

# **APPENDIX 8-1**

GEOTECHNICAL AND PEAT STABILITY REPORT



CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

# GEOTECHNICAL & PEAT STABILITY REPORT

## **COOLE WIND FARM**

Prepared for: MKO

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Unit 6, Bagenalstown Industrial Park, Bagenalstown, Co. Carlow, R21 XW81, Ireland **T: +353 59 9723800 E: info@ftco.ie** 

CORK | DUBLIN | CARLOW

www.fehilytimoney.ie





## GEOTECHNICAL & PEAT STABILITY ASSESSMENT REPORT COOLE WIND FARM

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Abstract: Fehily Timoney and Company (FT) were engaged by MKO to undertake a geotechnical assessment of the proposed Coole Wind Farm site with respect to peat stability. As part of the geotechnical assessment of the proposed development, FT completed walkover surveys at the site. The findings of the geotechnical and peat stability assessment showed that the site has an acceptable margin of safety and is suitable for the proposed wind farm development.



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#### **NON-TECHNCIAL SUMMARY** 1.

Fehily Timoney and Company (FT) was engaged by McCarthy Keville O'Sullivan (MKO) on behalf of Coole Wind Farm Ltd to undertake a geotechnical and peat stability assessment of the proposed Coole wind farm site. 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.

A walkover including intrusive peat depth probing, 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 (PLHRAG, 2017).

The findings, which involved analysis of over 200 locations, showed that the site generally has an acceptable margin of safety and is considered to be at low risk of peat failure/slide. A number of deeper peat areas are present on site which will require specific construction methods, but do not represent a peat slide/failure risk. The findings include recommendations and control measures for construction work in deep peat lands to ensure that all works adhere to an acceptable standard of safety.

The proposed wind farm comprises 15 no. wind turbines and associated infrastructure. A 1.2km section of the wind turbine delivery route to the south of the Proposed Wind Farm site which passes over an area of bogland is included in this assessment.

The site consists of a series of bogs which have formed in poorly drained topographical depressions which comprises intact deep peat and partially cutaway peat with an extensive drainage network. Prior to the growth of the bogs the area would have comprised water-logged and shallow lakes, which since the end of the last Ice Age have become silted, hence the formation of the blanket peat areas. The site has been harvested using mechanical harvesting equipment resulting in well drained and extensively trafficked peat.

Peat thicknesses recorded during the site walk-over and ground investigation ranged from 0 to 7.8m with an average of 3.0m. Depths of soft ground (including the thickness of the peat) of in excess of 12m were recorded on site.

Slope inclinations at the main infrastructure locations range from 0 to 3.0 degrees. The flat topography/nature of the terrain on site highlights the low risk of peat failure.

Ground conditions comprised mainly of peat overlying typically shell marl overlying lacustrine soil overlying localised glacial till.

In terms of likely construction techniques, with the exception of turbine T5 and T15 all turbines and their associated crane hardstands are likely to require a piled foundation as a result of the depth of peat and soft lacustrine deposits present. In addition, it is likely that a piled foundation will be required for the sub-station building. The sub-station platform and construction compound platform will likely be constructed using floating techniques. The proposed construction methods for the new proposed access roads are both floated and excavated techniques. This means that the volume of peat to be excavated and managed at the site is minimal.

A walk-over including intrusive peat depth probing, a ground investigation including trial pits and window sampling, desk study, stability analysis and risk assessment were 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, 2017).



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.

The stability analysis, which analysed the main infrastructure locations on site, generally showed results above the minimum acceptable FoS of 1.3 and hence have a satisfactory margin of safety except for 2 no. locations where FoS of 1.23 and 1.20 were calculated.

The locations where the lower FoS was calculated were at turbine T9 and a proposed section of access road south of turbine T12. The lower FoS corresponds to areas of deeper peat which are in topographical depressions and would not be at risk from a peat slide. There is a safety risk within the deeper peat areas during construction which can be overcome by adopting specific construction methods suitable for working in deep peat areas. Consequently, these areas have an elevated construction risk and will be subject to additional mitigation/control measures. In essence, excavations of peat at these locations will not occur and rather piled foundations and floating roads methodologies will be employed where possible.

Based on the findings of the peat stability assessment, the proposed Coole wind farm site and associated works has an acceptable margin of safety and is considered to be at low risk of peat failure/slide. A number of deeper peat areas are present on site which will require specific construction methods, but do not represent a peat slide/failure risk. The findings include recommendations and control measures for construction work in deep peat lands to ensure that all works adhere to an acceptable standard of safety.

In summary, the Coole wind farm site has an acceptable margin of safety and is considered to be at low risk of peat failure.



#### 2.1 **Fehily Timoney and Company**

Fehily Timoney and Company (FT) is an Irish engineering, environmental science and planning consultancy with offices in Cork, Dublin and Carlow. The practice was established in 1990 and currently has about 70 members of staff, including engineers, scientists, planners and technical support staff. FT deliver projects in Ireland and internationally in our core competency areas of Waste Management, Environment and Energy, Civils Infrastructure, Planning and GIS and Data Management.

#### 2.2 **Project Description**

FT was engaged in September 2020 by MKO on behalf of Coole Wind Farm Ltd to undertake a geotechnical & peat stability assessment of the proposed Coole wind farm site.

The Coole wind farm site comprises a cut-away blanket peat area of approximately 4.1km<sup>2</sup>. The site is located close to the eastern boundary of Co. Westmeath. The village of Coole is 3km southeast of the site. The surrounding landscape is predominately flat with land-use comprising forestry, agricultural land and both intact and cutaway peatland.

A 1.2km section of the wind turbine delivery route to the south of the wind farm which passes over an area of bogland has also being included in this assessment.

The development comprises of the following:

- (1) up to 15 no. wind turbines with a tip height of up to 175 metres and all associated foundations and hardstanding areas,
- (2) 1 no. onsite electrical substation including control building, associated electrical plant and equipment, welfare facilities and a wastewater holding tank,
- 1 no. temporary construction compound,
- (4) provision of new site access roads, upgrading of existing access roads and hardstanding areas,
- (5) excavation of 1 no. borrow pit,
- (6) all associated underground electrical and communications cabling connecting the turbines to the proposed onsite substation,
- (7) construction of 26 km of underground electricity cabling to facilitate the connection to the national grid from the proposed onsite substation located in the townland of Camagh to the existing 110kV Mullingar substation located in the townland of Irishtown,
- (8) upgrade works to the existing 110kV Mullingar substation consisting of the construction of an additional dedicated bay to facilitate connection of the cable,
- (9) construction of a link road between the R395 and R396 Regional Roads in the townland of Coole to facilitate turbine delivery,
- (10) junction improvement works to facilitate turbine delivery, at the N4 junction with the L1927 in the townland of Joanstown, on land to the South East of railway line level crossing on the L1927 in the townland of Culvin, the L1927 and L5828 junction in the townland of Boherquill and the L5828 and R395 junction in the townland of Corralanna,



- (11) drainage
- (12) forestry felling
- (13) signage, and
- (14) all associated site development works.

The peat depth data recorded by AGEC during a site walk-over during December 2016, by HES in 2012 and 2016 and by FT in September 2020 have been used in the assessment of peat stability for the proposed wind farm site. A ground investigation in the form of trial pits and window sampling was also carried out by HES in 2016. An intrusive ground investigation was undertaken by GII during July 2020.

### 2.3 Peat Stability Assessment Methodology

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

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

- (1) Desk study
- 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)
- (4) Peat contour depth plan – compiled based on the peat depth probes carried out across the site by FT, AGEC and HES
- Factor of safety plan compiled for the short-term critical condition (undrained) for over 200 no. FoS (5) points analysed along the proposed infrastructure envelope on site
- (6) Construction buffer zone plan – identifies areas with an elevated or higher construction risk where mitigation/control measures will need to be implemented during construction to minimise the potential risks and ensure they are kept within an acceptable range
- (7) A risk register was compiled to assess the potential design/construction risks at the infrastructure locations and determine adequate mitigation/control measures for each location to minimise the potential risks and ensure they are kept within an acceptable range, where necessary
- Preliminary assessment of foundation type for turbines (8)
- (9) Commentary of founding details for other infrastructure elements such as access roads, crane hardstands, substation & construction compound platforms and met mast foundation



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



#### Figure 2.1: **Methodology for Peat Stability Assessment**



#### 2.4 **Peat Failure Definition**

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

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

#### Main Approaches to Assessing Peat Stability 2.5

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



- Geomorphological (1)
- (2) Qualitative (judgement)
- (3) Index/Probabilistic (probability)
- (4) Deterministic (factor of safety)

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

As part of FT's deterministic approach, a qualitative risk assessment is also carried out taking into account qualitative factors, which cannot necessarily be quantified, such as the presence of mechanically cut peat, quaking peat, bog pools, sub peat water flow, slope characteristics and numerous other factors. The qualitative factors used in the risk assessment are compiled based on FT's experience of assessments and construction in peat land sites and peat failures throughout Ireland and the UK. This approach follows the guidelines for geotechnical risk management as given in Clayton (2001), as referenced in the best practice for Peat Landslide Hazard and Risk Assessment Guide (PLHRAG, 2017), and takes into account the approach of MacCulloch (2005).

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

#### 2.6 Peat Stability Assessment – Deterministic Approach

The peat stability assessment is carried out across a wide area of peatland to determine the stability of peat slopes and to identify areas of peatland that are suitable for development; this allows the layout of infrastructure on a particular wind farm site to be optimised. The assessment provides a numerical value (factor of safety) of the stability of individual parcels of peatland. The findings of the assessment 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 7).

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



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



The factor of safety provides a direct measure of the degree of stability of a slope and is the ratio of the shear resistance over the downslope destabilising force. Provided the available shear resistance is greater than the downslope destabilising force then the factor of safety will be greater than 1.0 and the slope will remain stable. If the factor of safety is less than 1.0 the slope is unstable and liable to fail. The acceptable range for factor of safety is typically from 1.3 to 1.4.

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

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

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

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

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

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

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



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

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

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

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

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

#### **DESK STUDY** 3.

#### 3.1 **Desk Study**

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

- Geological plans and Geological Survey of Ireland database
- Ordnance survey plans •
- Literature review of peat failures •
- Review of ground investigation data •

The geological plans on the Geological Survey of Ireland database (GSI, 2020) were used to verify the bedrock conditions.

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

The desk study also includes a review of both published literature and GSI online dataset viewer (GSI, 2020) on peat failures/landslides in the vicinity of the site.

A review of the findings of a ground investigation carried out by HES (2016) and by GII (2020) was also carried out.

#### 3.2 Soils, Subsoil & Bedrock

The bog at the Coole site was essentially formed in poorly drained topographical depressions within the north of the Midlands. Prior to the growth of the bog the area would have comprised water-logged and shallow lakes, which since the end of the last Ice Age have become silted hence the formation of a blanket peat area.

Based on the site walk-over, exposures present and ground investigation data for the site the superficial deposits were typically described as soft to firm dark brown to brown fibrous peat overlying shell marl (locally) overlying lacustrine soil overlying till (see Appendix A - Photo 5).

A review of the GSI subsoils maps indicate that the site is underlain by predominantly blanket peat with lacustrine soil and some localised till derived from limestone and shale rock.

The underlying bedrock was described by the Geological Survey of Ireland database (GSI, 2020). In the area of the Coole site, there is one dominant bedrock formation and one localised bedrock formation in the south of the site.

The dominant bedrock formation is from the Lucan formation and is generally described as dark limestone and shale (calp). A detailed description of the dominant bedrock formation is graded, intraclastic skeletal packstones interbedded with shales, laminated calcisiltites, argillaceous micrites and locally abundant chert representative of the basinal facies of the 'Calp'. Basal part of the Calp dominated by dark grey, calcareous, bioturbated mudstones and wackestones also referred to at the Tober Colleen formation.



In a localised area in the south of the site Mudbank limestone which is typically described as massive grey micritic limestone. There are two mapped faults located in the south of the site with a southwest to northeast trend.

No karst features were identified within the site boundary following a review of the GSI database or during the site walk-over. A number of karst features are noted to the east of the site. The closest karst feature is located some 3km to the east of the site where a spring was noted.

## 3.3 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 within the Coole wind farm site (GSI, 2020).

The nearest recorded peat failure is located some 20km west of the study area. The failure occurred in Rhine in Longford in 1809. The failure mechanism is described as a peat burst.

Other failures occurred some 25km west & 30km east of the study area in Newtownforbes in Longford and Chamberlainstown in Meath respectively. The failure in Newtownforbes occurred in 1883 in a raised peat bog. The triggering event of the peat failure is not specified. Minimal detail is available for the Chamberlainstown failure.

Based on the Geological Survey of Ireland's dataset viewer (GSI, 2016) no other peat or non-peat failures occurred within a 30km 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 and the terrain and ground conditions present on site it can be concluded that site conditions in the area of the Coole site have low potential of peat failure.

#### 3.4 Ground Conditions along Grid Connection

The proposed wind farm will connect to the grid via:

• An underground cable (approximately 26 km in length) running from the onsite substation to the existing 110 kV Mullingar substation, located to the south of the proposed wind farm site. The proposed underground cable will be located on existing or proposed tracks and within the public road corridor.

No peat stability or geotechnical issues are envisaged as a result of the proposed grid connection works. Refer to Appendix 4.4 and 4.5 of the EIAR for further information.



## 4. FINDINGS OF SITE RECONNAISSANCE

#### 4.1 Site Reconnaissance

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

The following salient geomorphological features were considered:

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

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

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

#### 4.2 Findings of Site Reconnaissance

The site reconnaissance undertaken by AGEC comprised walk-over inspections of the site & associated works from 13th to 15th December 2016 and 31st May 2017. An additional walkover covering the areas of T14 and T15 was undertaken by FT during September 2020.

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

The main findings of the site walkover of the wind farm site are as follows:

- (1) The site consists of a series of bogs which have formed in poorly drained topographical depressions which comprises intact deep peat and partially cutaway peat with an extensive drainage network. Prior to the growth of the bogs the area would have comprised water-logged and shallow lakes, which since the end of the last Ice Age have become silted hence the formation of the blanket peat areas. The site has been harvested using mechanical harvesting equipment resulting in a well-drained and extensively trafficked peat (see Appendix A Photos 1 to 3 for overview of site conditions).
- (2) Peat depths recorded across the site ranged from 0 to 7.8m with an average of 3.2m (Figure 4.1). In excess of 250 no. peat depth probes were carried out on site. Depths of soft ground (including the thickness of the peat) of in excess of 12m were recorded on site.
- (3) The peat depths recorded at the turbine locations varied from 0.3 to 7.5m with an average depth of 5.2m. The slope angle at the turbine locations range from 1.0 to 3.0 degrees which highlights the flat topography/nature of the site.



- (4) The site is relatively flat-lying with drainage channels running typically north to south. Across the central portion of the site the drainage channels typically run from east to west.
- (5) The access roads for the wind farm comprise construction of new proposed access roads, while utilising some of the localised existing access tracks present on site. The construction of new proposed access roads will be carried out using floated and excavated road construction techniques.
- (6) Slope angles at the turbine locations range from 1 to 3 degrees. These slope angle readings were obtained during the site reconnaissance by FT using handheld equipment, such as the Silva Clino Master which has an accuracy of +/- 0.25 degrees. The slope angle quoted typically reflects the slope within the footprint of each infrastructure location.
- (7) A number of deep peat areas were identified during the site walkover (Figure 4.1). 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 typically 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.
- (8) The peat has been harvested by surface stripping of the peat and excavation of drainage channels. The acrotelm layer (upper fibrous layer of peat) where most of the strength of the peat lies has been removed. Notwithstanding this, the stripped upper surface of the peat is relatively well drained.
- (9) Localised areas of ponding water were recorded close to and around areas subject to tracked vehicle movements. This is not unexpected given the ground conditions and the flat terrain present on site (see Appendix A Photo 3).
- (10) No evidence of past failures or any significant signs of peat instability were noted on site.
- (11) In relation to the 1.2km section of the wind turbine delivery route (TDR) to the south of the wind farm which passes over an area of bogland, the following comments are given:
  - (a) A section of the proposed delivery route overlies part of a bog and an existing gravel track. The bog would have formed in a poorly drained topographical depression which comprises intact deep peat and partially cutaway peat with an extensive drainage network. There is a mature forested area on a section of the bog. The existing gravel track is used to access agricultural land.
  - (b) The topography along the section of proposed TDR is relatively flat lying with drainage channels running typically north to south.
  - (c) The peat depths recorded along the TDR varied from 0m (no peat, along the existing track) to 2.8m in the bog with an average depth of 1.8m. The slope angle along the access track range from 0.5 to 3.0 degrees which highlights the flat topography/nature of the area.
  - (d) In the area of the bog, the peat has been harvested by surface stripping of the peat and excavation of drainage channels. The acrotelm layer (upper fibrous layer of peat) where most of the strength of the peat lies has been removed. Notwithstanding this, the stripped upper surface of the peat is relatively well drained.
  - (e) The construction of the access tracks for this section of the wind turbine delivery route will be carried out using a floated road construction technique through the bog and upgrading the existing track where present.
  - (f) No evidence of past failures or any significant signs of peat instability were noted along this section of the route.
- (12) The findings of the site reconnaissance are as follows:



- (a) The site consists of a series of bogs which have formed in poorly drained topographical depressions which comprises intact deep peat and partially cutaway peat with an extensive drainage network.
- (b) Peat depths recorded across the site vary from 0 to 7.8m with an average of 3.2m.
- (c) A construction buffer zone plan has been produced for the site (Figure 4.2). This Figure shows areas which have an elevated or higher construction risk due to the terrain and features encountered during the site reconnaissance e.g. deep peat, weak, quaking peat, etc.
- (d) The results of the peat depth probing, shear strength testing of the peat and qualitative factors identified on site have been used in the stability and risk assessment; the findings of which are shown on the construction buffer zone plan and factor of safety plan for site (Figures 4.2 and 7.1).
- (13) Based on the findings from the site reconnaissance, the proposed development footprint for the site would be considered to have a low risk of peat failure/slide. Notwithstanding the above, a number of deeper peat areas are present on site which will require specific construction methods, but do not represent a peat slide/failure risk





### Peat Depth Legend:



## Legend:







## Construction Buffer Zone Legend:

Areas which have an elevated or higher construction risk (areas with deep weak and occasionally quaking peat). Areas where additional control/mitigation measures are required.

Watercourse



Legend:

Turbine and Hardstand

0 

Construction Compound

700

Borrow Pit



Onsite Substation

----- Existing Internal Roads to Upgrade

New Internal Roads

Site Boundary



Temporary Hardcore Surfacing

Drawn - POR



A ground investigation was carried out at the Coole site by HES in December 2016. An additional ground investigation was carried out by GII (Ground Investigations Ireland) in July 2020.

The HES ground investigation consisted of 11 no. window samples and 8 no. trial pits. The trial pits and window samples were carried out at various locations across the site. The GII ground investigation consisted of 13 no. rotary cored boreholes at turbine and substation locations across the site.

The purpose of the ground investigations was to assess the ground conditions across the site and to determine the ground conditions at the proposed borrow pit location. A ground investigation location plan is included as Figure 5.1 in this report.

The trial pit, window sample and borehole logs are included within Appendix E of this report.

Based on the ground investigations, underlying the peat is a significant depth of soft ground consisting of shell marl and lacustrine deposits. Depths of soft ground of up to 14.0m (includes thickness of peat) were recorded on site. Note, occasionally the window sampling did not encounter the base of the soft ground. In addition, and based on observations during the window sampling, confined water pressures may also be present towards the base of the soft ground.

Based on the ground investigation data, the ground conditions at the wind farm and borrow pit location are outlined separately in the text below.

#### 5.1 Summary of Ground Conditions at proposed Wind Farm

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

Peat – Typically described as brown/dark brown fibrous and amorphous peat. The hand vanes carried out in the peat indicate undrained shear strengths in the range 13 to 96kPa, with an average value of about 36kPa. The relatively high strengths are as a result of the extensive drainage works which have taken place on site for the harvesting of the peat. Peat thicknesses from probing and the ground investigation ranged from 0 to 12m.

Calcareous Mud/Shell Marl – Soft cream coloured mud with local deposits of shell fragments. The thickness of the layer is variable across the site from 0.3 to 3.0m.

Lacustrine Soil – Locally grey to dark grey soft to firm clay. The marl is considered to be a lacustrine deposit. The thickness of the layer varies from 0.3 to 5.6m.

Glacial Granular Soils – Locally loose to dense wet grey sandy clayey silty gravel. This layer was locally encountered in a small number of the trial pits. The glacial granular soils are likely to have a mixed strength/density.

Weathered Bedrock – Possible weathered bedrock was only encountered in trial pit TP2-C. Arisings from the trial pit comprised of large angular cobbles and a matrix of sandy silt and angular gravel. Bedrock was recorded in all of the rotary cored boreholes at a depth of 6.05 to 16.9m bgl.



### 5.2 Summary of Ground Conditions at proposed Borrow Pit

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

Topsoil – Typically described as sandy gravelly clay.

Glacial Till – Consisted of orange to brown slightly gravelly Clay. Deposits ranged from 0.3m to 1.1m in thickness.

Weathered Bedrock – Typically consisting of angular gravels, cobbles and boulders of weathered limestone in a clay matrix. Weathered bedrock was typically encountered between 0.2m and 1.3mbgl.

Bedrock – Bedrock comprises of strong intact limestone at typically 1.5mbgl.



Date - 12.01.21



## Ground Investigation Legend:



+

Trial Pit Locations (HES 2016) Window Sample Location (HES 2016)

Borehole Location (2020)

## Legend:

Turbine and Hardstand



Construction Compound

Borrow Pit



Onsite Substation

700

— Existing Internal Roads to Upgrade

New Internal Roads Turbine Delivery Route

Site Boundary



Temporary Hardcore Surfacing



#### 6.1 Soils & Subsoils

The bog at the Coole site was essentially formed in poorly drained topographical depressions within the north of the Midlands. Prior to the growth of the bog the area would have comprised water-logged and shallow lakes, which since the end of the last Ice Age have become silted hence the formation of a blanket peat area.

Based on the site walk-over, exposures present and ground investigation data for the site the superficial deposits were typically described as soft to firm dark brown to brown fibrous peat overlying shell marl (locally) overlying lacustrine soil overlying till (see Appendix A - Photo 5).

A review of the GSI subsoils maps indicate that the site is underlain by predominantly blanket peat with lacustrine soil and some localised till derived from limestone and shale rock.

