1.8	1.8	25	2.80	6.36	8.84
MKOSA-91	2.3	4	10.0	10.0	1.0	1.0	25	2.00	10.02	10.84
MKOSA-92	0.8	4	10.0	10.0	3.5	3.5	25	4.50	8.16	13.75
MKOSA-93	0.8	4	10.0	10.0	3.8	3.8	25	4.80	7.52	12.89
MKOSA-99	No peat recorded at location									
1	3.5	4	10.0	10.0	0.8	0.8	25	1.80	8.10	7.78
2	2.7	4	10.0	10.0	1.0	1.0	25	2.00	8.35	9.03
3	8.3	4	10.0	10.0	0.7	0.7	25	1.70	4.02	3.55
4	8.6	4	10.0	10.0	2.0	2.0	25	3.00	1.35	1.93
5	12.0	4	10.0	10.0	0.2	0.2	25	1.20	9.82	3.46
6	13.7	4	10.0	10.0	0.4	0.4	25	1.40	4.34	2.61
7	12.5	4	10.0	10.0	0.3	0.3	25	1.30	6.30	3.07
8	11.6	4	10.0	10.0	0.9	0.9	25	1.90	2.26	2.27
9	11.0	4	10.0	10.0	1.0	1.0	25	2.00	2.14	2.27
10	3.5	4	10.0	10.0	0.1	0.1	25	1.10	65.82	12.93
11	6.0	4	10.0	10.0	3.5	3.5	25	4.50	1.10	1.84
12	7.0	4	10.0	10.0	2.1	2.1	25	3.10	1.58	2.31
13	4.5	4	10.0	10.0	0.6	0.6	25	1.60	8.60	6.96
14	4.7	4	10.0	10.0	2.1	2.1	25	3.10	2.34	3.42
15	11.7	4	10.0	10.0	0.7	0.7	25	1.70	2.88	2.51
16	6.4	4	10.0	10.0	0.4	0.4	25	1.40	9.04	5.56
17	7.0	4	10.0	10.0	0.4	0.4	25	1.40	8.25	5.07
18	3.6	4	10.0	10.0	0.3	0.3	25	1.30	21.25	10.60
21	3.7	4	10.0	10.0	1.2	1.2	25	2.20	5.15	6.07
22	3.2	4	10.0	10.0	1.1	1.1	25	2.10	6.51	7.38
27	1.8	4	10.0	10.0	2.4	2.4	25	3.40	5.21	7.97
28	1.2	4	10.0	10.0	2.6	2.6	25	3.60	7.33	11.46
68	2.2	4	10.0	10.0	4.0	4.0	25	5.00	2.57	4.45
69	3.8	4	10.0	10.0	0.7	0.7	25	1.70	8.70	7.74
70	5.9	4	10.0	10.0	0.7	0.7	25	1.70	5.61	4.97
71	7.1	4	10.0	10.0	0.4	0.4	25	1.40	8.19	5.03
72	5.7	4	10.0	10.0	0.6	0.6	25	1.60	6.73	5.44
74	6.6	4	10.0	10.0	0.7	0.7	25	1.70	5.03	4.46
77	0.4	4	10.0	10.0	0.3	0.3	25	1.30	190.49	95.20
78	0.2	4	10.0	10.0	0.3	0.3	25	1.30	444.45	222.13
79	2.2	4	10.0	10.0	1.7	1.7	25	2.70	6.20	8.45
80	1.3	4	10.0	10.0	3.0	3.0	25	4.00	5.80	9.42
81	0.7	4	10.0	10.0	3.4	3.4	25	4.40	9.05	15.15
82	1.8	4	10.0	10.0	4.7	4.7	25	5.70	2.66	4.75
84	1.6	4	10.0	10.0	2.5	2.5	25	3.50	5.72	8.84
85	1.6	4	10.0	10.0	0.9	0.9	25	1.90	15.89	16.29
86	3.5	4	10.0	10.0	0.7	0.7	25	1.70	9.25	8.23
87	3.6	4	10.0	10.0	1.0	1.0	25	2.00	6.37	6.89