### 6.2 Bedrock

The underlying bedrock was described by the Geological Survey of Ireland database (GSI, 2016). In the area of the Coole site, there is one dominant bedrock formation and one localised bedrock formation in the south of the site.

The dominant bedrock formation is from the Lucan formation and is generally described as dark limestone and shale (calp). A detailed description of the dominant bedrock formation is graded, intraclastic skeletal packstones interbedded with shales, laminated calcisiltites, argillaceous micrites and locally abundant chert representative of the basinal facies of the 'Calp'. Basal part of the Calp dominated by dark grey, calcareous, bioturbated mudstones and wackestones also referred to at the Tober Colleen formation.

In localised area in the south of the site Mudbank limestone which is typically described as massive grey micritic limestone.

There are two mapped faults located in the south of the site with a southwest to northeast trend.

No karst features were identified within the site boundary following a review of the GSI database or during the site walk-over. A number of karst features are noted to the east of the site. The closest karst feature is located some 3km to the east of the site where a spring was noted.



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

#### 7.1 Peat Depth

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

### 7.2 Peat Strength

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

### 7.3 Slope Angle

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

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

#### 7.4 Summary of Findings

Based on the peat depths recorded across the site by FT, AGEC and HES, the peat varied in depth from 0 to 7.8m with an average of 3.2m. All peat depth probes carried out on site have been utilised to produce a peat depth contour plan for the site (Figure 3.1).

A summary of the peat depths at the proposed infrastructure locations is given in Table 6.1. The data presented in Table 6.1 is used in the peat stability assessment of the site; see Section 8 of this report.

			Peat Depth	Average Peat	Slope Angle (°)
Turbine	Easting	Northing	Range (m) <sup>(1)</sup>	Depth (m)	(2)
T1	640852	777346	6.1 to 7.0	6.6	2.0
T2	641419	777267	3.5 to 4.4	4.0	2.0
Т3	641463	776708	5.0 to 6.1	5.9	2.0
T4	641994	776908	4.8 to 5.6	5.3	1.0
T5	641716	776074	0.3 to 2.0	0.6	2.0
Т6	641168	776069	4.3 to 4.8	4.6	2.0
Т7	640893	776651	2.9 to 4.0	3.4	1.0
Т8	640511	776034	3.1 to 3.9	3.6	2.0
Т9	640862	775599	5.0 to 6.2	6.0	3.0
T10	640322	775448	4.2 to 6.5	4.6	2.0
T11	639849	775149	5.0 to 6.5	5.6	1.0
T12	640263	774772	4.5 to 12.5	4.9	3.0
T13	640750	775050	4.6 to 8.0	5.4	2.0
T14	640986	774517	1.0	1.0	1
T15	642732	775628	0.8 to 1.9	1.5	1
Substation	639914	774720	0.4 to 3.4	2.0	2.0
Construction Compound	639942	774580	0.4 to 3.1	1.6	1.0
Borrow Pit	641896	774383	0.0	0.0	Variable

#### Table 7.1: Peat Depth & Slope Angle at Proposed Infrastructure Locations

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

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

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

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

The hand vane results indicate undrained shear strengths in the range 13 to 98kPa, with an average value of about 36kPa. The strengths recorded would be typical of well drained peat as is present on the Coole site.



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









## 8. PEAT STABILITY ASSESSMENTS

The peat stability assessment includes an assessment of the stability of the natural peat slopes for individual parcels across the site including at the turbine locations and along the proposed access roads. The assessment also analyses the stability of the natural peat slopes with a surcharge loading of 10kPa, equivalent to placing 1m of stockpiled peat on the surface of the peat slope.

#### 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 the change in groundwater level as a result of rainfall on the existing stability of the natural peat slopes.

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

A drained analysis requires effective cohesion (c') and effective friction angle ( $\phi'$ ) 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 8.1 shows a summary of the published information on peat together with drained strength values.

From Table 8.1 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' = 4kPa ø' = 25°



### Table 8.1: List of Effective Cohesion and Friction Angle Values for Peat

Reference	Cohesion, c' (kPa)	Friction Angle, ø' (degs)	Testing Apparatus/ Comments
Hanrahan et al (1967)	5 to 7	36 to 43	From triaxial apparatus
Rowe and Mylleville (1996)	2.5	28	From simple shear apparatus
Landva (1980)	2 to 4	27.1 to 32.5	Mainly ring shear apparatus for normal stress greater than 13kPa
	5 to 6	-	At zero normal stress
Carling (1986)	6.5	0	-
Farrell and Hebib	0	38	From ring shear and shear box apparatus. Results are not considered representative.
(1998)	0.61	31	From direct simple shear (DSS) apparatus. Result considered too low therefore DSS not considered appropriate
Rowe, Maclean and	1.1	26	From simple shear apparatus
Soderman (1984)	3	27	From DSS apparatus
McGreever and Farrell	6	38	From triaxial apparatus using soil with 20% organic content
(1988)	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



### 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 8.2.

#### Table 8.2: Factor of Safety Limits for Slopes

Factor of Safety (FoS)	Degree of Stability	
Less than 1.0	Unstable (red)	
Between 1.0 and 1.3	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 has a significantly higher undrained strength as a result of the extensive drainage & extraction works which have been carried out on site.

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

 $\gamma_z \sin \alpha \cos \alpha$ 

Where:

F = Factor of Safety



- $c_u$  = Undrained strength
- Bulk unit weight of material v =
- Depth to failure plane assumed as depth of peat z =
- α = Slope angle

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

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

Where:

- F = Factor of Safety
- c' = Effective cohesion
- Bulk unit weight of material  $\gamma =$
- 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
- α = 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 being completely dry and 100% equates to the peat been fully saturated.

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

- (1) Peat depths are based on the maximum peat depth recorded at each location from the walkover surveys.
- (2) The slope angles used in the peat stability assessment were obtained using a combination of readings taken during the site reconnaissance by FT using handheld equipment and from contour survey plans for site. It should be noted that slope angles derived from contour survey plans would be considered approximate, as such surveys are dependent on the density of survey data and do not always reflect local variations in ground topography.
- (3) Slope angle at base of sliding assumed to be parallel to ground surface.
- (4) A lower bound undrained shear strength,  $c_u$  for the peat of 6kPa was selected for the assessment. The lowest recorded value on the Coole wind farm site during the walkovers was 13kPa. It should be noted that a cu of 6kPa for the peat is considered a conservative value for the analysis and is not representative of all peat present across the site. In reality, the peat has a significantly higher undrained strength as a result of the extensive drainage & extraction works which have been carried out on site.



For the stability analysis two load conditions were examined, namely

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

#### 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 C and the results of the undrained analysis for the most critical load case (load condition 2) are shown on Figure 8.1. 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 8.3.

The calculated FoS for load condition (1) is in excess of 1.30 for each of the locations (220 no. locations) analysed with a range of FoS of 1.80 to in excess of 10, indicating a low risk of peat instability.

The calculated FoS for load condition (2) is in excess of 1.30 for each of the locations (220 no. locations) analysed with a range of FoS of 1.49 to in excess of 10, indicating a low risk of peat instability.

Table 8.3: Factor of Safety R	esults (Undrained Condition)
-------------------------------	------------------------------

Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition	
			Condition (1)	Condition (2)
T1	640852	777346	2.46	2.15
T2	641419	777267	3.91	3.19
Т3	641463	776708	2.82	2.42
T4	641994	776908	6.14	5.21
T5	641716	776074	19.11	9.05
Т6	641168	776069	3.58	2.97
Τ7	640893	776651	8.60	6.88
Т8	640511	776034	4.41	3.51
Т9	640862	775599	1.85	1.59
T10	640322	775448	3.31	2.77
T11	639849	775149	5.55	4.78
T12	640263	774772	2.17	1.82
T13	640750	775050	2.29	2.02
T14	640986	774517	34.38	17.19



Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition	
			Condition (1)	Condition (2)
T15	642732	775628	18.10	11.86
Substation	639914	774720	5.38	4.10
Construction Compound	639942	774580	11.09	8.39
Borrow Pit	641896	774383	No peat	recorded




### Factor of Safety Legend:



#### Legend:

Turbine and Hardstand



Construction Compound

Borrow Pit



Onsite Substation

700

Existing Internal Roads to Upgrade

New Internal Roads
Turbine Delivery Route

Site Boundary



Temporary Hardcore Surfacing



#### 8.3.2 Drained Analysis for the Peat

The results of the drained analysis for the peat are presented in Appendix C. The results from the main infrastructure locations are summarised in Table 8.4. As stated previously, the drained loading condition examines the effect of rainfall and water on the existing stability of the natural peat slopes.

The calculated FoS for load condition (1) is in excess of 1.30 for each of the locations (220 no. locations) analysed with a range of FoS of 1.30 to in excess of 10 except for 2 no. locations where FoS of 1.23 and 1.20 were calculated.

The locations where the lower FoS were calculated was at turbine T9 and a proposed section of access road south of turbine T12. The lower FoS correspond to areas of deeper peat which are located in topographical depressions and 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 overcome by adopting specific construction methods suitable for working in deep peat areas. Consequently, these areas have an elevated construction risk and will be subject to additional mitigation/control measures (see Appendix B). The remainder of the locations analysed had acceptable FoS 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 locations (220 no. locations) analysed with a range of FoS of 2.14 to in excess of 10, indicating a low risk of peat instability.

Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition				
			Condition (1)	Condition (2)			
T1	640852	777346	1.64	3.10			
T2	641419	777267	2.61	4.60			
Т3	641463	776708	1.88	3.50			
T4	641994	776908	4.09	7.52			
T5	641716	776074	12.74	13.06			
Т6	641168	776069	2.39	4.28			
T7	640893	776651	5.73	9.93			
Т8	640511	776034	2.94	5.07			
Т9	640862	775599	1.23	2.30			
T10	640322	775448	2.21	4.00			
T11	639849	775149	3.70	6.89			
T12	640263	774772	1.44	2.63			
T13	640750	775050	1.53	2.92			
T14	640986	774517	22.92	24.82			
T15	642732	775628	12.06	17.12			
Substation	639914	774720	3.58	5.91			
Construction Compound	639942	774580	7.39	12.11			

#### Table 8.4: Factor of Safety Results (Drained Conditions)



Turbine No./Waypoint	Easting	Northing	Factor of Safety for Load Condition				
			Condition (1)	Condition (2)			
Borrow Pit	641896	774383	No peat recorded				



### 9. PEAT STABILITY RISK ASSESSMENT

A peat stability risk assessment was carried out for the main infrastructure elements at the wind farm. This approach takes into account guidelines for geotechnical/peat stability risk assessments as given in PLHRAG (2017) and MacCulloch (2005).

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

For each of the main infrastructure elements, a risk rating (product of probability and impact) is calculated and rated as shown in Table 9.1. Where a subsection is rated 'Medium' or 'High', control measures are required to reduce the risk to at least a 'Low' risk rating. Where a subsection is rated 'Low' or 'Negligible', only routine control measures are required.

#### Table 9.1:Risk Rating Legend

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

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

#### 9.1 Summary of Risk Assessment Results

The results of the peat stability risk assessment for potential peat failure at the main infrastructure elements is presented as a Geotechnical Risk Register in Appendix B and summarised in Table 9.2.

The risk rating for each infrastructure element at the Coole wind farm is designated Negligible following some mitigation/control measures being implemented. Sections of access roads to the nearest infrastructure element will 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 B).



### Table 9.2: Summary of Peat Stability Risk Register

Infrastructure	Pre-Control Measure Implementation Risk Rating	Pre-Control Measure Implementation Risk Rating Category	Notable Control Measures Required	Post-Control Measure Implementation Risk Rating	Post-Control Measure Implementation Risk Rating Category					
		Coole Wind Fa	rm Site							
Turbine T1	Low	5 to 10	Yes	Negligible	1 to 4					
Turbine T2	Negligible	1 to 4	Yes	Negligible	1 to 4					
Turbine T3	Low	5 to 10	Yes	Negligible	1 to 4					
Turbine T4	Negligible	1 to 4	Yes	Negligible	1 to 4					
Turbine T5	Negligible	1 to 4	No	Negligible	1 to 4					
Turbine T6	Negligible	1 to 4	Yes	Negligible	1 to 4					
Turbine T7	Negligible	1 to 4	Yes	Negligible	1 to 4					
Turbine T8	Negligible	1 to 4	Yes	Negligible	1 to 4					
Turbine T9	Negligible	1 to 4	Yes	Negligible	1 to 4					
Turbine T10	Negligible	1 to 4	Yes	Negligible	1 to 4					
Turbine T11	Negligible	1 to 4 Yes		Negligible	1 to 4					
Turbine T12	Negligible	1 to 4	Yes	Negligible	1 to 4					
Turbine T13	Negligible	1 to 4	Yes	Negligible	1 to 4					
Turbine T14	Low	5 to 10	No	Negligible	1 to 4					
Turbine T15	Low	5 to 10	No	Negligible	1 to 4					
Substation	Negligible	1 to 4	Yes	Negligible	1 to 4					
Construction Compound	Negligible	1 to 4	No	Negligible	1 to 4					
Borrow Pit	N/A-	– No peat recorded		N	/A					
	Section of Wind Turbine delivery route									
Access Track (Upgrade of existing track)	N/A ·	N	/Α							
Access Track (New floated track)	Negligible	1 to 4	No	Negligible	1 to 4					



#### 10.1 Summary

The following summary is given.

FT was engaged by MKO on behalf of Coole Wind Farm Ltd. to undertake a geotechnical and peat stability assessment of the proposed wind farm site and associated works. An assessment of a 1.2km section of the wind turbine delivery route to the south of the wind farm which passes over an area of bogland is also included in this report.

The findings of the peat assessment showed that the site generally has an acceptable margin of safety and is considered to be at low risk of peat failure/slide. A number of deeper peat areas are present on site which will require specific construction methods, but do not represent a peat slide/failure risk. The findings include recommendations and control measures for construction work in deep peat lands to ensure that all works adhere to an acceptable standard of safety.

The area of the wind farm site and a section of the wind turbine delivery route assessed in this report consists of a series of bogs which have formed in poorly drained topographical depressions which comprises intact deep peat and partially cutaway peat with an extensive drainage network. Prior to the growth of the bogs the area would have comprised water-logged and shallow lakes, which since the end of the last Ice Age have become silted hence the formation of the blanket peat areas. The site has been harvested using mechanical harvesting equipment resulting in well-drained and extensively trafficked peat.

Peat thicknesses recorded during the site walk-overs from ranged from 0 to 7.8m with an average of 3.2m.

Slope inclinations at the main infrastructure locations range from 0 to 3 degrees. The flat topography/nature of the terrain on site highlights the low risk of peat failure.

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) & (2) for the locations analysed, show that all locations have an acceptable FoS of greater than 1.3, indicating a low risk of peat failure. The undrained analysis would be considered the most critical condition for the peat slopes.

A drained analysis was 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) & (2) for the locations analysed, show that all locations have an acceptable FoS of greater than 1.3 except for 2 no. locations (at T9 and south of T12) where FoS of 1.20 and 1.23 were calculated.

The locations where the lower FoS were calculated was at turbine T9 and a proposed section of access road south of turbine T12. The lower FoS correspond to areas of deeper peat which are located in topographical depressions and 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 overcome by adopting specific construction methods suitable for working in deep peat areas. Consequently, these areas have an elevated construction risk and will be subject to additional mitigation/control measures (see Appendix B). In essence, excavations of peat at these locations will not occur and rather piled foundations and floating roads methodologies will be employed where possible. The



remainder of the locations analysed had acceptable FoS's of greater than 1.3, indicating a low risk of peat instability.

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 B for details of the required mitigation/control measures for each infrastructure element.

In summary, the findings of the peat assessment showed that the proposed Coole wind farm site has an acceptable margin of safety, is suitable for the proposed wind farm development and is considered to be at **low** risk of peat failure. 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 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 will be taken into account and implemented throughout design and construction works (Appendix B).

In terms of likely construction techniques, with the exception of turbine T5 all turbines and their associated crane hardstands are likely to require a piled foundation as a result of the depth of peat and soft lacustrine deposits encountered. In addition, it is likely that a piled foundation will be required for the sub-station building. The sub-station platform and construction compound platform will likely be constructed using floating techniques. The proposed construction methods for all the new proposed access roads are floated and excavated techniques. Existing access tracks will be upgraded as required on site and incorporated into the infrastructure on site. All the above outlined construction techniques are to be confirmed at detailed design stage.

Figure 4.1 shows areas with elevated or higher construction risk based on qualitative factors identified during the site walk-over e.g. relatively deep peat, quaking peat, etc. Figure 8.1 shows the results of the factor of safety (FoS) analysis for the peat slopes on site for the most critical load condition.

Recommendations and guidelines given in FT's report 'Peat Management Plan - Coole Wind Farm, County Westmeath' (FT 2020) should be taken into consideration during the design and construction stage of the wind farm development. 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 Walkover





Photo 1 Overview of site conditions



Photo 2 Overview of site conditions



Photo 3 Overview of site conditions



Photo 4 Example of vegetated area within construction compound footprint



Photo 5 Example of ground conditions on site (peat overlying lacustrine deposits)



Photo 6 Existing bog pool to the south of turbine T12



Photo 7 Section of wind turbine delivery route (existing track)



Photo 8 Section of wind turbine delivery route (through peatland)



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# **APPENDIX B**

Peat Stability Risk Registers



Location:	Turbine T1
Grid Reference (Eastings, Northings):	240910 277329
Distance to Watercourse (m)	100 - 150
Maximum Measured Peat Depth (m):	7.0
Control Required:	Yes

		Pre-Control Measure Implementation				Post-Control Measure Impleme			olementation		
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating
1	FOS = 2.25 (u), 1.64 (d)	1	2	2	Negligible	No		1	2	2	Negligible
2	Evidence of sub peat water flow	1	2	2	Negligible	No		1	2	2	Negligible
3	Evidence of surface water flow	1	2	2	Negligible	No		1	2	2	Negligible
4	Evidence of previous failures/slips	0	2	0	Not Applicable	No		0	2	0	Not Applicable
5	Type of vegetation	2	2	4	Negligible	No		2	2	4	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	1	2	2	Negligible	No	See Below	1	2	2	Negligible
	Evidence of very soft/soft clay at base of peat	3	2	6	Low	Yes		1	2	2	Negligible
8	Evidence of mechanically cut peat	0	2	0	Not Applicable	No		0	2	0	Not Applicable
9	Evidence of quaking or buoyant peat	2	2	4	Negligible	No		1	2	2	Negligible
10	Evidence of bog pools	0	2	0	Not Applicable	No		0	2	0	Not Applicable
11	Deep peat	4	2	8	Low	Yes		1	2	2	Negligible

	Control Measures to be Implemented Prior to/and During Construction for Turbine T1
i	Due to deep peat at this turbine location, additional construction measures such as the following may be required:
	- access and working area possibly formed using bog mats with the addition of temporary working platform
	- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
	- detailed design of access platforms and temporary working platforms to be carried out in advance of construction works
	- construct using piled foundation due to depth of peat and soft underlying deposits
	- install piling/working platform required for the construction of turbine base foundation
	- monitoring (in the form of timber stakes as sightlines) to be installed in area of working platform and to be monitored regularly during the piling works
	- site trial of piling works and potential issues to be identified prior to commencing construction
	- testing of piles to be carried out in accordance with latest standards to ensure design assumptions are satisified
ii	Use of experienced geotechnical staff for construction supervision, monitoring works, etc.;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Maintain hydrology of area as far as possible.

Location:	Turb	Turbine T2			
Grid Reference (Eastings, Northings):	241477	277250			
Distance to Watercourse (m)	>	150			
Maximum Measured Peat Depth (m):	4	.4			
Control Required:	Y	Yes			

		Pre-Control Measure Implementation					Post-Control Measure Implementation				
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating
1	FOS = 3.19 (u), 2.61 (d)	1	1	1	Negligible	No		1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	1	1	1	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No	See Below	1	1	1	Negligible
	Evidence of very soft/soft clay at base of peat	3	1	3	Negligible	No		1	1	1	Negligible
8	Evidence of mechanically cut peat	1	1	1	Negligible	No		1	1	1	Negligible
9	Evidence of quaking or buoyant peat	1	1	1	Negligible	No		1	1	1	Negligible
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable
11	Deep peat	3	1	3	Negligible	Yes		1	1	1	Negligible

	Control Measures to be Implemented Prior to/and During Construction for <b>Turbine T2</b>
i	Due to deep peat at this turbine location, additional construction measures such as the following may be required:
	- access and working area possibly formed using bog mats with the addition of temporary working platform
	- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
	- detailed design of access platforms and temporary working platforms to be carried out in advance of construction works
	- construct using piled foundation due to depth of peat and soft underlying deposits
	- install piling/working platform required for the construction of turbine base foundation
	- monitoring (in the form of timber stakes as sightlines) to be installed in area of working platform and to be monitored regularly during the piling works
	- site trial of piling works and potential issues to be identified prior to commencing construction
	- testing of piles to be carried out in accordance with latest standards to ensure design assumptions are satisified
ii	Use of experienced geotechnical staff for construction supervision, monitoring works, etc.;
111	Use of experienced contractors and trained operators to carry out the work;
iv	Maintain hydrology of area as far as possible.

Location:	Turbine T3
Grid Reference (Eastings, Northings):	241521 276690
Distance to Watercourse (m)	100 - 150
Maximum Measured Peat Depth (m):	6.1
Control Required:	Yes

		Pre-Control Measure Implementation					Post-Control Measure Implementation							
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating			
1	FOS = 2.42 (u), 1.88 (d)	1	2	2	Negligible	No		1	2	2	Negligible			
2	Evidence of sub peat water flow	1	2	2	Negligible	No		1	2	2	Negligible			
3	Evidence of surface water flow	2	2	4	Negligible	No		1	2	2	Negligible			
4	Evidence of previous failures/slips	0	2	0	Not Applicable	No		0	2	0	Not Applicable			
5	Type of vegetation	2	2	4	Negligible	No		2	2	4	Negligible			
6	General slope characteristics upslope/downslope from infrastructure location	1	2	2	Negligible	No	See Below	1	2	2	Negligible			
7	Evidence of very soft/soft clay at base of peat	3	2	6	Low	No					1	2	2	Negligible
8	Evidence of mechanically cut peat	2	2	4	Negligible	No		1	2	2	Negligible			
9	Evidence of quaking or buoyant peat	1	2	2	Negligible	No		1	2	2	Negligible			
10	Evidence of bog pools	0	2	0	Not Applicable	No		0	2	0	Not Applicable			
11	Deep peat	4	2	8	Low	Yes		1	2	2	Negligible			

	Control Measures to be Implemented Prior to/and During Construction for Turbine T3
i	Due to deep peat at this turbine location, additional construction measures such as the following may be required:
	- access and working area possibly formed using bog mats with the addition of temporary working platform
	- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
	- detailed design of access platforms and temporary working platforms to be carried out in advance of construction works
	- construct using piled foundation due to depth of peat and soft underlying deposits
	- install piling/working platform required for the construction of turbine base foundation
	- monitoring (in the form of timber stakes as sightlines) to be installed in area of working platform and to be monitored regularly during the piling works
	- site trial of piling works and potential issues to be identified prior to commencing construction
	- testing of piles to be carried out in accordance with latest standards to ensure design assumptions are satisified
ii	Use of experienced geotechnical staff for construction supervision, monitoring works, etc.;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Maintain hydrology of area as far as possible.

Location:	Turbine T4
Grid Reference (Eastings, Northings):	242051 276891
Distance to Watercourse (m)	> 150
Maximum Measured Peat Depth (m):	5.6
Control Required:	Yes

		Pre-	Control Meas	sure Imple	mentation			Post-Control Measure Implementation				
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating	
1	FOS = 5.21 (u), 4.09 (d)	1	1	1	Negligible	No		1	1	1	Negligible	
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible	
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible	
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible	
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No	See Below	1	1	1	Negligible	
7	Evidence of very soft/soft clay at base of peat	3	1	3	Negligible	No		1	1	1	Negligible	
8	Evidence of mechanically cut peat	2	1	2	Negligible	No		1	1	1	Negligible	
9	Evidence of quaking or buoyant peat	1	1	1	Negligible	No		1	1	1	Negligible	
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
11	Deep peat	4	1	4	Negligible	Yes		1	1	1	Negligible	

	Control Measures to be Implemented Prior to/and During Construction for Turbine T4
i	Due to deep peat at this turbine location, additional construction measures such as the following may be required:
	- access and working area possibly formed using bog mats with the addition of temporary working platform
	- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
	- detailed design of access platforms and temporary working platforms to be carried out in advance of construction works
	- construct using piled foundation due to depth of peat and soft underlying deposits
	- install piling/working platform required for the construction of turbine base foundation
	- monitoring (in the form of timber stakes as sightlines) to be installed in area of working platform and to be monitored regularly during the piling works
	- site trial of piling works and potential issues to be identified prior to commencing construction
	- testing of piles to be carried out in accordance with latest standards to ensure design assumptions are satisified
ii	Use of experienced geotechnical staff for construction supervision, monitoring works, etc.;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Maintain hydrology of area as far as possible.

Location:	Т	Turbine T5		
Grid Reference (Eastings, Northings):	241	774	276057	
Distance to Watercourse (m)		50 - 100		
Maximum Measured Peat Depth (m):		0.9		
Control Required:		No		

		Pre-Control Measure Implementation				Post-Control Measure Imp			olementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating	
1	FOS = 9.05 (u), 12.74 (d)	1	3	3	Negligible	No		1	3	3	Negligible	
2	Evidence of sub peat water flow	1	3	3	Negligible	No		1	3	3	Negligible	
3	Evidence of surface water flow	1	3	3	Negligible	No		1	3	3	Negligible	
4	Evidence of previous failures/slips	0	3	0	Not Applicable	No		0	3	0	Not Applicable	
5	Type of vegetation	1	3	3	Negligible	No		1	3	3	Negligible	
6	General slope characteristics upslope/downslope from infrastructure location	1	3	3	Negligible	No	See Below	1	3	3	Negligible	
7	Evidence of very soft/soft clay at base of peat	1	3	3	Negligible	No			1	3	3	Negligible
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 T5</b>
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation at detailed design stage;
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;
v	Inspection & approval of turbine base sub-formation by a competent person where a gravity type foundation base is constructed.

Location:	Т	Turbine T6			
Grid Reference (Eastings, Northings):	241	226	276051		
Distance to Watercourse (m)		> 150			
Maximum Measured Peat Depth (m):		4.80			
Control Required:		Yes			

		Pre-	Pre-Control Measure Implementation					Post-Control Measure Impleme			olementation	
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating	
1	FOS = 2.97 (u), 2.39 (d)	1	1	1	Negligible	No			1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible	
3	Evidence of surface water flow	1	1	1	Negligible	No		1	1	1	Negligible	
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible	
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No	See Below	1	1	1	Negligible	
7	Evidence of very soft/soft clay at base of peat	3	1	3	Negligible	No		1	1	1	Negligible	
8	Evidence of mechanically cut peat	1	1	1	Negligible	No		1	1	1	Negligible	
9	Evidence of quaking or buoyant peat	1	1	1	Negligible	No		1	1	1	Negligible	
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
11	Deep peat	3	1	3	Negligible	Yes		1	1	1	Negligible	

	Control Measures to be Implemented Prior to/and During Construction for Turbine T6
i	Due to deep peat at this turbine location, additional construction measures such as the following may be required:
	- access and working area possibly formed using bog mats with the addition of temporary working platform
	- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
	- detailed design of access platforms and temporary working platforms to be carried out in advance of construction works
	- construct using piled foundation due to depth of peat and soft underlying deposits
	- install piling/working platform required for the construction of turbine base foundation
	- monitoring (in the form of timber stakes as sightlines) to be installed in area of working platform and to be monitored regularly during the piling works
	- site trial of piling works and potential issues to be identified prior to commencing construction
	- testing of piles to be carried out in accordance with latest standards to ensure design assumptions are satisified
ii	Use of experienced geotechnical staff for construction supervision, monitoring works, etc.;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Maintain hydrology of area as far as possible.

Location:	Turbine T7			
Grid Reference (Eastings, Northings):	240951 276634			
Distance to Watercourse (m)	> 150			
Maximum Measured Peat Depth (m):	4.0			
Control Required:	Yes			

		Pre-	Pre-Control Measure Implementation					Post-Control Measure Implementation				
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating	
1	FOS = 6.88 (u), 5.73 (d)	1	1	1	Negligible	No			1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible	
3	Evidence of surface water flow	1	1	1	Negligible	No		1	1	1	Negligible	
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible	
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No	See Below	1	1	1	Negligible	
7	Evidence of very soft/soft clay at base of peat	3	1	3	Negligible	No		1	1	1	Negligible	
8	Evidence of mechanically cut peat	1	1	1	Negligible	No		1	1	1	Negligible	
9	Evidence of quaking or buoyant peat	1	1	1	Negligible	No		1	1	1	Negligible	
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
11	Deep peat	3	1	3	Negligible	Yes		1	1	1	Negligible	

	Control Measures to be Implemented Prior to/and During Construction for Turbine T7
i	Due to deep peat at this turbine location, additional construction measures such as the following may be required:
	- access and working area possibly formed using bog mats with the addition of temporary working platform
	- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
	- detailed design of access platforms and temporary working platforms to be carried out in advance of construction works
	- construct using piled foundation due to depth of peat and soft underlying deposits
	- install piling/working platform required for the construction of turbine base foundation
	- monitoring (in the form of timber stakes as sightlines) to be installed in area of working platform and to be monitored regularly during the piling works
	- site trial of piling works and potential issues to be identified prior to commencing construction
	- testing of piles to be carried out in accordance with latest standards to ensure design assumptions are satisified
ii	Use of experienced geotechnical staff for construction supervision, monitoring works, etc.;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Maintain hydrology of area as far as possible.

Location:	Turbine T8			
Grid Reference (Eastings, Northings):	240569	276017		
Distance to Watercourse (m)	>	150		
Maximum Measured Peat Depth (m):	3	8.9		
Control Required:	Y	Yes		

		Pre-Control Measure Implementation						Post-Control Measure Implementati							
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating				
1	FOS = 3.51 (u), 2.94 (d)	1	1	1	Negligible	No				1	1	1	Negligible		
2	Evidence of sub peat water flow	1	1	1	Negligible	No			1	1	1	Negligible			
3	Evidence of surface water flow	0	1	0	Not Applicable	No		0	1	0	Not Applicable				
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable				
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible				
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No	See Below	1	1	1	Negligible				
7	Evidence of very soft/soft clay at base of peat	3	1	3	Negligible	No						1	1	1	Negligible
8	Evidence of mechanically cut peat	1	1	1	Negligible	No		1	1	1	Negligible				
9	Evidence of quaking or buoyant peat	1	1	1	Negligible	No		1	1	1	Negligible				
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable				
11	Deep peat	3	1	3	Negligible	Yes		1	1	1	Negligible				

	Control Measures to be Implemented Prior to/and During Construction for Turbine T8
i	Due to deep peat at this turbine location, additional construction measures such as the following may be required:
	- access and working area possibly formed using bog mats with the addition of temporary working platform
	- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
	- detailed design of access platforms and temporary working platforms to be carried out in advance of construction works
	- construct using piled foundation due to depth of peat and soft underlying deposits
	- install piling/working platform required for the construction of turbine base foundation
	- monitoring (in the form of timber stakes as sightlines) to be installed in area of working platform and to be monitored regularly during the piling works
	- site trial of piling works and potential issues to be identified prior to commencing construction
	- testing of piles to be carried out in accordance with latest standards to ensure design assumptions are satisified
ii	Use of experienced geotechnical staff for construction supervision, monitoring works, etc.;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Maintain hydrology of area as far as possible.

Location:	Turbine T9			
Grid Reference (Eastings, Northings):	2409	20	275581	
Distance to Watercourse (m)		> 150		
Maximum Measured Peat Depth (m):		6.2		
Control Required:		Yes		

		Pre-Control Measure Implementation					Post-Control Measure Implement			olementation		
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating	
1	FOS = 1.59 (u), 1.23 (d)	2	1	2	Negligible	No			1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No				1	1	1
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible	
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible	
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No	See Below	1	1	1	Negligible	
7	Evidence of very soft/soft clay at base of peat	3	1	3	Negligible	No		1	1	1	Negligible	
8	Evidence of mechanically cut peat	1	1	1	Negligible	No		1	1	1	Negligible	
9	Evidence of quaking or buoyant peat	2	1	2	Negligible	No		1	1	1	Negligible	
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
11	Deep peat	4	1	4	Negligible	Yes		1	1	1	Negligible	

	Control Measures to be Implemented Prior to/and During Construction for Turbine T9
i	Due to deep peat at this turbine location, additional construction measures such as the following may be required:
	- access and working area possibly formed using bog mats with the addition of temporary working platform
	- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
	- detailed design of access platforms and temporary working platforms to be carried out in advance of construction works
	- construct using piled foundation due to depth of peat and soft underlying deposits
	- install piling/working platform required for the construction of turbine base foundation
	- monitoring (in the form of timber stakes as sightlines) to be installed in area of working platform and to be monitored regularly during the piling works
	- site trial of piling works and potential issues to be identified prior to commencing construction
	- testing of piles to be carried out in accordance with latest standards to ensure design assumptions are satisified
ii	Use of experienced geotechnical staff for construction supervision, monitoring works, etc.;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Maintain hydrology of area as far as possible.

ocation: Turbine T			
Grid Reference (Eastings, Northings):	240380 275431		
Distance to Watercourse (m)	> 150		
Maximum Measured Peat Depth (m):	5.2		
Control Required:	Yes		

		Pre-Control Measure Implementation						Post-Control Measure Implementation				
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating	
1	FOS = 2.77 (u), 2.21 (d)	1	1	1	Negligible	No			1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No			1	1	1	Negligible
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible	
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible	
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No	See Below	1	1	1	Negligible	
7	Evidence of very soft/soft clay at base of peat	3	1	3	Negligible	No		1	1	1	Negligible	
8	Evidence of mechanically cut peat	1	1	1	Negligible	No		1	1	1	Negligible	
9	Evidence of quaking or buoyant peat	2	1	2	Negligible	No		1	1	1	Negligible	
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
11	Deep peat	4	1	4	Negligible	Yes		1	1	1	Negligible	

	Control Measures to be Implemented Prior to/and During Construction for <b>Turbine T10</b>
i	Due to deep peat at this turbine location, additional construction measures such as the following may be required:
	- access and working area possibly formed using bog mats with the addition of temporary working platform
	- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
	- detailed design of access platforms and temporary working platforms to be carried out in advance of construction works
	- construct using piled foundation due to depth of peat and soft underlying deposits
	- install piling/working platform required for the construction of turbine base foundation
	- monitoring (in the form of timber stakes as sightlines) to be installed in area of working platform and to be monitored regularly during the piling works
	- site trial of piling works and potential issues to be identified prior to commencing construction
	- testing of piles to be carried out in accordance with latest standards to ensure design assumptions are satisified
ii	Use of experienced geotechnical staff for construction supervision, monitoring works, etc.;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Maintain hydrology of area as far as possible.

Location:	Turbine T11			
Grid Reference (Eastings, Northings):	239907 275132			
Distance to Watercourse (m)	> 150			
Maximum Measured Peat Depth (m):	6.2			
Control Required:	Yes			

		Pre-Control Measure Implementation					Post-Control Measure Implementa			olementation			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating		
1	FOS = 4.78 (u), 3.70 (d)	1	1	1	Negligible	No			1	1	1	Negligible	
2	Evidence of sub peat water flow	1	1	1	Negligible	No			1	1	1	Negligible	
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible		
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable		
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible		
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No	See Below	1	1	1	Negligible		
7	Evidence of very soft/soft clay at base of peat	3	1	3	Negligible	No				1	1	1	Negligible
8	Evidence of mechanically cut peat	1	1	1	Negligible	No		1	1	1	Negligible		
9	Evidence of quaking or buoyant peat	1	1	1	Negligible	No			1	1	1	Negligible	
10	Evidence of bog pools	2	1	2	Negligible	No			1	1	1	Negligible	
11	Deep peat	4	1	4	Negligible	Yes		1	1	1	Negligible		

	Control Measures to be Implemented Prior to/and During Construction for Turbine T11
i	Due to deep peat at this turbine location, additional construction measures such as the following may be required:
	- access and working area possibly formed using bog mats with the addition of temporary working platform
	- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
	- detailed design of access platforms and temporary working platforms to be carried out in advance of construction works
	- construct using piled foundation due to depth of peat and soft underlying deposits
	- install piling/working platform required for the construction of turbine base foundation
	- monitoring (in the form of timber stakes as sightlines) to be installed in area of working platform and to be monitored regularly during the piling works
	- site trial of piling works and potential issues to be identified prior to commencing construction
	- testing of piles to be carried out in accordance with latest standards to ensure design assumptions are satisified
ii	Use of experienced geotechnical staff for construction supervision, monitoring works, etc.;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Maintain hydrology of area as far as possible.

Location:	Turbine T12			
Grid Reference (Eastings, Northings):	240321 274755			
Distance to Watercourse (m)	> 150			
Maximum Measured Peat Depth (m):	5.3			
Control Required:	Yes			

		Pre-Control Measure Implementation						Post	Control Me	easure Imp	olementation	
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating	
1	FOS = 1.82 (u), 1.44 (d)	1	1	1	Negligible	No		1	1	1	Negligible	
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible	
3	Evidence of surface water flow	1	1	1	Negligible	No		1	1	1	Negligible	
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible	
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No	See Below	See Below	1	1	1	Negligible
7	Evidence of very soft/soft clay at base of peat	3	1	3	Negligible	No		1	1	1	Negligible	
8	Evidence of mechanically cut peat	1	1	1	Negligible	No		1	1	1	Negligible	
9	Evidence of quaking or buoyant peat	1	1	1	Negligible	No		1	1	1	Negligible	
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
11	Deep peat	4	1	4	Negligible	Yes		1	1	1	Negligible	

	Control Measures to be Implemented Prior to/and During Construction for Turbine T12
i	Due to deep peat at this turbine location, additional construction measures such as the following may be required:
	- access and working area possibly formed using bog mats with the addition of temporary working platform
	- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
	- detailed design of access platforms and temporary working platforms to be carried out in advance of construction works
	- construct using piled foundation due to depth of peat and soft underlying deposits
	- install piling/working platform required for the construction of turbine base foundation
	- monitoring (in the form of timber stakes as sightlines) to be installed in area of working platform and to be monitored regularly during the piling works
	- site trial of piling works and potential issues to be identified prior to commencing construction
	- testing of piles to be carried out in accordance with latest standards to ensure design assumptions are satisified
ii	Use of experienced geotechnical staff for construction supervision, monitoring works, etc.;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Maintain hydrology of area as far as possible.

Location:	Turbine T13			
Grid Reference (Eastings, Northings):	240808 275032			
Distance to Watercourse (m)	> 150			
Maximum Measured Peat Depth (m):	7.5			
Control Required:	Yes			

		Pre-Control Measure Implementation						Post-Control Measure Implementation				
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating	
1	FOS = 2.02 (u), 1.53 (d)	1	1	1	Negligible	No			1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible	
3	Evidence of surface water flow	1	1	1	Negligible	No		1	1	1	Negligible	
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible	
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No	See Below	1	1	1	Negligible	
7	Evidence of very soft/soft clay at base of peat	3	1	3	Negligible	No		1	1	1	Negligible	
8	Evidence of mechanically cut peat	1	1	1	Negligible	No		1	1	1	Negligible	
9	Evidence of quaking or buoyant peat	2	1	2	Negligible	No		1	1	1	Negligible	
10	Evidence of bog pools	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
11	Deep peat	4	1	4	Negligible	Yes		1	1	1	Negligible	

	Control Measures to be Implemented Prior to/and During Construction for Turbine T13
I	Due to deep peat at this turbine location, additional construction measures such as the following may be required:
	- access and working area possibly formed using bog mats with the addition of temporary working platform
	- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
	- detailed design of access platforms and temporary working platforms to be carried out in advance of construction works
	- construct using piled foundation due to depth of peat and soft underlying deposits
	- install piling/working platform required for the construction of turbine base foundation
	- monitoring (in the form of timber stakes as sightlines) to be installed in area of working platform and to be monitored regularly during the piling works
	- site trial of piling works and potential issues to be identified prior to commencing construction
	- testing of piles to be carried out in accordance with latest standards to ensure design assumptions are satisified
ii	Use of experienced geotechnical staff for construction supervision, monitoring works, etc.;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Maintain hydrology of area as far as possible.

Location:	Turbine T14
Grid Reference (Eastings, Northings):	640985.5 774517
Distance to Watercourse (m)	50 - 100
Maximum Measured Peat Depth (m):	1.0
Control Required:	Yes

		Pre-Control Measure Implementation						Post-Control Measure Implementa			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating
1	FOS = 17.19 (u), 22.92 (d)	1	3	3	Negligible	No		1	3	3	Negligible
2	Evidence of sub peat water flow	1	3	3	Negligible	No		1	3	3	Negligible
3	Evidence of surface water flow	1	3	3	Negligible	No		1	3	3	Negligible
4	Evidence of previous failures/slips	0	3	0	Not Applicable	No		0	3	0	Not Applicable
5	Type of vegetation	2	3	6	Low	No		2	3	6	Low
6	General slope characteristics upslope/downslope from infrastructure location	1	3	3	Negligible	No	See Below	1	3	3	Negligible
7	Evidence of very soft/soft clay at base of peat	1	3	3	Negligible	No		1	3	3	Negligible
8	Evidence of mechanically cut peat	1	3	3	Negligible	No		1	3	3	Negligible
9	Evidence of quaking or buoyant peat	2	3	6	Low	No		1	3	3	Negligible
10	Evidence of bog pools	0	3	0	Not Applicable	No		0	3	0	Not Applicable
11	Deep peat	1	3	3	Negligible	No		1	3	3	Negligible

	Control Measures to be Implemented Prior to/and During Construction for Turbine T14
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation at detailed design stage;
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;
v	Inspection & approval of turbine base sub-formation by a competent person where a gravity type foundation base is constructed.

Location:		Turbine T15			
Grid Reference (Eastings, Northings):	6	42732	775628		
Distance to Watercourse (m)		50 - 100			
Maximum Measured Peat Depth (m):		1.9			
Control Required:		Yes			

		Pre-0	Control Meas	sure Implei	mentation			Post-Control Measure Implement				
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating	
1	FOS = 11.86 (u), 12.06 (d)	1	3	3	Negligible	No			1	3	3	Negligible
2	Evidence of sub peat water flow	1	3	3	Negligible	No		1	3	3	Negligible	
3	Evidence of surface water flow	1	3	3	Negligible	No		1	3	3	Negligible	
4	Evidence of previous failures/slips	0	3	0	Not Applicable	No		0	3	0	Not Applicable	
5	Type of vegetation	2	3	6	Low	No		2	3	6	Low	
6	General slope characteristics upslope/downslope from infrastructure location	1	3	3	Negligible	No	See Below	1	3	3	Negligible	
7	Evidence of very soft/soft clay at base of peat	1	3	3	Negligible	No		1	3	3	Negligible	
8	Evidence of mechanically cut peat	1	3	3	Negligible	No		1	3	3	Negligible	
9	Evidence of quaking or buoyant peat	1	3	3	Negligible	No		1	3	3	Negligible	
10	Evidence of bog pools	0	3	0	Not Applicable	No		0	3	0	Not Applicable	
11	Deep peat	1	3	3	Negligible	No		1	3	3	Negligible	

	Control Measures to be Implemented Prior to/and During Construction for Turbine T15
i	Maintain hydrology of area as far as possible;
ii	Use of experienced geotechnical staff for site investigation at detailed design stage;
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;
v	Inspection & approval of turbine base sub-formation by a competent person where a gravity type foundation base is constructed.

Location:

**Construction Compound** 

Grid Reference (Eastings, Northings):	240015	274575
Distance to Watercourse (m)	>	150
Maximum Measured Peat Depth (m):	3	5.1
Control Required:	N	lo

		Pre-	Control Mea	sure Imple	mentation			Post-Control Measure Implementation				
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating	
1	FOS = 8.39 (u), 7.39 (d)	1	1	1	Negligible	No		1	1	1	Negligible	
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible	
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible	
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible	
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No	See Below	1	1	1	Negligible	
7	Evidence of very soft/soft clay at base of peat	2	1	2	Negligible	No		1	1	1	Negligible	
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	Negligible	No		1	1	1	Negligible	

	Control Measures to be Implemented Prior to/and During Construction for Construction Compound
i	Due to relatively deep peat at the construction compound, additional construction measures such as the following may be required:
	- access to area formed using bog mats, where required
	- compound to be constructed using floated techniques
	- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
	- monitoring (in the form of timber stakes as sightlines) to be installed in area of working platform
ii	Use of experienced geotechnical staff for site investigation at detailed design stage;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Maintain hydrology of area as far as possible.