88	2.6	4	10.0	10.0	1.1	1.1	25	2.10	7.92	8.98
89	0.6	4	10.0	10.0	1.9	1.9	25	2.90	19.14	27.16
90	1.1	4	10.0	10.0	2.7	2.7	25	3.70	7.80	12.33
91	3.0	4	10.0	10.0	2.6	2.6	25	3.60	2.97	4.63
92	3.7	4	10.0	10.0	0.7	0.7	25	1.70	8.97	7.98
93	0.1	4	10.0	10.0	0.7	0.7	25	1.70	285.72	254.80
94	2.1	4	10.0	10.0	2.7	2.7	25	3.70	4.01	6.33
95	2.2	4	10.0	10.0	2.0	2.0	25	3.00	5.27	7.60
96	5.4	4	10.0	10.0	0.8	0.8	25	1.80	5.37	5.14
97	4.8	4	10.0	10.0	0.3	0.3	25	1.30	15.99	7.96
98	4.2	4	10.0	10.0	0.2	0.2	25	1.20	27.54	9.91
99	2.9	4	10.0	10.0	1.5	1.5	25	2.50	5.24	6.80
100	2.8	4	10.0	10.0	0.6	0.6	25	1.60	13.64	11.06
101	3.9	4	10.0	10.0	2.0	2.0	25	3.00	2.91	4.19
102	0.8	4	10.0	10.0	3.7	3.7	25	4.70	7.72	13.17
103	2.2	4	10.0	10.0	5.4	5.4	25	6.40	1.90	3.47
104	0.6	4	10.0	10.0	0.4	0.4	25	1.40	100.01	61.88
105	1.6	4	10.0	10.0	2.5	2.5	25	3.50	5.72	8.84
106	4.1	4	10.0	10.0	1.2	1.2	25	2.20	4.72	5.56
107	3.0	4	10.0	10.0	1.6	1.6	25	2.60	4.82	6.42
108	0.8	4	10.0	10.0	1.7	1.7	25	2.70	16.81	22.92
109	1.0	4	10.0	10.0	0.5	0.5	25	1.50	44.46	32.09
110	0.9	4	10.0	10.0	3.5	3.5	25	4.50	7.14	12.03
111	0.6	4	10.0	10.0	1.6	1.6	25	2.60	22.73	30.29
125	0.6	4	10.0	10.0	0.9	0.9	25	1.90	42.44	43.54
126	2.7	4	10.0	10.0	2.1	2.1	25	3.10	3.98	5.83
127	0.6	4	10.0	10.0	1.7	1.7	25	2.70	22.47	30.64
wp005	1.1	4	10.0	10.0	1.8	1.8	25	2.80	11.70	16.29
wp006	0.2	4	10.0	10.0	3.5	3.5	25	4.50	28.57	48.13
wp007	13.5	4	10.0	10.0	0.8	0.8	25	1.80	2.20	2.05
wp010	4.0	4	10.0	10.0	0.1	0.1	25	1.10	57.42	11.28
DB3	1.8	4	10.0	10.0	1.6	1.6	25	2.60	8.15	10.86
DB5	4.8	4	10.0	10.0	0.8	0.8	25	1.80	5.99	5.75
DB6	0.6	4	10.0	10.0	0.7	0.7	25	1.70	54.57	48.66
DB7	3.6	4	10.0	10.0	0.7	0.7	25	1.70	9.11	8.10
DB10	7.7	4	10.0	10.0	0.3	0.3	25	1.30	10.06	4.98
DB11	10.3	4	10.0	10.0	0.2	0.2	25	1.20	11.35	4.03
DB14	8.6	4	10.0	10.0	0.6	0.6	25	1.60	4.49	3.60
DB15	7.0	4	10.0	10.0	0.4	0.4	25	1.40	8.32	5.11
DB20	4.3	4	10.0	10.0	0.8	0.8	25	1.80	6.62	6.35
DB21	8.1	4	10.0	10.0	0.2	0.2	25	1.20	14.37	5.13