Location:

Substation

Grid Reference (Eastings, Northings):	239967	274699
Distance to Watercourse (m)	>	150
Maximum Measured Peat Depth (m):	3	.4
Control Required:	Y	es

		Pre-	Control Mea	sure Imple	mentation			Post-Control Measure Implementation				
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating	
1	FOS = 4.1 (u), 3.58 (d)	1	1	1	Negligible	No		1	1	1	Negligible	
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible	
3	Evidence of surface water flow	2	1	2	Negligible	No		1	1	1	Negligible	
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable	
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible	
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No	See Below	1	1	1	Negligible	
7	Evidence of very soft/soft clay at base of peat	2	1	2	Negligible	No		1	1	1	Negligible	
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	Negligible	Yes		1	1	1	Negligible	

	Control Measures to be Implemented Prior to/and During Construction for Substation
i	Due to relatively deep peat at the substation, additional construction measures such as the following may be required:
	- access to area formed using bog mats, where required
	- compound platform to be constructed using floated techniques
	- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
	- install piling/working platform required for the construction of substation building
	- substation building to be constructed using piled foundation due to depth of peat and soft underlying deposits
	- monitoring (in the form of timber stakes as sightlines) to be installed in area of working platform and to be monitored regularly during the piling works
ii	Use of experienced geotechnical staff for site investigation at detailed design stage;
iii	Use of experienced contractors and trained operators to carry out the work;
iv	Maintain hydrology of area as far as possible.

Location: Borrow Pit

	-	
Grid Reference (Eastings, Northings):	241921	274347
Distance to Watercourse (m)	>	150
Maximum Measured Peat Depth (m):	No	peat
Control Required:	N	lo

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

	Control Measures to be Implemented Prior to/and During Construction for Borrow Pit
N/A - No peat present	

Location:	n: Access Tra			
Grid Reference from/to (Eastings, Northings):	240579	272665		
	240245	272592		
Distance to Watercourse (m)	> .	150		
Maximum Measured Peat Depth (m):	No	peat		
Control Required:	No			

Includes the upgrade of a section of the existing track for the wind turbine delivery route south of the wind farm site

		Pre-	Control Mea	sure Imple	mentation			Post-Control Measure Implementat			
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating
1	FOS = No Peat (u), No Peat (d)	0	1	0	Not Applicable	No		0	1	0	Not Applicable
2	Evidence of sub peat water flow	0	1	0	Not Applicable	No		0	1	0	Not Applicable
3	Evidence of surface water flow	0	1	0	Not Applicable	No		0	1	0	Not Applicable
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	0	1	0	Not Applicable	No		0	1	0	Not Applicable
6	General slope characteristics upslope/downslope from infrastructure location	0	1	0	Not Applicable	No	See Below	0	1	0	Not Applicable
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 upgrade of a section of the existing track for the wind turbine delivery route
N	I/A - No peat present

Location:	Acces	Access Track			
	240200	272570			
Grid Reference (Eastings, Northings):	239652	272392			
Distance to Watercourse (m)	> 150				
Maximum Measured Peat Depth (m):	2.8				
Control Required:	N	No			

Includes the new floating track for a section of the wind turbine delivery route south of the wind farm

		Pre-	Control Mea	sure Imple	mentation			Post-	Control Me	easure Im	plementation
Ref.	Contributory/Qualitative Factors to Potential Peat Failure	Prob	Impact	Risk	Risk Rating	Control Required	Control measures to be implemented during construction	Prob	Impact	Risk	Risk Rating
1	FOS = 5.7 (u), 8.3 (d)	1	1	1	Negligible	No		1	1	1	Negligible
2	Evidence of sub peat water flow	1	1	1	Negligible	No		1	1	1	Negligible
3	Evidence of surface water flow	1	1	1	Negligible	No		1	1	1	Negligible
4	Evidence of previous failures/slips	0	1	0	Not Applicable	No		0	1	0	Not Applicable
5	Type of vegetation	2	1	2	Negligible	No		2	1	2	Negligible
6	General slope characteristics upslope/downslope from infrastructure location	1	1	1	Negligible	No	See Below	1	1	1	Negligible
7	Evidence of very soft/soft clay at base of peat	2	1	2	Negligible	No		1	1	1	Negligible
8	Evidence of mechanically cut peat	3	1	3	Negligible	No		2	1	2	Negligible
9	Evidence of quaking or buoyant peat	1	1	1	Negligible	No		1	1	1	Negligible
10	Evidence of bog pools	1	1	1	Negligible	No		1	1	1	Negligible
11	Other	0	1	0	Not Applicable	No		0	1	0	Not Applicable

		Control Measures to be Implemented Prior to/and During Construction for the floating track for a section of the wind turbine delivery route
<ul> <li>access road to be constructed using floated techniques (subject to detailed design)</li> <li>access road to be constructed using floated techniques (subject to detailed design)</li> <li>detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage</li> <li>monitoring (in the form of timber stakes as sightlines) to be installed along side the access track in deeper peat areas and regularly monitored</li> <li>Use of experienced geotechnical staff for site investigation at detailed design stage;</li> </ul>	i	Due to relatively deep peat along the access track, additional construction measures such as the following may be required:
<ul> <li>access road to be constructed using floated techniques (subject to detailed design)</li> <li>detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage</li> <li>monitoring (in the form of timber stakes as sightlines) to be installed along side the access track in deeper peat areas and regularly monitored</li> <li>Use of experienced geotechnical staff for site investigation at detailed design stage;</li> </ul>		- use of low ground bearing pressure machinery during construction e.g. wide tracked excavator
<ul> <li>- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage</li> <li>- monitoring (in the form of timber stakes as sightlines) to be installed along side the access track in deeper peat areas and regularly monitored</li> <li>iii Use of experienced geotechnical staff for site investigation at detailed design stage;</li> </ul>		- access road to be constructed using floated techniques (subject to detailed design)
<ul> <li>monitoring (in the form of timber stakes as sightlines) to be installed along side the access track in deeper peat areas and regularly monitored</li> <li>Use of experienced geotechnical staff for site investigation at detailed design stage;</li> </ul>		- access road to be constructed using floated techniques (subject to detailed design)
ii Use of experienced geotechnical staff for site investigation at detailed design stage;		- detailed ground investigation to determine peat, mineral soil and bedrock condition and properties for design stage
		- monitoring (in the form of timber stakes as sightlines) to be installed along side the access track in deeper peat areas and regularly monitored
iii Use of experienced contractors and trained operators to carry out the work;	i	Use of experienced geotechnical staff for site investigation at detailed design stage;
	ii	Use of experienced contractors and trained operators to carry out the work;
iv Maintain hydrology of area as far as possible.	/	Maintain hydrology of area as far as possible.



CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING

# **APPENDIX C**

Calculated FOS for Peat Slopes on Site


							nd Farm (Undi		
Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Peat Depth	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety	for Load Condition
			β (deg)	c <sub>u</sub> (kPa)	γ (kN/m³)	(m)	Condition (2)	Condition (1)	Condition (2)
T14	640986	774517	1.0	6	T SEPTEMBER 20 10	20 SITE DATA 1.0	2.0	34.38	17.19
T15	640986	775628	1.0	6	10	1.9	2.9	18.10	11.86
WP028	641003	775208	2.0	6	10	0.6	1.6	28.67	10.75
WP030	641006	775108	1.0	6	10	0.8	1.8	42.98	19.10
WP032	641008	775008	1.0	6	10	3.5	4.5	9.82	7.64
WP034	641001	774908	1.0	6	10	2.5	3.5	13.75	9.82
WP036 WP038	640989 640983	774809 774709	1.0 1.0	6	10 10	4.0	5.0 2.5	8.60 22.92	6.88 13.75
WP040	640976	774609	1.0	6	10	1.0	2.0	34.38	17.19
WP056	642131	774597	3.0	6	10	0.1	1.1	114.80	10.44
WP059	642222	774709	3.0	6	10	0.2	1.2	57.40	9.57
WP062	642321	774822	5.0	6	10	0.1	1.1	69.11	6.28
WP065 WP068	642392 642446	774953 775093	3.0 6.0	6	10 10	0.3	1.3 1.8	38.27 7.21	8.83
WP008	642477	775188	1.0	6	10	1.0	2.0	34.38	17.19
WP072	642508	775283	2.0	6	10	0.6	1.6	28.67	10.75
WP074	642540	775378	1.0	6	10	0.8	1.8	42.98	19.10
WP076	642572	775473	1.0	6	10	1.1	2.1	31.26	16.37
WP078	642607	775566	1.0	6	10	1.1	2.1	31.26	16.37
WP079 WP080	642648 642690	775594 775620	1.0 1.0	6	10 10	1.5 1.7	2.5 2.7	22.92 20.23	13.75 12.73
WP0001	642390	774986	6.0	6	10	0.3	1.3	19.24	4.44
				•	•		· ····		
				1	GEC DECEMBER 2				-
T1	240910	277329	2.0	6	10	7.0	8.0	2.46	2.15
T2	241477	277250	2.0	6	10	4.4	5.4	3.91	3.19
T3 T4	241521 242051	276690 276891	2.0	6	10 10	6.1 5.6	7.1 6.6	2.82 6.14	2.42
T5	242051	276057	2.0	6	10	0.9	1.9	19.11	9.05
T6	241226	276051	2.0	6	10	4.8	5.8	3.58	2.97
T7	240951	276634	1.0	6	10	4.0	5.0	8.60	6.88
T8	240569	276017	2.0	6	10	3.9	4.9	4.41	3.51
T9	240920	275581	3.0	6	10	6.2	7.2	1.85	1.59
T10 T11	240380 239907	275431 275132	2.0 1.0	6	10 10	5.2 6.2	6.2 7.2	3.31 5.55	2.77
T12	240321	274755	3.0	6	10	5.3	6.3	2.17	1.82
T13	240808	275032	2.0	6	10	7.5	8.5	2.29	2.02
BP1	241778	274360				No Peat rec	orded at location		
BP2	241877	274450				No Peat rec	orded at location		
BP3	241961	274577					orded at location		
BP4	242074	274477					orded at location		
BP5 BP6	242033	274425					orded at location orded at location		
BP0 BP7	242124 242013	274378 274207					orded at location		
BP8	241909	274255					orded at location		
BP9	241888	274225				No Peat rec	orded at location		
BPC1	241874	274329					orded at location		
BPC3	241985	274471					orded at location		
BPC4 CC1	241964 239933	274287 274514	1.0	6	10	3.1	orded at location 4.1	11.09	8.39
CC2	239925	274545	1.0	6	10	2.3	3.3	14.95	10.42
CC3	239981	274581	1.0	6	10	0.6	1.6	57.31	21.49
CC4	240050	274619	1.0	6	10	0.6	1.6	57.31	21.49
CC5	240072	274597	1.0	6	10	0.4	1.4	85.96	24.56
CC7	240003	274544	1.0	6	10	2.2	3.2	15.63	10.75
CC8 CC10	239961 240015	274518 274575	1.0 1.0	6	10 10	2.5	3.5 2.6	13.75 21.49	9.82 13.22
SUB1	239759	274575	1.0	6	10	1.8	2.8	19.10	13.22
SUB2	239833	274835	2.0	6	10	2.9	3.9	5.93	4.41
SUB3	239907	274873	2.0	6	10	3.2	4.2	5.38	4.10
SUB4	239969	274755	2.0	6	10	1.2	2.2	14.34	7.82
SUB5 SUB6	240031	274637	2.0	6	10 10	0.5	1.5 1.4	34.41 43.01	11.47 12.29
SUB6 SUB7	239956 239882	274592 274547	2.0	6	10	0.4	1.4 2.7	43.01 10.12	<u>12.29</u> 6.37
SUB7	239882	274547 274672	1.0	6	10	3.1	4.1	11.09	8.39
SUB9	239869	274763	1.0	6	10	3.4	4.4	10.11	7.81
WP001	239994	274807	1.0	6	10	3.0	4.0	11.46	8.60
WP002	241682	276069	2.0	6	10	0.9	1.9	19.11	9.05
WP003	241813	277182	2.0	6	10	3.0	4.0	5.73	4.30
1 2	239927 239935	274426 274496	0.3	6	10 10	1.0 1.3	2.0 2.3	100.00 461.54	50.00 260.87
3	239933	274490	0.1	6	10	0.3	1.3	153.87	35.51
4	240027	274705	0.5	6	10	3.0	4.0	22.22	16.67
6	239943	274829	0.2	6	10	3.8	4.8	52.63	41.67
7	239912	274897	0.8	6	10	3.5	4.5	12.25	9.53
	239903	274971	2.0	6	10	3.2	4.2	5.38	4.10
8	239898 240138	275046	0.1 3.0	6	10 10	3.2	4.2	107.43 12.76	81.85 6.04
8 9		274601 274625	3.0 6.0	6	10	0.9	1.9	12.76 2.62	6.04 1.80
8 9 10		2/4020	4.0	6	10	4.8	5.8	1.80	1.80
8 9 10 11	240209			v		5.6	6.6	10.72	9.09
8 9 10 11 12		274650		6	10				
8 9 10 11	240209 240279		0.6	6	10 10	4.8	5.8	17.86	14.78
8 9 10 11 12 13 14 16	240209 240279 240327 240361 240427	274650 274705 274772 274907	0.6 0.4 1.0	6 6	10 10	4.8 5.7	6.7	6.03	14.78 5.13
8 9 10 11 12 13 14 16 17	240209 240279 240327 240361 240427 240461	274650 274705 274772 274907 274974	0.6 0.4 1.0 2.0	6 6 6	10 10 10	4.8 5.7 5.5	6.7 6.5	6.03 3.13	14.78 5.13 2.65
8 9 10 11 12 13 14 16 17 18	240209 240279 240327 240361 240427 240461 240495	274650 274705 274772 274907 274974 275041	0.6 0.4 1.0 2.0 2.0	6 6 6 6	10 10 10 10	4.8 5.7 5.5 5.8	6.7 6.5 6.8	6.03 3.13 2.97	14.78 5.13 2.65 2.53
8 9 10 11 12 13 14 16 17 18 19	240209 240279 240327 240361 240427 240461 240495 240529	274650 274705 274772 274907 274974 275041 275108	0.6 0.4 1.0 2.0 2.0 0.4	6 6 6 6 6	10 10 10 10 10	4.8 5.7 5.5 5.8 4.9	6.7 6.5 6.8 5.9	6.03 3.13 2.97 17.49	14.78 5.13 2.65 2.53 14.53
8 9 10 11 12 13 14 16 17 18 19 20	240209 240279 240327 240361 240427 240461 240495 240529 240563	274650 274705 274772 274907 274974 275041 275108 275174	0.6 0.4 1.0 2.0 2.0 0.4 0.4	6 6 6 6 6 6	10 10 10 10 10 10	4.8 5.7 5.5 5.8 4.9 5.2	6.7 6.5 6.8 5.9 6.2	6.03 3.13 2.97 17.49 16.53	14.78 5.13 2.65 2.53 14.53 13.86
8 9 10 11 12 13 14 16 17 18 19	240209 240279 240327 240361 240427 240461 240495 240529	274650 274705 274772 274907 274974 275041 275108	0.6 0.4 1.0 2.0 2.0 0.4	6 6 6 6 6	10 10 10 10 10	4.8 5.7 5.5 5.8 4.9	6.7 6.5 6.8 5.9	6.03 3.13 2.97 17.49	14.78 5.13 2.65 2.53 14.53

					-		nd Farm (Und		-
Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Peat Depth	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety	for Load Condition
			β (deg)	c <sub>u</sub> (kPa)	γ (kN/m³)	(m)	Condition (2)	Condition (1)	Condition (2)
26	240608	275522	1.0	6	10	3.8	4.8	9.29	7.36
27	240538	275535	2.0	6	10	3.6	4.6	4.78	3.74
28	240479	275488	0.1	6	10	2.4	3.4	125.00	88.24
30	240762	275438	0.1	6	10	1.3	2.3	230.77	130.44
31	240825	275398	0.1	6	10	1.5	2.5	400.00	240.00
32 34	240889 240890	275359 275217	0.4	6	10 10	2.4 3.6	3.4 4.6	35.72 11.11	25.21 8.70
35	240878	275143	0.6	6	10	3.7	4.7	16.22	12.77
36	240869	275088	0.6	6	10	3.3	4.3	16.53	12.69
37	240763	275475	2.0	6	10	4.6	5.6	3.74	3.07
38	240824	275519	2.0	6	10	5.2	6.2	3.31	2.77
39 40	240855 240826	275543	0.4	6	10 10	4.9 6.3	5.9	17.49 13.64	14.53 11.77
40	240826	275539 275596	0.4	6	10	5.5	6.5	109.09	92.31
43	240847	275713	1.1	6	10	2.2	3.2	13.64	9.38
44	240779	275745	2.7	6	10	2.6	3.6	4.82	3.48
46	240647	275814	2.3	6	10	1.7	2.7	8.84	5.56
47	240611	275879	2.0	6	10	1.5	2.5	11.47	6.88
48	240585	275940	0.4	6	10	1.3	2.3	65.94	37.27
50 51	241002 241076	275740 275742	0.8	6	10 10	1.7 1.3	2.7 2.3	25.22 461.54	15.88 260.87
52	241070	275729	0.1	6	10	0.3	1.3	285.73	65.94
53	241217	275761	1.0	6	10	0.3	1.3	114.61	26.45
54	241290	275779	1.0	6	10	0.4	1.4	85.96	24.56
55	241350	275818	1.0	6	10	0.3	1.3	114.61	26.45
56	241390	275881	1.0	6	10	0.2	1.2	171.92	28.65
57 58	241428 241482	275946 275996	1.0 1.1	6	10 10	0.5	1.5 2.0	68.77 31.59	22.92 15.80
59	241482	275990	1.1	6	10	1.6	2.6	22.07	13.58
60	241555	276069	0.2	6	10	1.4	2.4	107.14	62.50
63	241585	276130	1.3	6	10	0.6	1.6	44.09	16.53
64	241545	276194	1.3	6	10	1.1	2.1	24.81	12.99
66	241430	276258	0.5	6	10	4.9	5.9	13.61	11.30
67 69	241363 241259	276224 276168	1.0 0.9	6	10 10	5.1 4.5	6.1 5.5	6.92 8.34	5.79 6.82
70	241255	276311	2.0	6	10	4.6	5.6	3.73	3.06
71	241437	276379	1.0	6	10	3.4	4.4	10.11	7.81
72	241400	276437	1.0	6	10	3.9	4.9	9.05	7.20
73	241338	276479	0.8	6	10	3.5	4.5	12.25	9.53
74	241279	276526	1.2	6	10	4.8	5.8	5.96	4.93
75 77	241220	276572	1.7 0.1	6	10 10	5.3 4.5	6.3 5.5	3.78 66.67	3.18 54.55
78	241084 241020	276628 276638	0.1	6	10	3.3	4.3	20.20	15.51
79	241527	276221	0.5	6	10	3.5	4.5	19.65	15.28
81	241573	276356	2.2	6	10	0.9	1.9	17.38	8.23
82	241611	276421	2.2	6	10	0.3	1.3	52.71	12.16
83	241618	276490	2.0	6	10	0.8	1.8	21.50	9.56
84 85	241571 241542	276545 276615	2.5 0.7	6	10 10	3.8 3.6	4.8 4.6	3.60 12.82	2.85
86	241542	276645	1.1	6	10	5.6	6.6	5.64	4.79
87	241587	276511	1.7	6	10	5.5	6.5	3.64	3.08
89	241467	276600	1.7	6	10	4.4	5.4	4.71	3.83
90	241414	276654	1.9	6	10	2.7	3.7	6.54	4.77
91	241358	276703	2.2	6	10	2.2	3.2	7.19	4.94
92 93	241310 241266	276760 276820	1.0 0.8	6	10 10	3.1 3.6	4.1 4.6	11.09 11.91	8.39 9.32
94	241200	276881	0.0	6	10	3.8	4.8	157.89	125.00
95	241177	276942	1.0	6	10	3.4	4.4	10.11	7.81
96	241133	277002	0.6	6	10	5.3	6.3	10.29	8.66
97	241089	277063	0.1	6	10	5.1	6.1	117.65	98.36
98 99	241047	277125 277163	0.9	6	10 10	5.6 5.1	6.6 6.1	7.14 6.92	6.06 5.79
100	241024 241017	277210	1.0	6	10	5.1 4.9	5.9	6.92 7.02	5.83
100	240955	277252	1.0	6	10	5.8	6.8	5.75	4.90
103	241033	277230	0.5	6	10	4.8	5.8	13.89	11.50
105	241168	277281	0.7	6	10	5.2	6.2	8.88	7.45
106	241242	277290	2.0	6	10	4.7	5.7	3.66	3.02
107 109	241317 241465	277298 277284	2.0 2.0	6	10 10	4.4	5.4 4.7	3.91 4.65	3.19 3.66
109	241465 241540	277284	2.0	6	10	3.7	4.7	4.65	3.58
110	241615	277272	2.0	6	10	1.1	2.1	15.60	8.17
112	241689	277277	3.0	6	10	0.3	1.3	38.27	8.83
113	241756	277250	3.0	6	10	0.1	1.1	114.80	10.44
115	241876	277192	0.5	6	10	0.4	1.4	166.68	47.62
116 117	241950 242022	277183 277163	0.6	6	10 10	0.1	1.1 1.4	600.06 250.01	54.55 71.43
117	242022	277183	1.4	6	10	0.4	1.4	240.15	21.83
110	242135	277073	1.0	6	10	2.0	3.0	16.67	11.11
120	242111	277006	0.7	6	10	3.4	4.4	13.58	10.49
121	242077	276956	0.2	6	10	3.7	4.7	54.05	42.55
14/6 11	2222-1	0774-7-		-	HES 2016 PEAT D				
WS-11 WS13	239871 240855	275103 275030	1.7 0.5	6	10 10	6.2 7.5	7.2 8.5	3.26 8.91	2.81
WS13 WS09	240855	275030	0.5	6	10	6.0	7.0	100.33	85.96
WS08	240523	276013	0.5	6	10	0.8	1.8	93.76	41.67
WS07	240950	276633	0.4	6	10	4.0	5.0	21.59	17.25
WS02	241426	277287	0.3	6	10	4.2	5.2	28.57	23.08
WS01	240876	277321	0.3	6	10	5.4	6.4	21.42	18.05
WS03	241517	276713	2.6	6	10	6.2	7.2	2.14	1.84
WS100 WS101	241441 240833	277395 277407	2.6	6	10 10	5.6 5.4	6.6 6.4	2.39 3.83	2.02 3.24
******	277407	274562	0.7	6	10	0.9	1.9	51.29	24.30

Turbine No./Waypoint	Easting	Northing	Slope	Undrained shear strength	Bulk unit weight of Peat	Peat Depth	Surcharge Equivalent Placed Fill Depth (m)	Factor of Safety	for Load Condition
			β (deg)	c <sub>u</sub> (kPa)	γ (kN/m³)	(m)	Condition (2)	Condition (1)	Condition (2)
TP1-C	240039	274580	0.7	6	10	2.7	3.7	17.10	12.48
TP2-C	239994	274552	0.9	6	10	0.7	1.7	61.55	24.25
		-			HES 2012 PEAT D	EPTH DATA			
69	242338	276904	0.1	6	10	3.1	4.1	196.08	147.78
70	242196	276760	0.1	6	10	3.4	4.4	175.44	135.75
71	242080	276595	1.1	6	10	4.8	5.8	6.60	5.46
72	241953	276386	0.2	6	10	5.5	6.5	27.08	22.94
73	241754	276444	0.2	6	10	4.6	5.6	43.10	35.46
74 75	241865 241979	276613 276780	0.4	6	10 10	5.7	6.7 7.0	15.08 14.38	12.83 12.32
76	241979	276953	1.5	6	10	6.0 4.0	5.0	5.56	4.45
77	242083	270333	1.0	6	10	3.4	4.4	9.69	7.51
78	241973	277141	0.1	6	10	1.7	2.7	172.41	109.49
79	241863	276972	0.2	6	10	5.5	6.5	36.63	30.96
80	241754	276803	0.2	6	10	6.6	7.6	26.08	22.65
81	241644	276631	1.4	6	10	7.1	8.1	3.48	3.05
82	241451	276652	1.4	6	10	5.8	6.8	4.15	3.54
83	241561	276815	1.4	6	10	7.8	8.8	3.15	2.79
84	241672	276986	0.7	6	10	6.8	7.8	6.79	5.92
85	241786	277158	2.9	6	10	0.7	1.7	17.60	7.06
86	241605	277249	1.8	6	10	2.9	3.9	6.56	4.86
87	241485	277080	0.1	6	10	5.4	6.4	55.56	46.88
88	241374	276912	0.4	6	10	5.5	6.5	15.50	13.13
89	241190	276937	0.1	6	10	4.6	5.6	129.87	106.76
90	241065	277103	0.1	6	10	4.0	5.0	150.00	120.00
91	241316	277096	0.5	6	10	6.1	7.1	12.34	10.59
92	241422	277328	2.6	6	10	5.1	6.1	2.59	2.16
93 94	241394 241322	277536 277715	2.6 1.0	6	10 10	4.9	5.9 5.3	2.69 8.17	2.24 6.64
95	241322	277701	1.6	6	10	4.3	5.3	5.02	4.07
96	241118	277500	1.6	6	10	3.8	4.8	5.63	4.46
97	241142	277290	0.7	6	10	4.2	5.2	11.10	8.95
98	240924	277267	1.7	6	10	4.8	5.8	4.35	3.59
99	240896	277471	0.5	6	10	5.0	6.0	15.00	12.50
100	240876	277669	0.1	6	10	2.7	3.7	223.05	162.60
101	240793	277631	0.8	6	10	6.3	7.3	6.86	5.91
102	240829	277365	0.8	6	10	6.4	7.4	6.69	5.79
				AGEO	May 2017 Acces	s Road Walkover	r		
1	240579	272665	2.0			No F	Peat recorded at location		
2	240532	272648	2.0				Peat recorded at location		
3	240483	272651	2.0				Peat recorded at location		
4	240434	272654	1.0				Peat recorded at location		
5	240386	272640	1.0				Peat recorded at location		
6	240338	272628	1.0				Peat recorded at location		
7	240290	272614	2.0				Peat recorded at location Peat recorded at location		
8	240245 240200	272592 272570	3.0	6	10	0.7	1.7	49.12	20.23
10	240200	272552	2.0	6	10	1.5	2.5	49.12	6.88
10	240153	272532	1.5	6	10	2.5	3.5	9.17	6.55
12	240107	272534	1.0	6	10	1.5	2.5	22.92	13.75
13	240023	272572	0.5	6	10	1.5	2.5	45.84	27.50
14	239987	272607	1.0	6	10	1.8	2.8	19.10	12.28
15	239944	272632	1.0	6	10	1.5	2.5	22.92	13.75
16	239899	272654	0.5	6	10	0.7	1.7	98.23	40.45
17	239854	272676	1.0	6	10	1.4	2.4	24.56	14.33
18	239806	272687	0.5	6	10	2.5	3.5	27.50	19.65
19	239760	272670	0.5	6	10	2.1	3.1	32.74	22.18
20	239735	272627	1.0	6	10	1.8	2.8	19.10	12.28
21	239716	272581	1.0	6	10	2.8	3.8	12.28	9.05
22	239697	272535	0.5	6	10	2.3	3.3	29.89	20.84
23	239680	272488	1.0	6	10	2.0	3.0	17.19	11.46
24	239666	272440	2.0	6	10	2.0	3.0	8.60	5.73
25	239652	272392	2.0	6	10	2.0	3.0	8.60	5.73

Minimum =	1.80	1.49
Maximum =	600.06	260.87
Average =	43.25	22.20

#### Notes:

 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 i.e. 10kPa.

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

 (4) A lower bound undrained shear strength, cu for the peat of 6kPa was selected for the assessment. It should be noted that a cu of 6kPa for the peat.

 is considered a conservative value for the analysis and is not representative of all peat present across the site.

 (5) Peat depths based on probes carried out by AGEC & HES.

 (6) For load conditions see report text.

		Calcul						ind Farm	(Drained An		
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	Surcharge Equivalent Placed Fill	Equivalent Total Depth of Peat (m)	Factor of Safety f	or Load Condition
	α (deg)	c' (kPa)	γ (kN/m³)	γ <sub>w</sub> (kN/m³)	(m)	(m)	ø' (deg)	Condition (2)	Condition (2)	Condition (1)	Condition (2)
					FT CED	TEMPER 2020 C				100% Water	100% Water
T14	1.0	4	10.0	10.0	1.0	1.0	25	1.0	2.0	22.92	24.82
T15	1.0	4	10.0	10.0	1.9	1.9	25	1.0	2.9	12.06	17.12
WP028	2.0	4	10.0	10.0	0.6	0.6	25	1.0	1.6	19.11	15.51
WP030 WP032	1.0	4	10.0 10.0	10.0	0.8	0.8	25 25	1.0 1.0	1.8 4.5	28.65 6.55	27.58
WP032 WP034	1.0	4	10.0	10.0	2.5	2.5	25	1.0	3.5	9.17	14.18
WP036	1.0	4	10.0	10.0	4.0	4.0	25	1.0	5.0	5.73	9.93
WP038	1.0	4	10.0	10.0	1.5	1.5	25	1.0	2.5	15.28	19.86
WP040 WP056	1.0 3.0	4	10.0 10.0	10.0 10.0	1.0 0.1	1.0	25 25	1.0 1.0	2.0	22.92 76.53	24.82 15.05
WP050 WP059	3.0	4	10.0	10.0	0.1	0.1	25	1.0	1.1	38.27	13.79
WP062	5.0	4	10.0	10.0	0.1	0.1	25	1.0	1.1	46.07	9.03
WP065	3.0	4	10.0	10.0	0.3	0.3	25	1.0	1.3	25.51	12.73
WP068	6.0	4	10.0	10.0	0.8	0.8	25	1.0	1.8	4.81	4.60
WP070 WP072	1.0 2.0	4	10.0 10.0	10.0	1.0 0.6	1.0	25 25	1.0 1.0	2.0	22.92 19.11	24.82 15.51
WP074	1.0	4	10.0	10.0	0.8	0.8	25	1.0	1.8	28.65	27.58
WP076	1.0	4	10.0	10.0	1.1	1.1	25	1.0	2.1	20.84	23.64
WP078	1.0	4	10.0	10.0	1.1	1.1	25	1.0	2.1	20.84	23.64
WP079	1.0	4	10.0	10.0	1.5 1.7	1.5 1.7	25	1.0	2.5 2.7	15.28	19.86
WP080 WP001	6.0	4	10.0 10.0	10.0 10.0	0.3	0.3	25 25	1.0 1.0	1.3	13.48 12.83	18.38 6.37
	0.0	· · ·									0.07
						ECEMBER 2016					
T1	2.0	4	10.0	10.0	7.0	7.0	25	1.0	8.0	1.64	3.10
T2 T3	2.0	4	10.0 10.0	10.0 10.0	4.4 6.1	4.4 6.1	25 25	1.0 1.0	5.4 7.1	2.61 1.88	4.60 3.50
13 T4	2.0	4	10.0	10.0	6.1 5.6	5.6	25	1.0	7.1	1.88 4.09	3.50
T5	2.0	4	10.0	10.0	0.9	0.9	25	1.0	1.9	12.74	13.06
T6	2.0	4	10.0	10.0	4.8	4.8	25	1.0	5.8	2.39	4.28
T7	1.0	4	10.0	10.0	4.0	4.0	25	1.0	5.0	5.73	9.93
T8 T9	2.0	4	10.0 10.0	10.0 10.0	3.9 6.2	3.9 6.2	25 25	1.0 1.0	4.9 7.2	2.94 1.23	5.07 2.30
T10	2.0	4	10.0	10.0	5.2	5.2	25	1.0	6.2	2.21	4.00
T11	1.0	4	10.0	10.0	6.2	6.2	25	1.0	7.2	3.70	6.89
T12	3.0	4	10.0	10.0	5.3	5.3	25	1.0	6.3	1.44	2.63
T13	2.0	4	10.0	10.0	7.5	7.5	25	1.0	8.5	1.53	2.92
						No Peat rec	orded at locat	tion			
BP1							orded at local				
BP1 BP2						No Peat rec	orded at locat	tion			
BP1						No Peat reco No Peat reco	orded at locat orded at locat orded at locat	tion tion			
BP1 BP2 BP3 BP4 BP5						No Peat reco No Peat reco No Peat reco No Peat reco	orded at locat orded at locat orded at locat	tion tion tion			
BP1 BP2 BP3 BP4 BP5 BP6						No Peat reco No Peat reco No Peat reco No Peat reco No Peat reco	orded at locat orded at locat orded at locat orded at locat	tion tion tion tion			
BP1 BP2 BP3 BP4 BP5 BP6 BP7						No Peat reco No Peat reco No Peat reco No Peat reco No Peat reco No Peat reco No Peat reco	orded at locat orded at locat orded at locat orded at locat orded at locat	tion tion tion tion tion			
BP1 BP2 BP3 BP4 BP5 BP6						No Peat reco No Peat reco	orded at locat orded at locat orded at locat orded at locat	tion tion tion tion tion tion			
BP1 BP2 BP3 BP4 BP5 BP6 BP7 BP8 BP9 BPC1						No Peat reco No Peat reco	orded at loca orded at loca	tion tion tion tion tion tion tion			
BP1 BP2 BP3 BP4 BP5 BP6 BP7 BP8 BP9 BPC1 BPC3						No Peat reco No Peat reco	orded at loca orded at loca	tion tion tion tion tion tion tion tion			
BP1 BP2 BP3 BP4 BP5 BP6 BP7 BP8 BP9 BPC1 BPC3 BPC4	1.0	4	10.0	10.0	3.1	No Peat reco No Peat reco	orded at local orded at local	tion tion tion tion tion tion tion tion	4.1	7.39	12.11
BP1 BP2 BP3 BP4 BP5 BP6 BP7 BP8 BP9 BPC1 BPC3	<u>1.0</u> 1.0	4 4	10.0	10.0 10.0	3.1 2.3	No Peat reco No Peat reco	orded at loca orded at loca	tion tion tion tion tion tion tion tion	4.1 3.3	7.39 9.97	12.11
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP9           BPC1           BPC3           BPC4           CC1           CC2           CC3	1.0 1.0	4 4	10.0 10.0	10.0 10.0	2.3 0.6	No Peat reco No Peat reco 3.1 2.3 0.6	orded at local orded at local 25 25 25	tion tion tion tion tion tion tion tion	3.3 1.6	9.97 38.20	15.04 31.02
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP9           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4	1.0	4	10.0 10.0 10.0	10.0 10.0 10.0	2.3 0.6 0.6	No Peat reco No Peat reco 3.1 2.3	orded at local orded at local	tion tion tion tion tion tion tion tion	3.3 1.6 1.6	9.97 38.20 38.20	15.04 31.02 31.02
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP9           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5	1.0 1.0 1.0 1.0	4 4 4 4	10.0 10.0 10.0 10.0	10.0 10.0 10.0 10.0	2.3 0.6 0.6 0.4	No Peat reco No Peat reco 3.1 2.3 0.6 0.6 0.4	orded at local orded	tion tion tion tion tion tion tion tion	3.3 1.6 1.6 1.4	9.97 38.20 38.20 57.31	15.04 31.02 31.02 35.46
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP9           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7	1.0 1.0 1.0 1.0 1.0	4 4	10.0 10.0 10.0	10.0 10.0 10.0	2.3 0.6 0.6	No Peat reco No Peat reco 3.1 2.3 0.6 0.6 0.6 0.4 2.2	orded at local orded at local	tion tion tion tion tion tion tion tion	3.3 1.6 1.6	9.97 38.20 38.20	15.04 31.02 31.02
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP9           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10	1.0 1.0 1.0 1.0 1.0 1.0 1.0	4 4 4 4 4 4 4 4	10.0 10.0 10.0 10.0 10.0 10.0 10.0	10.0 10.0 10.0 10.0 10.0 10.0 10.0	2.3 0.6 0.6 0.4 2.2 2.5 1.6	No Peat reco No Peat reco 3.1 2.3 0.6 0.6 0.6 0.4 2.2 2.5 1.6	orded at loca orded ot loca ot loca	tion tion tion tion tion tion tion tion	3.3 1.6 1.6 1.4 3.2 3.5 2.6	9.97 38.20 38.20 57.31 10.42 9.17 14.33	15.04 31.02 31.02 35.46 15.51 14.18 19.09
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	4 4 4 4 4 4 4 4 4	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	2.3 0.6 0.4 2.2 2.5 1.6 1.8	No Peat reco No Peat reco 3.1 2.3 0.6 0.6 0.6 0.4 2.2 2.5 1.6 1.8	orded at loca orded ot loca ot loc	tion tion tion tion tion tion tion tion	3.3 1.6 1.4 3.2 3.5 2.6 2.8	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73	15.04 31.02 35.46 15.51 14.18 19.09 17.73
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP0           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 2.0	4 4 4 4 4 4 4 4 4 4	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9	No Peat reco No Peat reco 3.1 2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9	orded at loca orded at loca or	tion tion tion tion tion tion tion tion	3.3 1.6 1.4 3.2 3.5 2.6 2.8 3.9	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95	15.04 31.02 33.46 15.51 14.18 19.09 17.73 6.36
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP9           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 2.0 2.0	4 4 4 4 4 4 4 4 4 4	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2	No Peat reco No Peat reco 3.1 2.3 0.6 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2	orded at loca orded at loca 25 25 25 25 25 25 25 25 25 25 25 25 25	tion tion tion tion tion tion tion tion	3.3 1.6 1.6 1.4 3.2 3.5 2.6 2.8 3.9 4.2	9.97 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58	15.04 31.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP0           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 2.0	4 4 4 4 4 4 4 4 4 4	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9	No Peat reco No Peat reco 3.1 2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9	orded at loca orded at loca or	tion tion tion tion tion tion tion tion	3.3 1.6 1.4 3.2 3.5 2.6 2.8 3.9	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95	15.04 31.02 35.46 15.51 14.18 19.09 17.73 6.36
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP9           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB4           SUB5           SUB6	1.0 1.0 1.0 1.0 1.0 1.0 1.0 2.0 2.0 2.0 2.0 2.0 2.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	$\begin{array}{c} 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \end{array}$	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2 1.2 0.5 0.4	No Peat reco No Pe	orded at loca orded at loca or	tion tion tion tion tion tion tion tion	3.3 1.6 1.4 3.2 3.5 2.6 2.8 3.9 4.2 2.2 1.5 1.4	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67	15.04 31.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP9           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3           SUB4           SUB6           SUB7	1.0 1.0 1.0 1.0 1.0 1.0 1.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	$\begin{array}{c} 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \end{array}$	$\begin{array}{c} 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ \end{array}$	2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7	No Peat record           3.1           2.3           0.6           0.6           0.4           2.2           2.5           1.6           1.8           2.9           3.2           1.2           0.5           0.4           1.7	orded at loca orded at loca or	tion tion tion tion tion tion tion tion	3.3 1.6 1.4 3.2 3.5 2.6 2.8 3.9 4.2 2.2 1.5 1.4 2.7	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75	15.04 31.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP01           BP2           BP6           BP7           BP8           BP01           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3           SUB4           SUB5           SUB6           SUB7           SUB8	1.0 1.0 1.0 1.0 1.0 1.0 1.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 1.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1	No Peat reco No Peat reco 3.1 2.3 0.6 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1	orded at loca orded at loca or	tion tion tion tion tion tion tion tion	3.3 1.6 1.6 1.4 3.2 3.5 2.6 2.8 3.9 4.2 2.2 1.5 1.4 2.7 4.1	9.97 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39	15.04 31.02 33.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 9.19
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP9           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3           SUB4           SUB5           SUB7           SUB8           SUB8           SUB9	1.0 1.0 1.0 1.0 1.0 1.0 1.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 1.0 1.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	$\begin{array}{c} 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10$	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1 3.4	No Peat record           3.1           2.3           0.6           0.6           0.6           0.6           0.6           0.6           0.6           0.6           0.6           0.6           0.6           0.7           1.8           2.9           3.2           1.2           0.5           0.4           1.7           3.1           3.4	orded at loca orded at loca or	tion tion tion tion tion tion tion tion	3.3           1.6           1.4           3.2           2.6           2.8           3.9           4.2           2.2           1.5           1.4           2.7           4.1           4.4	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39 6.74	15.04 31.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 12.11 11.28
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP01           BP2           BP6           BP7           BP8           BP01           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3           SUB4           SUB5           SUB6           SUB7           SUB8	1.0 1.0 1.0 1.0 1.0 1.0 1.0 2.0 2.0 2.0 2.0 2.0 2.0 1.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1	No Peat reco No Peat reco 3.1 2.3 0.6 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1	orded at loca orded at loca or	tion tion tion tion tion tion tion tion	3.3 1.6 1.6 1.4 3.2 3.5 2.6 2.8 3.9 4.2 2.2 1.5 1.4 2.7 4.1	9.97 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39	15.04 31.02 33.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 9.19
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP0           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3           SUB4           SUB5           SUB6           SUB7           SUB8           SUB9           WP001           WP002           WP003	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	$\begin{array}{c} 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10$	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	2.3 0.6 0.4 2.2 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1 3.1 3.4 3.0 0.9 3.0	No Peat record           3.1           2.3           0.6           0.4           2.2           2.5           1.6           1.8           2.9           3.2           1.2           0.5           0.4           1.7           3.1           3.4           3.0           0.9           3.0	orded at loca orded at loca or	tion tion tion tion tion tion tion tion	$\begin{array}{c} 3.3 \\ 1.6 \\ 1.6 \\ 1.4 \\ 3.2 \\ 2.6 \\ 2.8 \\ 3.9 \\ 4.2 \\ 2.2 \\ 1.5 \\ 1.4 \\ 2.7 \\ 4.1 \\ 4.4 \\ 4.0 \\ 1.9 \\ 4.0 \end{array}$	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39 6.74 7.64 12.74 3.82	15.04 31.02 33.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 12.11 11.28 12.41 13.06 6.21
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP9           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB4           SUB5           SUB6           SUB7           SUB8           SUB9           WP001           WP003           1	1.0 1.0 1.0 1.0 1.0 1.0 1.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 1.0 1.0 1.0 0.3	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	$\begin{array}{c} 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10$	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1 3.4 3.0 0.9 3.0 1.0	No Peat reco No Peat reco 3.1 2.3 0.6 0.6 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1 3.1 3.0 5 0.4 1.7 3.1 3.1 0.5 0.5 0.4 1.7 3.1 1.2 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	orded at loca orded at loca or	tion tion tion tion tion tion tion tion	3.3           1.6           1.4           3.2           3.5           2.6           2.8           3.9           4.2           2.2           1.5           1.4           2.7           4.1           4.1           4.1           4.2           2.7           4.1           2.7           4.1           2.7           4.1           4.0           2.0	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39 6.74 7.64 12.74 3.82 66.67	15.04 31.02 33.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 12.11 11.28 12.41 13.06 6.21 72.19
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP0           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3           SUB4           SUB5           SUB6           SUB7           SUB8           SUB9           WP001           WP003           1           2	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	$\begin{array}{c} 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 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1.2 0.5 0.4 1.7 1.2 0.5 0.4 1.7 1.2 0.5 0.4 1.7 1.2 0.5 0.4 1.7 1.2 0.5 0.4 1.7 1.2 0.5 0.4 1.7 1.2 0.5 0.4 1.7 1.7 1.3 1.1 1.2 0.5 0.4 1.7 1.3 1.1 1.2 0.5 0.4 1.7 1.7 1.3 1.1 1.3 1.1 1.3 1.0 0.0 1.0 1.0 1.0 1.3	orded at loca orded at loca or	tion tion tion tion tion tion tion tion	$\begin{array}{c} 3.3 \\ 1.6 \\ 1.4 \\ 3.2 \\ 3.5 \\ 2.6 \\ 2.8 \\ 3.9 \\ 4.2 \\ 2.2 \\ 1.5 \\ 1.4 \\ 2.7 \\ 4.1 \\ 4.4 \\ 4.0 \\ 1.9 \\ 4.0 \\ 1.9 \\ 4.0 \\ 2.0 \\ 2.3 \end{array}$	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 9.56 22.94 28.67 6.75 7.39 6.74 7.64 12.74 3.82 66.67 307.69	15.04 31.02 33.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 12.11 11.28 12.41 13.06 6.21 72.19 376.66
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP9           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB4           SUB5           SUB6           SUB7           SUB8           SUB9           WP001           WP003           1	1.0 1.0 1.0 1.0 1.0 1.0 1.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 1.0 1.0 1.0 0.3	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	$\begin{array}{c} 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10$	10.0 10.0 10.0 10.0 10.0 10.0 10.0 10.0	2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1 3.4 3.0 0.9 3.0 1.0	No Peat reco No Peat reco 3.1 2.3 0.6 0.6 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1 3.1 3.0 5 0.4 1.7 3.1 3.1 0.5 0.5 0.4 1.7 3.1 1.2 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5	orded at loca orded at loca or	tion tion tion tion tion tion tion tion	3.3           1.6           1.4           3.2           3.5           2.6           2.8           3.9           4.2           2.2           1.5           1.4           2.7           4.1           4.1           4.1           4.2           2.7           4.1           2.7           4.1           2.7           4.1           4.0           2.0	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39 6.74 7.64 12.74 3.82 66.67	15.04 31.02 33.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 12.11 11.28 12.41 13.06 6.21 72.19
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP0           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3           SUB4           SUB5           SUB6           SUB7           SUB8           SUB9           WP001           WP002           MP003           1           2           3           4           6	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	$\begin{array}{c} 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 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No 6           0.6           0.6           0.6           0.6           0.6           0.6           0.4           1.2           0.5           0.4           1.2           0.5           0.4           1.7           3.1           3.0           0.9           3.0           1.3           0.3           3.0	orded at loca orded at loca or	tion tion tion tion tion tion tion tion	$\begin{array}{c} 3.3 \\ 1.6 \\ 1.4 \\ 3.2 \\ 3.5 \\ 2.6 \\ 2.8 \\ 3.9 \\ 4.2 \\ 2.2 \\ 1.5 \\ 1.4 \\ 2.7 \\ 4.1 \\ 4.4 \\ 4.0 \\ 1.9 \\ 4.0 \\ 2.0 \\ 2.3 \\ 1.3 \\ 1.3 \\ 4.0 \\ 4.8 \end{array}$	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39 6.74 7.64 12.74 3.82 66.67 307.69 102.58 14.82 35.09	15.04 31.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 12.11 11.28 12.41 13.06 6.21 13.06 6.21 17.2.19 376.66 51.26 524.07 60.16
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP0           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3           SUB4           SUB5           SUB8           SUB8           SUB9           WP001           WP003           1           2           3           4           6           7	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	$\begin{array}{c} 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 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         3.2           1.2           0.5           0.4           1.7           3.1           3.0           0.9           3.0           1.3           0.3           3.0           3.8           3.5           3.2	orded at loca orded ot loca ot	tion tion tion tion tion tion tion tion	3.3         1.6         1.4         3.2         3.5         2.6         2.8         3.9         4.2         2.2         1.5         1.4         2.7         1.4         2.7         4.1         4.2         2.3         1.3         4.0         2.0         2.3         1.3         4.0         4.2         4.2	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39 6.74 7.64 12.74 3.82 66.67 307.69 102.58 14.82 35.09 8.16 3.58 7.1.62	15.04 31.02 33.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 12.11 11.28 12.41 13.06 6.21 72.19 376.66 51.26 51.26 51.26 54.07 60.16 13.75 5.91 118.18
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP0           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3           SUB4           SUB5           SUB5           SUB8           SUB8           SUB9           WP001           WP003           1           2           3           4           6           7           8	1.0 1.0 1.0 1.0 1.0 1.0 1.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	$\begin{array}{c} 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 10.0 \\ 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    2.9           3.2           1.2           0.5           0.4           1.7           3.1           3.0           0.9           3.0           1.0           1.3           0.3           3.0           3.0           3.0           3.0           3.0           3.0           3.0           3.0           3.0           3.0	orded at loca orded at loca or	tion tion tion tion tion tion tion tion	$\begin{array}{c} 3.3 \\ 1.6 \\ 1.6 \\ 1.4 \\ 3.2 \\ 3.5 \\ 2.6 \\ 2.8 \\ 3.9 \\ 4.2 \\ 2.2 \\ 1.5 \\ 1.4 \\ 2.7 \\ 4.1 \\ 4.4 \\ 4.0 \\ 1.9 \\ 1.9 \\ 4.0 \\ 2.0 \\ 2.3 \\ 1.3 \\ 4.0 \\ 4.8 \\ 4.5 \\ 4.2 \end{array}$	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39 6.74 7.64 12.74 12.74 3.82 66.67 307.69 102.58 14.82 35.09 8.16 3.58	15.04 31.02 33.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 12.11 11.28 12.41 13.06 6.21 72.19 376.66 51.26 24.07 60.16 13.75 5.91
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP0           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3           SUB4           SUB5           SUB8           SUB8           SUB9           WP001           WP002           WP003           1           2           3           4           6           7           8           9           10	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	$\begin{array}{c} 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 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Peat record           3.1           2.3           0.6           0.6           0.6           0.6           0.6           0.6           0.6           0.6           0.6           0.6           0.6           0.6           0.6           0.4           2.2           2.5           1.6           1.8           2.9           3.2           1.2           0.5           0.4           1.7           3.1           3.0           1.0           1.3           0.3           3.0           3.2           3.2           3.2           3.2           3.2	orded at loca orded at loca or	tion tion tion tion tion tion tion tion tion tion tion tion tion 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	$\begin{array}{c} 3.3\\ 1.6\\ 1.6\\ 1.4\\ 3.2\\ 3.5\\ 2.6\\ 2.8\\ 3.9\\ 4.2\\ 2.2\\ 1.5\\ 1.4\\ 2.7\\ 4.1\\ 4.4\\ 4.0\\ 1.9\\ 1.9\\ 4.0\\ 2.0\\ 2.3\\ 1.3\\ 4.0\\ 4.2\\ 4.2\\ 4.2\\ 4.2\\ 4.2\\ 4.2\\ 4.2\\ 4.2$	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39 6.74 7.64 12.74 12.74 3.82 66.67 307.69 102.58 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BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP9           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3           SUB4           SUB5           SUB6           SUB7           SUB8           SUB9           WP001           WP003           1           2           3           4           6           7           8           9           10           11           12           13           14           16	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	$\begin{array}{c} 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 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4.8\\ 4.5\\ 4.2\\ 4.2\\ 1.9\\ 3.2\\ 5.8\\ 6.6\\ 5.8\\ 6.7\end{array}$	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39 6.74 7.64 12.74 3.82 66.67 307.69 102.58 14.82 35.09 8.16 3.58 71.62 8.50 1.75 1.20 7.14 11.91 4.02	15.04 31.02 33.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 12.11 11.28 12.41 13.06 6.21 72.19 376.66 51.26 24.07 60.16 13.75 5.91 118.18 8.71 12.59 2.14 13.13 21.34 7.41
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP7           BP8           BP7           BP8           BP7           BP6           C1           C2           C3           CC1           CC2           C3           C4           C5           C7           C8           SUB1           SUB2           SUB3           SUB4           SUB5           SUB8           SUB8           SUB9           WP001           WP002           WP003           1           2           3           4           6           7           8           9           10           11           12           13           14           16           17	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	$\begin{array}{c} 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 10.0\\ 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6.7\end{array}$	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39 6.74 7.64 12.74 3.82 66.67 307.69 102.58 14.82 35.09 8.16 3.58 71.62 8.50 1.75 1.20 7.14 11.91 4.02	15.04 31.02 33.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 12.11 11.28 12.41 13.06 6.21 72.19 376.66 51.26 24.07 60.16 13.75 5.91 118.18 8.71 12.59 2.14 13.13 21.34 7.41
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP7           BP8           BP7           BP8           BP7           BP6           BP7           BP8           BP7           BP8           BP7           BP6           BP7           BP6           BP7           BP6           BP7           BP6           BP7           BP6           BP7           BP6           SU8           SUB1           SUB2           SUB3           SUB4           SUB5           SUB5           SUB8           SUB7           SUB8           SUB8           SUB9           WP001           WP002           WP003           1           2           3           4           6           7	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0        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BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP0           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3           SUB4           SUB5           SUB5           SUB8           SUB8           SUB9           WP001           WP002           WP003           1           2           3           4           6           7           8           9           10           11           12           13           14           16           17           18           19           20           22	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0	10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0	2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1 3.4 3.0 0.9 3.0 1.0 1.3 0.9 3.0 1.0 1.3 0.3 3.0 1.0 3.2 3.2 1.2 0.5 0.4 1.7 3.1 3.4 3.0 0.9 3.0 1.0 1.3 0.9 3.0 1.0 1.3 0.9 3.0 1.0 1.3 0.9 3.0 1.0 1.3 0.9 3.0 1.0 1.3 0.9 3.0 1.0 1.3 0.9 3.0 1.0 1.3 1.0 3.0 1.0 1.3 3.0 1.3 3.0 1.3 3.0 1.3 3.0 3.0 1.0 3.0 1.0 3.0 1.0 3.0 3.0 1.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3	No Peat reco No Peat reco 3.1 2.3 0.6 0.4 2.2 2.5 1.6 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1 3.2 1.2 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.9 3.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1	orded at loca orded at loca or	tion tion tion tion tion tion tion tion tion tion tion 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	$\begin{array}{c} 3.3\\ 1.6\\ 1.6\\ 1.4\\ 3.2\\ 3.5\\ 2.6\\ 2.8\\ 3.9\\ 4.2\\ 2.2\\ 1.5\\ 1.4\\ 2.7\\ 4.1\\ 4.4\\ 4.0\\ 1.9\\ 4.0\\ 2.0\\ 2.3\\ 1.3\\ 4.0\\ 2.0\\ 2.3\\ 1.3\\ 4.0\\ 2.0\\ 2.3\\ 1.3\\ 4.0\\ 2.0\\ 5.8\\ 6.6\\ 5.8\\ 6.6\\ 5.8\\ 6.5\\ 5.8\\ 6.5\\ 6.8\\ 5.9\\ 6.2\\ 5.6\\ \end{array}$	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39 6.74 7.64 12.74 3.82 66.67 307.69 102.58 14.82 35.09 8.16 3.58 71.62 7.14 11.91 4.02 2.09 1.98 11.62 11.02 14.49	15.04 31.02 33.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 12.11 11.28 12.41 13.06 6.21 72.19 376.66 51.26 24.07 60.16 13.75 5.91 118.18 8.71 2.59 2.14 13.13 21.34 7.41 3.82 3.65 20.01 25.78
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP7           BP8           BP7           BP8           BP7           BP61           BP72           BP61           BP73           BP61           BP73           BP61           BP73           BP61           BP73           BP61           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3           SUB4           SUB5           SUB5           SUB5           SUB8           SUB8           SUB8           SUB8           SUB8           SUB9           WP001           WP003           1           2           3	1.0 1.0 1.0 1.0 1.0 1.0 1.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2	4           4           4           4           4           4           4           4           4           4           4           4           4           4           4           4           4           4           4           4 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      10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0	2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1 3.1 3.1 3.0 0.9 3.0 1.0 1.3 0.3 3.0 1.0 1.3 0.3 3.0 3.0 3.0 3.0 3.2 3.2 0.9 3.2 1.2 0.5 0.4 3.2 1.2 0.5 0.4 3.2 0.5 0.4 3.2 0.5 0.4 3.2 0.5 0.4 3.2 0.5 0.4 3.2 0.5 0.4 3.2 0.5 0.4 3.2 0.5 0.4 3.2 0.5 0.4 3.1 3.0 0.9 3.0 1.0 1.3 0.3 3.0 3.0 3.0 3.0 3.2 3.2 0.5 5.5 5.5 5.5 5.5 5.5 5.8 4.9 5.2 4.6 3.7 1.5 5.5 5.5 5.5 5.8 4.9 5.2 4.6 3.7 1.5 5.5 5.5 5.5 5.8 3.7 1.5 5.5 5.5 5.5 5.5 5.8 3.7 1.5 5.5 5.5 5.8 5.8 5.7 5.5 5.5 5.5 5.8 5.8 5.7 5.5 5.8 5.8 5.7 5.5 5.5 5.5 5.5 5.5 5.5 5.5	No Peat reco           3.1           2.3           0.6           0.4           2.2           2.5           1.6           1.8           2.9           3.2           1.2           0.5           0.4           1.7           3.1           3.0           1.7           3.1           3.0           1.0           1.3           0.3           3.0           1.3           0.3           3.0           1.3           0.3           3.0           1.3           0.3           3.2           3.2           3.2           3.2           3.2	orded at loca orded at loca or	tion tion tion tion tion tion tion tion tion tion tion tion tion tion 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	$\begin{array}{c} 3.3\\ 1.6\\ 1.6\\ 1.4\\ 3.2\\ 3.5\\ 2.6\\ 2.8\\ 3.9\\ 4.2\\ 2.2\\ 1.5\\ 1.4\\ 2.7\\ 4.1\\ 4.4\\ 4.0\\ 1.9\\ 4.0\\ 2.0\\ 2.3\\ 1.3\\ 1.3\\ 4.0\\ 4.8\\ 4.5\\ 4.2\\ 4.2\\ 1.9\\ 3.2\\ 5.8\\ 6.6\\ 5.8\\ 6.7\\ 6.5\\ 5.8\\ 6.7\\ 6.5\\ 5.8\\ 5.9\\ 6.2\\ 5.6\\ 4.7\\ \end{array}$	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39 6.74 7.64 12.74 12.74 12.74 3.82 66.67 307.69 102.58 14.82 35.09 8.16 3.58 71.62 8.50 1.75 1.20 7.14 11.91 4.02 2.09 11.66 11.02 1.98 11.66 11.02 1.98 14.49 2.07	15.04 31.02 33.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 12.11 11.28 12.41 13.06 6.21 72.19 376.66 51.26 24.07 60.16 13.75 5.91 118.18 8.71 2.59 2.14 13.13 21.34 7.41 3.82 20.98 20.01 25.78 3.52
BP1           BP2           BP3           BP4           BP5           BP6           BP7           BP8           BP0           BPC1           BPC3           BPC4           CC1           CC2           CC3           CC4           CC5           CC7           CC8           CC10           SUB1           SUB2           SUB3           SUB4           SUB5           SUB5           SUB8           SUB8           SUB9           WP001           WP002           WP003           1           2           3           4           6           7           8           9           10           11           12           13           14           16           17           18           19           20           22	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0	10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0           10.0	2.3 0.6 0.4 2.2 2.5 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1 3.4 3.0 0.9 3.0 1.0 1.3 0.9 3.0 1.0 1.3 0.3 3.0 1.0 3.2 3.2 1.2 0.5 0.4 1.7 3.1 3.4 3.0 0.9 3.0 1.0 1.3 0.9 3.0 1.0 1.3 0.9 3.0 1.0 1.3 0.9 3.0 1.0 1.3 0.9 3.0 1.0 1.3 0.9 3.0 1.0 1.3 0.9 3.0 1.0 1.3 1.0 3.0 1.0 1.3 3.0 1.3 3.0 1.3 3.0 1.3 3.0 3.0 1.0 3.0 1.0 3.0 1.0 3.0 3.0 1.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3	No Peat reco No Peat reco 3.1 2.3 0.6 0.4 2.2 2.5 1.6 1.6 1.8 2.9 3.2 1.2 0.5 0.4 1.7 3.1 3.2 1.2 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.5 0.4 1.7 3.1 3.0 0.9 3.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1	orded at loca orded at loca or	tion tion tion tion tion tion tion tion tion tion tion 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0	$\begin{array}{c} 3.3\\ 1.6\\ 1.6\\ 1.4\\ 3.2\\ 3.5\\ 2.6\\ 2.8\\ 3.9\\ 4.2\\ 2.2\\ 1.5\\ 1.4\\ 2.7\\ 4.1\\ 4.4\\ 4.0\\ 1.9\\ 4.0\\ 2.0\\ 2.3\\ 1.3\\ 4.0\\ 2.0\\ 2.3\\ 1.3\\ 4.0\\ 2.0\\ 2.3\\ 1.3\\ 4.0\\ 2.0\\ 5.8\\ 6.6\\ 5.8\\ 6.6\\ 5.8\\ 6.5\\ 5.8\\ 6.5\\ 6.8\\ 5.9\\ 6.2\\ 5.6\\ \end{array}$	9.97 38.20 38.20 57.31 10.42 9.17 14.33 12.73 3.95 3.58 9.56 22.94 28.67 6.75 7.39 6.74 7.64 12.74 3.82 66.67 307.69 102.58 14.82 35.09 8.16 3.58 71.62 7.14 11.91 4.02 2.09 1.98 11.62 11.02 14.49	15.04 31.02 33.02 35.46 15.51 14.18 19.09 17.73 6.36 5.91 11.28 16.55 17.73 9.19 12.11 11.28 12.41 13.06 6.21 72.19 376.66 51.26 24.07 60.16 13.75 5.91 118.18 8.71 2.59 2.14 13.13 21.34 7.41 3.82 3.65 20.01 25.78