## Calculated FoS of Natural Peat Slopes for Ardderroo Wind Farm (Drained Analysis)

Turbine No./Waypoint	Slope	Design c'	Bulk unit weight of Peat	Unit weight of Water	100% Water to height of Peat	Depth of In-situ Peat	Friction Angle	Equivalent Total Depth of Peat (m)	Factor of Safety for Load Condition	
									Condition (1)	Condition (2)
	$\alpha$ (deg)	c' (kPa)	$\gamma$ (kN/m <sup>3</sup> )	$\gamma_w$ (kN/m <sup>3</sup> )	(m)	(m)	$\phi'$ (deg)	Condition (2)	100% Water	100% Water
DB24	6.1	4	10.0	10.0	0.6	0.6	25	1.60	6.36	5.13
DB25	5.3	4	10.0	10.0	1.3	1.3	25	2.30	3.34	4.07
DB30	2.3	4	10.0	10.0	1.9	1.9	25	2.90	5.27	7.47
DB32	5.0	4	10.0	10.0	0.8	0.8	25	1.80	5.79	5.55
DB33	9.7	4	10.0	10.0	0.5	0.5	25	1.50	4.82	3.42
DB34	2.9	4	10.0	10.0	1.0	1.0	25	2.00	8.02	8.67
DB35	4.8	4	10.0	10.0	0.6	0.6	25	1.60	7.99	6.47
DB37	5.3	4	10.0	10.0	0.4	0.4	25	1.40	10.85	6.68
wp001	0.6	4	10.0	10.0	0.9	0.9	25	1.90	42.44	43.54
wp002	2.1	4	10.0	10.0	1.8	1.8	25	2.80	6.01	8.37
wp003	2.5	4	10.0	10.0	1.8	1.8	25	2.80	5.18	7.20
T14	0.7	4	10.0	10.0	3.0	3.0	25	4.00	11.11	18.05
T14-1	0.9	4	10.0	10.0	1.9	1.9	25	2.90	14.04	19.92
T14-2	2.1	4	10.0	10.0	3.2	3.2	25	4.20	3.38	5.58
T14-3	1.3	4	10.0	10.0	3.5	3.5	25	4.50	5.20	8.75
T14-4	0.9	4	10.0	10.0	4.9	4.9	25	5.85	5.50	9.87
T14-5	0.9	4	10.0	10.0	5.0	5.0	25	6.00	5.33	9.63
T14-7	0.8	4	10.0	10.0	4.0	4.0	25	5.00	7.14	12.38
T14-8	1.4	4	10.0	10.0	5.0	5.0	25	6.00	3.34	6.02
T14-9	1.4	4	10.0	10.0	4.0	4.0	25	5.00	4.17	7.22
T14-10	0.9	4	10.0	10.0	1.0	1.0	25	2.00	26.67	28.88
T14-11	2.3	4	10.0	10.0	1.0	1.0	25	2.00	9.77	10.57
T14-12	2.3	4	10.0	10.0	1.5	1.5	25	2.50	6.68	8.67
T15-1	2.3	4	10.0	10.0	2.0	2.0	25	3.00	5.01	7.22
T15-2	2.3	4	10.0	10.0	2.6	2.6	25	3.60	3.76	5.87
T15-3	2.2	4	10.0	10.0	1.2	1.2	25	2.20	8.56	10.10
T15-11	1.8	4	10.0	10.0	3.0	3.0	25	4.00	4.17	6.77
T15-12	1.7	4	10.0	10.0	0.6	0.6	25	1.60	23.01	18.68
T21	0.6	4	10.0	10.0	1.7	1.7	25	2.70	23.53	32.09
T21-1	0.6	4	10.0	10.0	5.0	5.0	25	6.00	8.00	14.44
T21-4	0.6	4	10.0	10.0	0.5	0.5	25	1.50	80.01	57.76
T21-5	0.6	4	10.0	10.0	1.8	1.8	25	2.80	22.22	30.94
T21-6	1.8	4	10.0	10.0	2.8	2.8	25	3.80	4.61	7.36
T21-7	0.6	4	10.0	10.0	1.5	1.5	25	2.50	26.67	34.65
T21-8	0.6	4	10.0	10.0	1.1	1.1	25	2.10	36.37	41.25
T21-9	0.6	4	10.0	10.0	1.7	1.7	25	2.70	23.53	32.09
T21-10	0.6	4	10.0	10.0	2.0	2.0	25	3.00	20.00	28.88
T21-11	0.6	4	10.0	10.0	2.4	2.4	25	3.40	16.67	25.48
T21-12	0.6	4	10.0	10.0	2.0	2.0	25	3.00	20.00	28.88
T10 route	4.0	4	10.0	10.0	1.0	1.0	25	2.00	5.74	6.20
T101	0.1	4	10.0	10.0	1.3	1.3	25	2.30	153.85	188.33
T102	0.3	4	10.0	10.0	1.5	1.5	25	2.50	53.33	69.31
T103	1.2	4	10.0	10.0	3.0	3.0	25	4.00	6.35	10.32
T104	2.9	4	10.0	10.0	2.2	2.2	25	3.20	3.65	5.42
T15	1.8	4	10.0	10.0	1.7	1.7	25	2.70	7.36	10.03
T151	1.4	4	10.0	10.0	4.2	4.2	25	5.20	3.81	6.67
T1510	2.9	4	10.0	10.0	0.8	0.8	25	1.80	10.03	9.64
T152	1.4	4	10.0	10.0	4.5	4.5	25	5.50	3.56	6.30
T156	2.1	4	10.0	10.0	0.9	0.9	25	1.90	12.36	12.67
T157	3.7	4	10.0	10.0	1.2	1.2	25	2.20	5.15	6.07
T159	1.7	4	10.0	10.0	2.5	2.5	25	3.50	5.52	8.54
MCKOS 1.1	6.8	4	10.0	10.0	1.0	1.0	25	2.00	3.41	3.66
MCKOS 1.2	4.6	4	10.0	10.0	1.1	1.1	25	2.10	4.57	5.17
MCKOS 1.3	5.7	4	10.0	10.0	0.4	0.4	25	1.40	10.10	6.22
MCKOS 1.4	5.8	4	10.0	10.0	0.2	0.2	25	1.20	19.81	7.11
MCKOS 1.5	4.1	4	10.0	10.0	0.9	0.9	25	1.90	6.20	6.35
MCKOS 1.6	1.1	4	10.0	10.0	4.7	4.7	25	5.70	4.26	7.60
MCKOS 1.7	1.6	4	10.0	10.0	1.5	1.5	25	2.50	9.53	12.38
MCKOS 1.8	4.9	4	10.0	10.0	0.8	0.8	25	1.80	5.92	5.68
MCKOS 1.9	2.2	4	10.0	10.0	2.4	2.4	25	3.40	4.28	6.54
MCKOS 1.10	3.4	4	10.0	10.0	2.1	2.1	25	3.10	3.19	4.67
MCKOS 1.11	3.4	4	10.0	10.0	1.5	1.5	25	2.50	4.46	5.78
MCKOS 1.12	3.1	4	10.0	10.0	1.0	1.0	25	2.00	7.29	7.89
MCKOS 1.13	5.7	4	10.0	10.0	0.5	0.5	25	1.50	8.16	5.86
MCKOS 1.14	6.4	4	10.0	10.0	0.9	0.9	25	1.90	4.02	4.09
MCKOS 1.15	4.8	4	10.0	10.0	0.5	0.5	25	1.50	9.59	6.90
MCKOS 1.16	1.4	4	10.0	10.0	3.5	3.5	25	4.50	4.57	7.70
MCKOS 1.17	5.6	4	10.0	10.0	1.6	1.6	25	2.60	2.58	3.42
MCKOS 1.18	6.1	4	10.0	10.0	0.2	0.2	25	1.20	19.08	6.85
MCKOS 1.19	5.8	4	10.0	10.0	0.7	0.7	25	1.70	5.66	5.02
MCKOS 1.20	4.7	4	10.0	10.0	1.3	1.3	25	2.30	3.73	4.55
MCKOS 1.21	3.4	4	10.0	10.0	1.8	1.8	25	2.80	3.72	5.17
MCKOS 1.22	1.3	4	10.0	10.0	1.4	1.4	25	2.40	12.99	16.41
MCKOS 1.23	1.5	4	10.0	10.0	1.5	1.5	25	2.50	9.88	12.84
MCKOS 1.24	2.0	4	10.0	10.0	1.8	1.8	25	2.80	6.36	8.84
MCKOS 1.25	1.9	4	10.0	10.0	0.9	0.9	25	1.90	13.48	13.82
MCKOS 1.26	1.2	4	10.0	10.0	1.6	1.6	25	2.60	11.91	15.87
MCKOS 1.27	3.7	4	10.0	10.0	0.9	0.9	25	1.90	6.97	7.14
MCKOS 1.28	4.4	4	10.0	10.0	0.2	0.2	25	1.20	26.13	9.40
MCKOS 1.29	1.8	4	10.0	10.0	0.9	0.9	25	1.90	13.90	14.26
MCKOS 1.30	1.5	4	10.0	10.0	0.9	0.9	25	1.90	16.47	16.89
MCKOS 1.31	1.8	4	10.0	10.0	1.1	1.1	25	2.10	11.74	13.31
MCKOS 1.32	2.1	4	10.0	10.0	0.9	0.9	25	1.90	12.36	12.67
MCKOS 1.33	1.6	4	10.0	10.0	0.9	0.9	25	1.90	15.89	16.29