Netword         Partial         Partial         Partial         Partial         Partial         Partial         Partial         Partial         Partial           Image							-			(Drained An		
step         ethel         pythol         pythol <th>Turbine No./Waypoint</th> <th>Slope</th> <th>Design c'</th> <th></th> <th>Unit weight of Water</th> <th></th> <th>Depth of In situ Peat</th> <th>Friction Angle</th> <th></th> <th>Equivalent Total Depth of Peat (m)</th> <th>Factor of Safety</th> <th>for Load Condition</th>	Turbine No./Waypoint	Slope	Design c'		Unit weight of Water		Depth of In situ Peat	Friction Angle		Equivalent Total Depth of Peat (m)	Factor of Safety	for Load Condition
B     D1     4     100     110     120     120     120     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130     130		α (deg)	c' (kPa)		γ <sub>w</sub> (kN/m³)		(m)	ø' (deg)		Condition (2)	Condition (1)	Condition (2)
B0     11     61     4     300     130     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     13     14	20	0.1	4	10.0	10.0	2.4	2.4	25	1.0	2.4		100% Water 127.40
No.       No.     No.     No.     No.     No.     No.     No.     No.     No.       No.     No.     No.     No.     No.     No.     No.     No.     No.       No.     No.     No.     No.     No.     No.     No.     No.     No.       No.     No.     No.     No.     No.     No.     No.     No.     No.       No.     No.     No.     No.     No.     No.     No.     No.       No.     No.     No.     No.     No.     No.     No.     No.       No.     No.     No.     No.     No.     No.     No.     No.       No.     No.     No.     No.     No.     No.     No.     No.       No.     No.     No.     No.     No.     No.     No.     No.       No.     No.     No.     No.     No.     No.     No.     No.       No.     No.     No.     No.     No.     No.     No.     No.       No.     No.     No.     No.     No.     No.     No.   <												188.33
SecDLLLLLLCALB0.00.0100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>346.52</td></td<>												346.52
B36.64.61.501.001.301.311.511.604.741.921.93B30.54.1.001.001.301.001.301.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001.001												36.40 12.56
38.95.1.04.31.001.004.31.10219.2.041.001.004.64.65.51.04.31.10218.2.041.001.004.64.65.51.06.36.440.6.441.001.006.36.35.51.06.36.51.007.31.0041.6.141.001.001.21.21.21.06.51.271.07.31.007.3743.1.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.11.1 </td <td></td> <td>12.56</td>												12.56
33104410010052527510063128390.440.010063636310100100100400.140.0010063133100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100100	36	0.6		10.0		3.3	3.3	25	1.0		11.02	18.32
pp pp pp pp pp pp pp pp pp pp pp pp pp pp pp pp pp pp pp pp pp pp 												4.43
000.10.10.100.50.50.51.07.30.900.10.10.10.100.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.50.												20.98
44         27         4         100         100         120         22         22         23         100         120         120           44         23         4         100         100         121         121         125         100         23         123         123           46         0.4         4         100         100         13         13         125         100         23         143         135           51         0.1         4         100         100         13         13         125         1.0         13         135           51         0.1         4         100         100         0.1         0.1         100         13         125         1.0         13         135           10         4         100         100         0.1         0.1         0.1         0.1         13         135           10         4         100         100         0.1         0.1         0.1         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13	40	0.4	4	10.0	10.0	6.3	6.3	25	1.0	7.3	9.09	17.00
446         23         4         100         100         126         26         25         100         320         539           46         23         4         100         100         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         14         13         13         13         13         13         13         13         13         13         13         13         13         13         13         <												133.28
46         23         4         100         100         17         17         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         13         14         13         13         13         13         13         13         13         13         13         14         13         14         13         14         13         14         13         14         13         14         13         14         13         14         13         14         13         14         13         14         13         14         13         14         13         14         13         14 <th13< th="">         14         13         14&lt;</th13<>												13.54 5.02
HerAddAddBooBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioBioB												8.03
90         0.8         4         100         100         1.7         1.7         1.3         1.2         1.0         2.3         100.9           51         0.1         4         100         100         0.3         0.3         1.0         1.3         100.9           51         0.1         4         100         100         0.3         0.3         25         1.0         1.3         1764.1           55         1.0         4         100         100.0         0.3         0.3         25         1.0         1.3         764.1           58         1.0         4         100         100.0         0.3         0.3         25         1.0         1.2         1.44.1           59         1.1         4         100         100         1.0         25         1.0         2.0         2.2         1.0         2.0         2.2         1.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.												9.93
S1         0.1         4         100         1.0         1.3         1.3         25         1.0         1.3         130.97           S2         0.4         4         0.0         0.0         0.3         0.3         25         1.0         1.3         150.97           S3         1.0         4         0.0         0.0         0.3         0.3         25         1.0         1.3         750.97           S6         1.0         4         0.00         1.0.0         0.3         0.3         25         1.0         1.3         750.97           S6         1.0         4         0.00         1.0.0         1.0         1.0         25         1.0         1.3         4.6         8.5           S6         1.3         4         0.00         1.0         1.0         2.5         1.0         1.1         2.5         1.0         2.6         1.6           S64         1.3         4         0.0         1.0.0         4.3         4.9         2.5         1.0         4.1         4.5           G64         0.5         4.0         0.0         1.0         4.3         3.4         3.5         1.0         4.3         4.5<												53.81 22.92
53         1.0         4         100         100         0.3         0.3         25         1.0         1.4         76.4           55         1.0         4         100         100         0.3         0.3         25         1.0         1.3         76.4           55         1.0         4         100         100         0.5         25         1.0         1.3         76.4           58         1.0         4         100         1.0         1.5         1.0         1.5         77.4           59         1.0         4         1.00         1.0         1.5         1.0         2.6         77.4           60         0.2         4         1.00         1.0         1.6         1.6         7.5         1.0         2.6         77.4           61         1.3         4         1.00         1.0         1.1         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0         1.0												376.66
54         1.0         4         10.0         10.0         0.4         0.4         0.5         1.0         1.1         75.4           55         1.0         4         10.0         10.0         0.2         0.2         25         1.0         1.2         156.4           56         1.0         4         10.0         10.0         0.2         0.2         25         1.0         1.2         156.4           57         1.0         4         10.0         1.0         1.6         1.5         10.0         1.5         155.5         10.0         1.6         155.5           60         0.2         4         10.0         10.0         1.1         11.1         12.5         10.0         1.6         23.9           64         1.3         4         10.0         10.0         4.0         4.0         2.5         10.0         1.6         15.4           64         0.5         4         10.0         10.0         4.5         4.6         2.5         10.0         4.6         2.6           71         10         4         10.0         10.0         3.3         3.3         2.5         10.0         4.5         4.5     <												95.20
55         1.0         4         100         100         0.3         0.3         25         1.0         1.3         764.           57         1.0         4         100         100         0.5         0.5         25         1.0         1.2         1.64.           58         1.1         4         100         100         1.0         1.5         1.65.         1.65.           90         1.2         4         100         1.00         1.4         1.0         25         1.0         1.2         4.5.           81         1.3         4         1.00         1.00         1.4         1.1         1.1         25         1.0         1.5         25.           66         0.5         4         1.00         1.00         4.4         1.00         1.00         4.4         1.00         1.0         4.4         1.0         1.0         4.4         1.0         1.0         4.4         1.0         1.0         4.4         1.0         1.0         4.4         1.0         1.0         4.4         1.0         1.0         4.5         1.0         4.5         4.5         1.0         4.5         4.5         1.0         1.0         1.												38.18 35.46
57         10         4         100         100         100         10         10         10         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0         2.0												33.46
58         1.0         4         100         100         1.0         1.0         2.5         1.0         2.6         11.0           60         0.2         4         100         100         1.4         1.4         2.5         1.0         2.4         71.43           60         1.3         4         100         100         1.1         1.1         2.5         1.0         2.4         71.43           64         1.3         4         100         100         4.5         4.5         2.5         1.0         3.0         2.1         1.654           66         0.0         4         100         100         4.5         4.5         2.5         1.0         5.5         5.56           70         2.0         4         100         100         3.4         3.4         2.5         1.0         4.4         6.0           71         0.4         100         100         4.5         4.5         2.5         1.0         4.5         8.15           72         0.1         4         100         100         4.5         3.5         1.0         4.5         3.5           73         1.1         4         <	56	1.0	4	10.0	10.0	0.2	0.2	25	1.0	1.2	114.61	41.36
59         10         2         4         100         100         1.6         2.6         1.471           60         0.2         4         100         100         1.4         144         2.5         1.0         2.6         74.4           63         1.3         4         100         100         1.1         11         2.5         1.0         2.1         16.5         2.333           66         0.5         4         100         100         4.6         4.9         2.5         1.0         6.1         4.53           66         0.5         4         100         100         4.6         4.6         2.5         1.0         6.1         4.53           70         0.0         4         100         100         4.5         3.4         2.5         1.0         4.4         6.03           71         10         4         100         100         3.3         3.5         1.0         6.3         3.37           73         0.8         4         100         100         0.3         3.3         2.5         1.0         6.3         3.44           74         1.2         4         100         10												33.09 22.80
60         0.2         4         100         100         1.4         1.4         2.5         1.0         2.4         77.43           64         1.3         4         100         100         1.1         1.1         2.5         1.0         1.6         33.3           64         1.3         4         100         100         4.1         1.1         2.5         1.0         5.3         39.7           66         0.5         4         100         100         5.1         5.1         2.5         1.0         5.6         4.4           67         1.0         4         100         100         5.1         5.1         2.5         1.0         4.4         6.6         4.2           72         1.0         4         100         100         5.3         3.5         2.5         1.0         4.4         3.6           73         1.7         4         100         100         4.5         4.3         3.5         1.0         5.3         3.5         3.5         1.0         1.3         3.5.14           74         1.0         100         100         0.3         0.3         2.5         1.0         1.8												22.80
64         1.3         4         100         100         1.1         1.1         1.5         1.0         2.1         156.4           66         0.5         4         100         100         5.1         5.1         2.5         1.0         6.1         4.61           69         0.9         4         100         100         4.5         4.5         2.5         1.0         5.4         5.4           70         1.0         4         100         100         4.5         4.5         2.5         1.0         5.4         6.6           71         1.0         4         100         100         3.5         3.5         2.5         1.0         5.8         8.87           74         1.2         4         100         100         4.5         4.5         2.5         1.0         6.3         3.83           75         1.7         4         100         100         3.3         3.3         2.5         1.0         4.3         1.13           81         2.2         4         100         100         3.6         3.6         2.5         1.0         6.3         3.6           81         2.7	60	0.2	4	10.0	10.0	1.4	1.4	25	1.0		71.43	90.24
66         0.5         4         100         100         4.9         4.9         4.9         1.0         5.9         9.97           67         1.0         4         100         100         4.5         4.5         2.5         1.0         5.5         5.56           70         2.0         4         10.0         10.0         3.4         3.4         2.5         1.0         4.4         6.63           71         1.0         4         10.0         10.0         3.5         3.5         1.0         4.4         6.63           73         0.8         4         10.0         10.0         3.5         3.5         1.0         4.5         8.6           77         1.1         4         10.0         10.0         4.5         4.5         2.5         1.0         4.5         3.6           78         0.5         4         10.0         10.0         3.5         3.5         1.0         1.3         1.34           79         0.5         4         10.0         10.0         3.6         3.5         1.0         1.0         1.3         1.34           81         2.2         4         10.0         10.0												23.86
67         1.0         4         100         100         4.51         5.1         5.5         1.0         5.5         5.56           70         2.0         4         10.0         10.0         4.6         4.6         2.5         1.0         5.6         2.49           71         1.0         4         10.0         10.0         3.4         3.4         2.5         1.0         4.4         6.74           72         1.0         4         10.0         10.0         3.9         3.5         2.5         1.0         4.5         8.66           73         0.8         4         10.0         10.0         4.8         4.8         2.5         1.0         6.3         3.2           75         1.7         4.4         10.0         10.0         4.5         4.5         1.0         1.3         3.5           81         2.2         4         10.0         10.0         3.6         3.7         1.0         1.3         3.5           82         2.2         4         10.0         10.0         3.6         3.6         2.5         1.0         1.3         3.5           81         2.2         4         10.0 <td></td> <td>18.76 16.32</td>												18.76 16.32
70         10         4         100         100         46         46         25         1.0         5.6         249           71         1.0         4         100         100         3.9         3.9         25         1.0         4.4         6.74           73         0.8         4         100         100         4.8         4.8         25         1.0         4.5         8.16           74         1.2         4         100         100         4.5         4.8         25         1.0         6.3         2.52           77         0.1         4         100         100         4.5         4.5         2.5         1.0         4.3         11.47           78         0.5         4         100         100         3.5         3.5         2.5         1.0         4.5         1.30         1.33           81         2.0         4         100         100         0.8         0.8         2.5         1.0         1.6         3.76           84         2.5         4         100         100         5.5         5.5         2.5         1.0         6.6         3.76           87         1.7												8.36
71         1.0         4         100         100         34         3.4         25         1.0         4.4         6.63           73         0.8         4         100         100         35         3.5         25         1.0         4.5         8.16           74         1.2         4         100         100         4.8         4.8         25         1.0         5.8         3.37           75         1.7         4         100         100         4.5         4.5         25         1.0         6.3         4.32           77         0.1         4         100         100         3.3         3.3         25         1.0         4.3         13.0           81         2.2         4         100         100         0.3         0.3         25         1.0         1.3         35.14           82         2.2         4         100         100         0.8         0.8         25         1.0         1.8         34.3           83         2.0         4         100         100         3.6         3.6         2.5         1.0         1.8         3.4           86         1.1         4												9.85
72         1.0         4         100         100         3.9         3.9         2.5         1.0         4.9         6.63           74         1.2         4         100         100         4.8         4.8         2.5         1.0         5.8         3.37           75         1.7         4         100         100         4.5         4.5         2.5         1.0         6.3         2.52           77         0.1         4         100         100         3.5         3.5         2.5         1.0         5.5         44.44           78         0.5         4         100         100         3.5         3.5         2.5         1.0         1.3         13.47           79         0.5         4         100         100         0.3         0.3         2.5         1.0         4.5         13.14           81         2.2         4         100         100         3.6         3.6         2.5         1.0         1.8         14.34           83         2.0         4         100         100         5.5         5.5         1.0         1.6         3.7         4.3           86         1.7												4.42
78         0.8         4         10.0         10.0         3.5         3.5         2.5         1.0         4.5         8.16           77         1.7         4         10.0         10.0         5.3         5.3         2.5         10.0         5.8         3.37           77         0.1         4         10.0         10.0         3.5         3.5         2.5         10.0         4.5         4.5           78         0.5         4         10.0         10.0         3.5         3.5         2.5         10.0         4.5         13.30           81         2.2         4         10.0         10.0         0.9         0.9         2.5         10.0         1.8         13.4           82         2.2         4         10.0         10.0         3.8         3.8         2.5         1.0         1.8         13.4           83         2.0         4         10.0         10.0         3.6         3.6         2.5         1.0         4.6         8.5           81         1.4         10.0         10.0         2.6         5.5         2.5         1.0         4.5         2.4           91         2.2 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>10.40</td></td<>												10.40
75         1.7         4         10.0         10.0         4.5         2.5         1.0         6.3         2.52           78         0.5         4         10.0         10.0         3.3         3.3         2.5         1.0         4.3         13.47           79         0.5         4         10.0         10.0         3.5         3.5         2.5         1.0         4.5         13.10           81         2.2         4         10.0         10.0         0.3         0.3         2.5         1.0         1.8         13.47           82         2.2         4         10.0         10.0         0.8         0.8         2.5         1.0         1.8         14.34           83         2.0         4         10.0         10.0         3.6         3.6         2.5         1.0         4.8         2.0           84         2.5         4         10.0         10.0         5.6         2.5         1.0         4.6         8.55           87         1.7         4         10.0         10.0         2.2         2.5         1.0         5.4         3.4           90         1.9         4         10.0         10	73	0.8		10.0	10.0	3.5	3.5	25	1.0	4.5	8.16	13.75
77         0.1         4         10.0         10.0         3.3         3.3         2.5         1.0         4.3         13.4           79         0.5         4         10.0         10.0         3.3         2.5         1.0         4.5         13.10           81         2.2         4         10.0         10.0         0.9         2.5         1.0         1.3         13.51.4           83         2.0         4         10.0         10.0         0.8         0.8         2.5         1.0         1.8         14.3           84         2.5         4         10.0         10.0         3.8         3.8         2.5         1.0         4.8         2.40           85         0.7         4         10.0         10.0         5.6         5.5         5.5         1.0         6.6         3.76           86         1.1         4         10.0         10.0         2.7         7.2         5         1.0         5.4         3.14           90         1.9         4         10.0         10.0         3.1         3.1         2.5         1.0         4.1         3.7           91         1.0         4         10.0												7.11
78         0.5         4         10.0         10.0         3.3         3.3         2.5         1.0         4.3         13.47           81         2.2         4         10.0         10.0         0.9         0.9         25         1.0         1.9         11.59           82         2.2         4         10.0         10.0         0.8         0.8         25         1.0         1.8         14.34           83         2.0         4         10.0         10.0         3.8         2.5         1.0         4.8         1.44           84         2.5         4         10.0         10.0         3.6         3.6         2.5         1.0         4.8         2.00           85         1.7         4         10.0         10.0         5.5         5.5         1.0         6.5         2.33           91         2.2         4         10.0         10.0         2.2         2.5         1.0         3.7         4.34           93         0.8         4         10.0         10.0         3.1         3.1         2.5         1.0         4.1         7.39           94         0.1         4         10.0         10.												4.59 78.76
81         2.2         4         10.0         10.0         0.9         0.9         25         1.0         1.9         1159           82         2.2         4         10.0         10.0         0.8         0.8         25         1.0         1.8         13.3         35.14           84         2.5         4         10.0         10.0         3.8         3.8         2.5         1.0         4.8         1.44           84         2.5         4         10.0         10.0         3.6         3.6         2.5         1.0         4.6         8.55           86         1.1         4         10.0         10.0         5.5         5.5         2.5         1.0         6.6         7.76           87         1.7         4         10.0         10.0         2.7         2.7         2.5         1.0         3.7         4.36           91         2.2         4         10.0         10.0         3.1         3.1         2.5         1.0         4.1         7.39           91         0.1         4         10.0         10.0         3.6         3.6         2.5         1.0         4.1         7.39           92												22.39
82         2.2         4         10.0         10.0         0.3         0.3         25         1.0         1.3         35.14           83         2.0         4         10.0         10.0         3.8         0.8         2.5         1.0         1.8         14.34           84         2.5         4         10.0         10.0         3.6         3.6         2.5         1.0         4.6         8.85           85         0.7         4         10.0         10.0         5.5         5.5         2.5         1.0         6.6         3.76           87         1.7         4         10.0         10.0         4.4         4.4         2.5         1.0         5.4         2.13           90         1.9         4         10.0         10.0         2.7         2.7         2.5         1.0         3.7         4.36           91         2.2         4         10.0         10.0         3.1         3.1         2.5         1.0         4.1         7.39           92         1.0         4         10.0         10.0         3.6         3.6         2.5         1.0         4.6         7.94           94         0.												22.06
83         2.0         4         10.0         10.0         0.8         0.8         25         1.0         1.8         14.34           84         2.5         4         10.0         10.0         3.8         3.8         2.5         1.0         4.6         8.55           86         1.1         4         10.0         10.0         5.5         5.5         1.0         6.6         3.76           87         1.7         4         10.0         10.0         2.7         2.7         2.5         1.0         5.4         3.14           90         1.9         4         10.0         10.0         2.7         2.7         2.5         1.0         3.2         4.79           91         2.2         4         10.0         10.0         3.6         3.6         2.5         1.0         4.6         7.94           92         1.0         4         10.0         10.0         3.6         3.6         2.5         1.0         4.6         7.94           94         0.1         4         10.0         10.0         3.4         3.4         2.5         1.0         6.1 <b>7.84</b> 95         1.0         4												11.88
84         2.5         4         100         100         3.8         3.8         2.5         1.0         4.8         2.40           85         0.7         4         100         100         5.6         5.6         25         1.0         6.6         3.76           86         1.1         4         100         100         5.5         5.5         25         1.0         6.5         2.43           89         1.7         4         100         100         2.2         2.2         2.5         1.0         3.7         4.36           90         1.9         4         10.0         10.0         2.2         2.2         2.5         1.0         4.1         7.79           91         2.2         4         10.0         10.0         3.6         3.6         2.5         1.0         4.1         7.79           92         1.0         4         10.0         10.0         3.6         3.6         2.5         1.0         4.6         7.94           94         0.1         4         10.0         10.0         5.3         5.3         2.5         1.0         6.6         4.76           97         0.1												17.55 13.79
86         1.1         4         100         100         5.6         5.6         25         1.0         6.6         3.76           87         1.7         4         100         100         5.5         5.5         25         1.0         6.5         2.43           90         1.9         4         10.0         10.0         2.7         2.7         2.5         1.0         3.7         4.36           91         2.2         4         10.0         10.0         3.1         3.1         2.5         1.0         3.2         4.79           92         1.0         4         10.0         10.0         3.6         3.6         2.5         1.0         4.1         7.39           93         0.8         4         10.0         10.0         3.8         3.8         2.5         1.0         4.8         105.26           95         1.0         4         10.0         10.0         5.3         5.3         2.5         1.0         6.1 <b>7.843</b> 98         0.9         4         10.0         10.0         5.6         5.6         2.5         1.0         6.1 <b>4.61</b> 100         1												4.11
87         1.7         4         10.0         10.0         5.5         5.5         2.5         1.0         6.5         2.43           90         1.9         4         10.0         10.0         2.7         2.7         2.5         1.0         3.7         4.36           91         2.2         4         10.0         10.0         2.1         2.2         2.5         1.0         3.2         4.79           92         1.0         4         10.0         10.0         3.1         3.1         2.5         1.0         4.1         7.39           93         0.8         4         10.0         10.0         3.6         3.6         2.5         1.0         4.6         7.94           94         0.1         4         10.0         10.0         3.4         3.4         2.5         1.0         4.8         10.5.7           95         1.0         4         10.0         10.0         5.1         5.1         2.5         1.0         6.3         6.8           97         0.1         4         10.0         10.0         5.1         5.1         2.5         1.0         6.6         4.76           98         0.												14.49
89         1.7         4         10.0         10.0         4.4         4.4         25         1.0         5.4         3.14           90         1.9         4         10.0         10.0         2.7         2.7         2.5         1.0         3.7         4.36           91         2.2         4         10.0         3.0         2.7         2.5         1.0         3.7         4.36           92         1.0         4         10.0         10.0         3.6         3.6         2.5         1.0         4.1         7.39           93         0.8         4         10.0         10.0         3.8         3.8         2.5         1.0         4.4         6.74           95         1.0         4         10.0         10.0         5.3         5.3         2.5         1.0         6.6         4.76           97         0.1         4         10.0         10.0         5.6         5.5         1.0         6.6         4.76           99         1.0         4         10.0         10.0         4.9         4.9         2.5         1.0         6.1         4.61           100         1.0         4.0         10.0												6.91 4.44
90         1.9         4         10.0         10.0         2.7         2.7         2.5         1.0         3.7         4.36           91         2.2         4         10.0         10.0         2.2         2.2         2.5         1.0         3.2         4.79           92         1.0         4         10.0         10.0         3.1         3.1         2.5         1.0         4.1         7.39           93         0.8         4         10.0         10.0         3.6         3.6         2.5         1.0         4.4         10.526           94         0.1         4         10.0         10.0         3.4         3.4         2.5         1.0         4.4         6.74           96         0.6         4         10.0         10.0         5.1         5.1         2.5         1.0         6.1         78.43           97         0.1         4         10.0         10.0         5.1         5.1         2.5         1.0         6.6         4.76           99         1.0         4         10.0         10.0         5.8         5.8         2.5         1.0         6.1         4.461           101 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>4.44</td></t<>												4.44
92         1.0         4         10.0         10.0         3.1         3.1         2.5         1.0         4.1         7.39           93         0.8         4         10.0         10.0         3.6         3.6         2.5         1.0         4.6         7.94           94         0.1         4         10.0         10.0         3.8         3.8         2.5         1.0         4.4         10.5.6           95         1.0         4         10.0         10.0         5.3         5.3         2.5         1.0         4.4         6.74           96         0.6         4         10.0         10.0         5.6         5.6         2.5         1.0         6.1 <b>7.8.3</b> 98         0.9         4         10.0         10.0         5.1         5.1         2.5         1.0         6.6         4.76           99         1.0         4         10.0         10.0         5.1         5.1         2.5         1.0         6.6         3.83           100         1.0         4.4         4.8         2.5         1.0         5.8         2.82           105         0.7         4         10.0								25		3.7		6.89
93         0.8         4         10.0         10.0         3.6         3.6         25         1.0         4.6         7.94           94         0.1         4         10.0         10.0         3.8         3.8         25         1.0         4.8         105.26           95         1.0         4         10.0         10.0         5.3         5.3         25         1.0         6.3         6.86           97         0.1         4         10.0         10.0         5.1         5.1         25         1.0         6.5         4.76           99         1.0         4         10.0         10.0         5.1         5.1         25         1.0         6.5         4.61           100         1.0         4         10.0         10.0         4.9         4.9         25         1.0         5.8         9.26           103         0.5         4         10.0         10.0         4.8         4.8         25         1.0         5.8         9.26           105         0.7         4         10.0         10.0         4.7         4.7         25         1.0         5.3         9.26           106         2.0 </td <td></td> <td>7.13</td>												7.13
94         0.1         4         10.0         10.0         3.8         3.8         25         1.0         4.8         105.26           95         1.0         4         10.0         10.0         3.4         3.4         25         1.0         4.4         6.74           96         0.6         4         10.0         10.0         5.3         5.3         25         1.0         6.3         6.86           97         0.1         4         10.0         10.0         5.6         5.6         25         1.0         6.1 <b>78.3</b> 98         0.9         4         10.0         10.0         5.6         5.6         25         1.0         6.1 <b>4.61</b> 100         1.0         4         10.0         10.0         5.8         5.8         25         1.0         6.8         3.83           103         0.5         4         10.0         10.0         5.2         2.2         1.0         5.7         2.44           107         2.0         4         10.0         10.0         3.7         3.7         2.5         1.0         4.7         3.10           110         2.0 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>12.11 13.45</td></th<>												12.11 13.45
96         0.6         4         10.0         10.0         5.3         5.3         25         1.0         6.3         6.86           97         0.1         4         10.0         10.0         5.1         5.1         25         1.0         6.1         78.43           98         0.9         4         10.0         10.0         5.6         25         1.0         6.6         4.76           99         1.0         4         10.0         10.0         4.9         25         1.0         6.6         4.76           100         1.0         4         10.0         10.0         4.9         25         1.0         6.8         3.83           103         0.5         4         10.0         10.0         5.2         2.5         1.0         6.2         5.92           106         2.0         4         10.0         10.0         4.4         4.4         25         1.0         5.4         2.61           109         2.0         4         10.0         10.0         3.7         3.7         2.5         1.0         4.8         3.02           111         2.0         4         10.0         10.0         3.8												180.48
97         0.1         4         10.0         10.0         5.1         5.1         25         1.0         6.1         78.43           98         0.9         4         10.0         10.0         5.6         5.6         25         1.0         6.6         4.76           99         1.0         4         10.0         10.0         4.9         4.9         25         1.0         5.9         4.68           100         1.0         4         10.0         10.0         4.8         4.8         25         1.0         6.8         3.83           103         0.5         4         10.0         10.0         5.2         5.2         25         1.0         6.2         5.92           105         0.7         4         10.0         10.0         4.7         4.7         25         1.0         6.2         5.92           106         2.0         4         10.0         10.0         3.7         3.7         25         1.0         6.4         3.0           110         2.0         4         10.0         10.0         3.8         3.8         25         1.0         1.1         1.0           111         2.0 <td></td> <td>11.28</td>												11.28
980.9410.010.05.65.6251.06.64.76991.0410.010.05.15.1251.06.14.611001.0410.010.04.94.9251.06.83.831030.5410.010.04.84.8251.06.83.831030.5410.010.04.84.8251.06.25.921062.0410.010.04.74.7251.05.72.441072.0410.010.03.73.7251.04.73.101102.0410.010.03.83.8251.04.83.021112.0410.010.00.30.3251.01.110.401123.0410.010.00.10.1251.01.11.11133.0410.010.00.40.4251.01.11.11160.6410.010.00.10.1251.01.11400.041170.3410.010.00.40.4251.01.1166.071181.4410.010.00.40.4251.01.1166.011191.0410.010.0												12.50
$\begin{array}{c c c c c c c c c c c c c c c c c c c $												142.02 8.75
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$												8.36
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		1.0					4.9					8.41
105         0.7         4         10.0         10.0         5.2         5.2         25         1.0         6.2         5.92           106         2.0         4         10.0         10.0         4.7         4.7         25         1.0         5.7         2.44           109         2.0         4         10.0         10.0         4.4         4.4         25         1.0         5.7         2.44           109         2.0         4         10.0         10.0         3.7         3.7         25         1.0         4.7         3.10           110         2.0         4         10.0         10.0         3.8         3.8         25         1.0         4.8         3.02           111         2.0         4         10.0         10.0         0.3         0.3         25         1.0         1.1         3.0         4         10.0         10.0         1.1         1.1         76.53           115         0.5         4         10.0         10.0         0.1         0.1         25         1.0         1.1         111.12           116         0.6         4         10.0         10.0         0.1         0.1         <												7.08
106         2.0         4         10.0         10.0         4.7         4.7         25         1.0         5.7         2.44           107         2.0         4         10.0         10.0         4.4         4.4         25         1.0         5.4         2.61           109         2.0         4         10.0         10.0         3.7         3.7         25         1.0         4.7         3.10           110         2.0         4         10.0         10.0         3.8         3.8         25         1.0         4.8         3.02           111         2.0         4         10.0         10.0         1.1         1.1         25         1.0         4.8         3.02           1112         3.0         4         10.0         10.0         0.3         0.3         25         1.0         1.1         76.53           1113         3.0         4         10.0         10.0         0.1         0.1         25         1.0         1.1         40.04           117         0.3         4         10.0         10.0         0.1         0.1         25         1.0         1.1         166.67           118												16.60
109         2.0         4         10.0         10.0         3.7         3.7         2.5         1.0         4.7         3.10           110         2.0         4         10.0         10.0         3.8         3.8         25         1.0         4.8         3.02           111         2.0         4         10.0         10.0         1.1         1.1         2.5         1.0         2.1         10.040           112         3.0         4         10.0         10.0         0.3         0.3         25         1.0         1.3         25.51           113         3.0         4         10.0         10.0         0.1         0.1         25         1.0         1.1         76.53           115         0.5         4         10.0         10.0         0.1         0.1         25         1.0         1.1         111.12           16         0.6         4         10.0         10.0         0.1         0.1         25         1.0         1.1         140.0.0           117         0.3         4         10.0         10.0         2.0         2.5         1.0         3.0         11.1           120         0.7	106	2.0	4	10.0	10.0	4.7	4.7	25	1.0	5.7	2.44	4.35
110         2.0         4         10.0         10.0         3.8         3.8         2.5         1.0         4.8         3.02           111         2.0         4         10.0         10.0         1.1         1.1         2.5         1.0         2.1         10.40           112         3.0         4         10.0         10.0         0.3         0.3         2.5         1.0         1.3         25.51           113         3.0         4         10.0         10.0         0.1         0.1         2.5         1.0         1.1         76.53           115         0.5         4         10.0         10.0         0.4         0.4         2.5         1.0         1.1         400.04           117         0.3         4         10.0         10.0         0.1         0.1         2.5         1.0         1.1         406.67           118         1.4         4         10.0         10.0         0.1         0.1         2.5         1.0         1.1         166.67           119         1.0         4         10.0         10.0         3.4         3.4         2.5         1.0         4.7         36.04           121 </td <td></td> <td>4.60</td>												4.60
111         2.0         4         10.0         10.0         1.1         1.1         2.5         1.0         2.1         10.40           112         3.0         4         10.0         10.0         0.3         0.3         25         1.0         1.3         25.51           113         3.0         4         10.0         10.0         0.1         0.1         25         1.0         1.1         76.53           115         0.5         4         10.0         10.0         0.4         0.4         25         1.0         1.4         111.12           116         0.6         4         10.0         10.0         0.1         0.1         25         1.0         1.4         400.04           117         0.3         4         10.0         10.0         0.1         0.1         25         1.0         1.1         400.04           119         1.0         4         10.0         10.0         2.0         2.0         25         1.0         3.0         11.11           120         0.7         4         10.0         10.0         3.7         3.7         25         1.0         4.4         9.05           121												5.28 5.17
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$												11.79
115         0.5         4         10.0         10.0         0.4         0.4         25         1.0         1.4         111.12           116         0.6         4         10.0         10.0         0.1         0.1         25         1.0         1.1         400.04           117         0.3         4         10.0         10.0         0.1         0.1         25         1.0         1.1         400.04           117         0.3         4         10.0         10.0         0.1         0.1         25         1.0         1.1         400.04           118         1.4         4         10.0         10.0         0.1         0.1         25         1.0         1.1         166.00           119         1.0         4         10.0         10.0         2.0         2.5         1.0         3.0         11.11           120         0.7         4         10.0         10.0         3.7         3.7         25         1.0         4.4         9.05           121         0.2         4         10.0         10.0         6.2         6.2         25         1.0         7.2         2.18           WS13         0.5		3.0		10.0	10.0		0.3	25		1.3		12.73
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$												15.05 68.76
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$												68.76
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	117		4	10.0	10.0	0.4	0.4	25	1.0	1.4	166.67	103.13
120         0.7         4         10.0         10.0         3.4         3.4         25         1.0         4.4         9.05           121         0.2         4         10.0         10.0         3.7         3.7         25         1.0         4.4         9.05           121         0.2         4         10.0         10.0         3.7         3.7         25         1.0         4.4         9.05           HES 2016 PEAT DEPTH DAT           HES 2016 PEAT DEPTH DAT           WS-11         1.7         4         10.0         10.0         6.2         6.2         25         1.0         7.2         2.18           WS13         0.5         4         10.0         10.0         7.5         7.5         25         1.0         7.0         66.89           WS09         0.1         4         10.0         10.0         0.8         0.8         25         1.0         7.0         66.89           WS08         0.5         4         10.0         10.0         4.0         4.0         25         1.0         1.8         62.50           WS07         0.4         4         10.0         10.0         4.2												31.51
121         0.2         4         10.0         10.0         3.7         3.7         25         1.0         4.7         36.04           HES 2016 PEAT DEPTH DATA           WS-11         1.7         4         10.0         10.0         6.2         6.2         25         1.0         4.7         36.04           WS-11         1.7         4         10.0         10.0         6.2         6.2         25         1.0         7.2         2.18           WS13         0.5         4         10.0         10.0         7.5         7.5         25         1.0         7.2         2.18           WS09         0.1         4         10.0         10.0         6.0         6.0         25         1.0         7.2         66.89           WS08         0.5         4         10.0         10.0         0.8         0.8         25         1.0         1.8         62.50           WS07         0.4         4         10.0         10.0         4.2         4.2         25         1.0         5.0         14.39           WS02         0.3         4         10.0         10.0         5.4         5.4         25         1.0 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>16.05 15.15</td></t<>												16.05 15.15
HES 2016 PEAT DEPTH DATA           WS-11         1.7         4         10.0         10.0         6.2         6.2         25         1.0         7.2         2.18           WS13         0.5         4         10.0         10.0         7.5         7.5         25         1.0         8.5         5.94           WS09         0.1         4         10.0         10.0         6.0         6.0         25         1.0         7.0         66.89           WS08         0.5         4         10.0         10.0         0.8         0.8         25         1.0         1.8         62.50           WS07         0.4         4         10.0         10.0         4.0         4.0         25         1.0         5.0         14.39           WS02         0.3         4         10.0         10.0         4.2         4.2         25         1.0         5.2         19.05           WS01         0.3         4         10.0         10.0         5.4         5.4         25         1.0         6.4         14.28           WS03         2.6         4         10.0         10.0         5.6         25         1.0         6.6 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>61.44</td></t<>												61.44
WS13         0.5         4         10.0         10.0         7.5         7.5         25         1.0         8.5         5.94           WS09         0.1         4         10.0         10.0         6.0         6.0         25         1.0         7.0         66.89           WS08         0.5         4         10.0         10.0         0.8         0.8         25         1.0         1.8         62.50           WS07         0.4         4         10.0         10.0         4.0         4.0         25         1.0         1.8         62.50           WS07         0.4         4         10.0         10.0         4.0         4.0         25         1.0         5.0         14.39           WS02         0.3         4         10.0         10.0         4.2         4.2         25         1.0         5.2         19.05           WS01         0.3         4         10.0         10.0         5.4         5.4         25         1.0         6.4         14.28           WS03         2.6         4         10.0         10.0         5.6         5.6         25         1.0         6.6         1.59           WS101 <td></td> <td></td> <td></td> <td></td> <td></td> <td>HES 2</td> <td>2016 PEAT DEPT</td> <td>'H DATA</td> <td></td> <td></td> <td></td> <td></td>						HES 2	2016 PEAT DEPT	'H DATA				
WS09         0.1         4         10.0         10.0         6.0         6.0         25         1.0         7.0         66.89           WS08         0.5         4         10.0         10.0         0.8         0.8         25         1.0         1.8         62.50           WS07         0.4         4         10.0         10.0         4.0         4.0         25         1.0         5.0         14.39           WS02         0.3         4         10.0         10.0         4.2         4.2         25         1.0         5.0         14.39           WS01         0.3         4         10.0         10.0         5.4         5.4         25         1.0         6.4         14.28           WS03         2.6         4         10.0         10.0         6.2         6.2         25         1.0         6.4         14.28           WS103         2.6         4         10.0         10.0         5.6         5.6         25         1.0         6.6         1.59           WS100         2.6         4         10.0         10.0         5.6         5.6         25         1.0         6.6         1.59           WS101 </td <td></td> <td>4.06</td>												4.06
WS08         0.5         4         10.0         10.0         0.8         0.8         25         1.0         1.8         62.50           WS07         0.4         4         10.0         10.0         4.0         4.0         25         1.0         1.8         62.50           WS07         0.4         4         10.0         10.0         4.0         4.0         25         1.0         5.0         14.39           WS02         0.3         4         10.0         10.0         4.2         4.2         25         1.0         5.2         19.05           WS01         0.3         4         10.0         10.0         5.4         5.4         25         1.0         6.4         14.28           WS03         2.6         4         10.0         10.0         6.2         6.2         25         1.0         6.4         14.28           WS100         2.6         4         10.0         10.0         5.6         5.6         25         1.0         6.6         1.59           WS101         1.7         4         10.0         10.0         5.4         5.4         25         1.0         6.4         2.56												11.35 124.11
WS07         0.4         4         10.0         10.0         4.0         4.0         25         1.0         5.0         14.39           WS02         0.3         4         10.0         10.0         4.2         4.2         25         1.0         5.2         19.05           WS01         0.3         4         10.0         10.0         5.4         5.4         25         1.0         6.4         14.28           WS03         2.6         4         10.0         10.0         6.2         6.2         25         1.0         6.4         14.28           WS100         2.6         4         10.0         10.0         5.6         5.6         25         1.0         6.6         1.59           WS101         1.7         4         10.0         10.0         5.4         5.4         25         1.0         6.6         1.59												60.16
WS01         0.3         4         10.0         10.0         5.4         5.4         25         1.0         6.4         14.28           WS03         2.6         4         10.0         10.0         6.2         6.2         25         1.0         7.2         1.42           WS100         2.6         4         10.0         10.0         5.6         5.6         25         1.0         6.6         1.59           WS101         1.7         4         10.0         10.0         5.4         5.4         25         1.0         6.4         2.56	WS07	0.4		10.0		4.0	4.0	25		5.0	14.39	24.90
WS03         2.6         4         10.0         10.0         6.2         6.2         25         1.0         7.2         1.42           WS100         2.6         4         10.0         10.0         5.6         5.6         25         1.0         6.6         1.59           WS101         1.7         4         10.0         10.0         5.4         5.4         25         1.0         6.4         2.56												33.32
WS100         2.6         4         10.0         10.0         5.6         5.6         25         1.0         6.6         1.59           WS101         1.7         4         10.0         10.0         5.4         5.4         25         1.0         6.4         2.56												26.06 2.65
WS101 1.7 4 10.0 10.0 5.4 5.4 25 1.0 6.4 <b>2.56</b>												2.03
	WS101	1.7	4	10.0	10.0	5.4	5.4	25	1.0	6.4	2.56	4.67
	WS1-C	0.7	4	10.0	10.0	0.9	0.9	25	1.0	1.9	34.19	35.08
TP1-C         0.7         4         10.0         10.0         2.7         2.7         25         1.0         3.7         11.40           TP2-C         0.9         4         10.0         10.0         0.7         0.7         25         1.0         1.7         41.03												18.01 35.01

		Calcul	ated FoS o	f Natural	Peat Slo	pes for C	coole W	ind Farm	(Drained An	alysis)	
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	Surcharge Equivalent Placed Fill	Equivalent Total Depth of Peat (m)	Factor of Safety f	for Load Condition
	α (deg)	c' (kPa)	γ (kN/m³)	γ <sub>w</sub> (kN/m³)	(m)	(m)	ø' (deg)	Condition (2)	Condition (2)	Condition (1)	Condition (2)
										100% Water	100% Water
69	0.1	4	10.0	10.0	3.1	3.1	25	1.0	4.1	130.72	213.38
70	0.1	4	10.0	10.0	3.4	3.4	25	1.0	4.4	116.96	196.00
71	1.1	4	10.0	10.0	4.8	4.8	25	1.0	5.8	4.40	7.88
72 73	0.2	4	10.0 10.0	10.0	5.5 4.6	5.5 4.6	25 25	1.0 1.0	6.5 5.6	18.05 28.74	33.12 51.20
73	0.2	4	10.0	10.0	5.7	5.7	25	1.0	6.7	10.05	18.52
75	0.4	4	10.0	10.0	6.0	6.0	25	1.0	7.0	9.59	17.78
76	1.5	4	10.0	10.0	4.0	4.0	25	1.0	5.0	3.71	6.42
77	1.0	4	10.0	10.0	3.4	3.4	25	1.0	4.4	6.46	10.84
78	0.1	4	10.0	10.0	1.7	1.7	25	1.0	2.7	114.94	158.09
79 80	0.2	4	10.0 10.0	10.0	5.5 6.6	5.5 6.6	25 25	1.0 1.0	6.5 7.6	24.42 17.39	44.70 32.70
81	1.4	4	10.0	10.0	7.1	7.1	25	1.0	8.1	2.32	4.40
82	1.4	4	10.0	10.0	5.8	5.8	25	1.0	6.8	2.77	5.11
83	1.4	4	10.0	10.0	7.8	7.8	25	1.0	8.8	2.10	4.03
84	0.7	4	10.0	10.0	6.8	6.8	25	1.0	7.8	4.53	8.54
85	2.9	4	10.0	10.0	0.7	0.7	25	1.0	1.7	11.74	10.18
86 87	1.8 0.1	4	10.0 10.0	10.0	2.9 5.4	2.9 5.4	25 25	1.0 1.0	3.9 6.4	4.38 37.04	7.02 67.68
88	0.4	4	10.0	10.0	5.5	5.5	25	1.0	6.5	10.33	18.95
89	0.1	4	10.0	10.0	4.6	4.6	25	1.0	5.6	86.58	154.15
90	0.1	4	10.0	10.0	4.0	4.0	25	1.0	5.0	100.00	173.26
91	0.5	4	10.0	10.0	6.1	6.1	25	1.0	7.1	8.22	15.30
92	2.6	4	10.0	10.0	5.1	5.1	25	1.0	6.1	1.73	3.12
93 94	2.6	4	10.0 10.0	10.0	4.9 4.3	4.9 4.3	25 25	1.0	5.9 5.3	<u>1.79</u> 5.45	3.23 9.58
95	1.0	4	10.0	10.0	4.3	4.3	25	1.0	5.3	3.35	5.87
96	1.6	4	10.0	10.0	3.8	3.8	25	1.0	4.8	3.75	6.44
97	0.7	4	10.0	10.0	4.2	4.2	25	1.0	5.2	7.40	12.92
98	1.7	4	10.0	10.0	4.8	4.8	25	1.0	5.8	2.90	5.19
99	0.5	4	10.0	10.0	5.0	5.0	25	1.0	6.0	10.00	18.05
100 101	0.1	4	10.0 10.0	10.0	2.7 6.3	2.7	25 25	1.0	3.7 7.3	148.70 4.57	234.77 8.54
101	0.8	4	10.0	10.0	6.4	6.4	25	1.0	7.3	4.57	8.54
102	0.8	4	10.0	10.0		2017 Access Ro			7.4	4.40	8.30
1	2.0						at recorded a				
2	2.0					No Pe	at recorded a	t location			
3	2.0						at recorded a				
4	1.0						at recorded a				
5	1.0						at recorded a at recorded a				
7	2.0						at recorded a				
8	3.0						at recorded a				
9	1.0	4	10.0	10.0	0.7	0.7	25	1.0	1.7	32.75	29.20
10	2.0	4	10.0	10.0	1.5	1.5	25	1.0	2.5	7.65	9.93
11	1.5	4	10.0	10.0	2.5	2.5	25	1.0	3.5	6.11	9.46
12 13	1.0 0.5	4	10.0 10.0	10.0	1.5 1.5	1.5 1.5	25 25	1.0 1.0	2.5 2.5	15.28 30.56	19.86 39.71
13	1.0	4	10.0	10.0	1.5	1.5	25	1.0	2.5	12.73	17.73
15	1.0	4	10.0	10.0	1.5	1.5	25	1.0	2.5	15.28	19.86
16	0.5	4	10.0	10.0	0.7	0.7	25	1.0	1.7	65.48	58.40
17	1.0	4	10.0	10.0	1.4	1.4	25	1.0	2.4	16.37	20.68
18	0.5	4	10.0	10.0	2.5	2.5	25	1.0	3.5	18.34	28.36
19	0.5	4	10.0	10.0	2.1	2.1	25	1.0	3.1	21.83	32.02
20 21	1.0	4	10.0 10.0	10.0	1.8 2.8	1.8 2.8	25 25	1.0 1.0	2.8 3.8	12.73 8.19	17.73 13.06
21	0.5	4	10.0	10.0	2.8	2.8	25	1.0	3.8	19.93	30.08
23	1.0	4	10.0	10.0	2.0	2.0	25	1.0	3.0	11.46	16.55
24	2.0	4	10.0	10.0	2.0	2.0	25	1.0	3.0	5.73	8.27
25	2.0	4	10.0	10.0	2.0	2.0	25	1.0	3.0	5.73	8.27