**Minimum =** 1.05      **1.81**  
**Maximum =** 2000.01      **541.44**  
**Average =** 18.37      **16.02**

**Notes:**

- (1) Assuming a bulk unit weight of peat of 10 (kN/m<sup>3</sup>)
- (2) Assuming a surcharge equivalent to fill depth of 1.0 (m)
- (3) Slope inclination ( $\beta$ ) based on site readings and contour plans.
- (4) FoS is based on slope inclination and shear test results obtained from published data.
- (5) Peat depths based on peat depth probes.
- (6) For load conditions see Report text.
- (7) Minimum acceptable factor of safety required of 1.3 for first-time failures based on BS: 6031:1981 Code of practice for Earthworks.



**APPENDIX E**  
**METHODOLOGY FOR RISK ASSESSMENT**

## Methodology for Risk Assessment

A risk assessment is carried out for the main infrastructure elements at the proposed wind farm development. This approach follows the guidelines for geotechnical risk management as given in Clayton (2001), as referenced in PHRAG, and takes into account the approach of MacCulloch (2005).

The risk assessment uses the results of the stability analysis (deterministic approach) in combination with qualitative factors (Table A), 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.

The stability analysis takes into account the peat depth, slope angle and shear strength properties of the peat (see section 7 of report). The qualitative factors used in the risk assessment have been compiled based on AGECS experience of assessments and construction in peat land sites and peat failures throughout Ireland and the UK.

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 a particular location.

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

Qualitative Factor	Type of Feature/Indicator for each Qualitative Factor <sup>(1)</sup>	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	
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	

Qualitative Factor	Type of Feature/Indicator for each Qualitative Factor <sup>(1)</sup>	Explanation/Description of Qualitative Factor
	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 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.
	Yes	
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

Qualitative Factor	Type of Feature/Indicator for each Qualitative Factor <sup>(1)</sup>	Explanation/Description of Qualitative Factor
	Yes	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.
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.

### Probability

The likelihood of a hazard (peat failure) occurring has been based on the results of the stability calculation FoS and qualitative factors from Table B, where present.

The probability assigned to the FoS and qualitative factors is judged on a qualitative scale (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 water course 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

**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:  $R = P \times I$

The Risk Rating can range from 1 to 20 as shown in Table D.

**Table D Qualitative Risk Rating**

		Probability						
		1	2	3	4	5		
Impact	4	4	8	12	16	20	10 to 20	Unacceptable: re-location or significant control measures required
	3	3	6	9	12	15	5 to 9	Substantial: notable control measures required
	2	2	4	6	8	10	3 to 4	Tolerable: only routine control measures required
	1	1	2	3	4	5	1 to 2	Trivial: none or only routine control measures required

Note. Where any individual contributory factor is given a probability of 5 then this defaults to an 'Unacceptable' risk rating irrespective of the impact.

In many cases a simple 4- to 5-level scale is considered sufficient (Clayton, 2001); in this case a 4-level scale is used. The control measures in response to the qualitative risk ratings are included in the Geotechnical Risk Register for each turbine in Appendix C.

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.