Minimum =	1.20	2.14
Maximum =	400.04	376.66
Average =	28.73	31.95

#### Notes:

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 (β) based on site readings and contour survey plans of site.
 (4) FoS is based on slope inclination and shear test results obtained from published data.
 (5) Peat depths based on probes carried out by AGEC & HES.
 (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.



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# **APPENDIX D**

Methodology for Peat Stability Risk Assessment



#### Methodology for Peat Stability Risk Assessment

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

The main approaches for assessing peat stability include the following:

- (a) Geomorphological
- (b) Qualitative (judgement)
- (c) Index/Probabilistic (probability)
- (d) Deterministic (factor of safety)

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

### Probability

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

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

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

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

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

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

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

Table B:	Probability Scale
----------	-------------------

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

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

### Impact

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

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

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

Table C:	Impact Scale
----------	--------------

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

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

#### **Risk Rating**

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

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

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

**Qualitative Risk Rating** 

	Probability										
		1	2	3	4	5					
	5	5	10	15	20	25					
Impact	4	4	8	12	16	20					
<u>E</u>	3	3	6	9	12	15					
	2	2	4 6 8		8	10					
	1	1	2	3	4	5					

Tab		
тао	ел	

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

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

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



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# **APPENDIX E**

Ground Investigation – Trial Pit & Window Sample Logs



			TRI	al pit l	.0G			TRIAL PIT NUMBER: BP-TP1
HYDRO-ENVIRONMENTAL SERVICES	PROJECT NUMBER: P13 SITE: Clonsura, Co. We CLIENT: Element Powe	estmeat	'n	I	LOGGE	D BY: M.	4/12/2016 Gill Paul Etherson	EASTING: 241953 NORTHING: 274535 ELEVATION: 84.50mOD
Comments	Sample Number	Sample Type	Water Strikes	Elevation	Meters Below Ground Surface	Lithology	Form	ation Description
No Water				84.50	- 0		Soft, brown tops CLAY (glacial till) <b>WEATHERED BE</b> Dry, dark grey, c	<b>DROCK</b> layey, sandy, angular obles of weathered
No water enco	untered BP-TP1-S	В		83.30	-		BEDROCK Strong, solid lime EOH 1.3mbgl Total	stone Depth of Trial Pit
REMARKS: Bulk rock sample tal LEGEND V - Water strike	ken at 1.3mbgl					<u> </u>		PIT LENGTH: 2.5m PIT BREADTH: 1.4m FINAL DEPTH: 1.3m EXCAVATOR: 12 tonne
D - Disturbed sample B - Bulk disturbed sample W - Water sample V - Vane test T - No. of threads R - Average length of ribbo Dil - Dilatancy recorded ND - No dilatancy recorde	d	oh 5						PAGE 1 of 1 SCALE nfo@hydroenvironmental.ie

				TRL	al pit l	OG			TRIAL PIT NUMBER: BP-TP2	
HYDRO-ENVIRONMENTAL SERVICES	PROJECT NU SITE: Clonsu CLIENT: Elen	ra, Co. Wes	stmeath	٦		LOGGE	D BY: M.	4/12/2016 Gill Paul Etherson	EASTING: 241969 NORTHING: 274417 ELEVATION: 97.2mOD	
Comments		Sample Number	Sample Type	Water Strikes	Elevation	Meters Below Ground Surface	Lithology	Forma	ation Description	
					97.20	0-	222 222 222	Gri TOPSOIL	ound Surface	
					97.10	-		Brown, sandy, gra	avelly CLAY	
No Water No Water						-		WEATHERED BEDROCK Dark, grey, clayey, sandy, angular GRAVE and COBBLES of weathered Limestone Bedrock		
					95.45	2-		\1.75mbgl	solid limestone bedrock at / Depth of Trial Pit	
REMARKS:			<u> </u>		1	<u> </u>		I	PIT LENGTH: 2.6m PIT BREADTH: 1.4m FINAL DEPTH: 1.75m EXCAVATOR: 12 tonne	
LEGEND ∇ - Water strike D - Disturbed sample B - Bulk disturbed sample W - Water sample V - Vane test T - No. of threads									PAGE 1 of 1	
R - Average length of ribbor Dil - Dilatancy recorded ND - No dilatancy recorded									SCALE	

				TRI	al pit l	OG			TRIAL PIT NUMBER: BP-TP3
HYDRO-ENVIRONMENTAL SERVICES	PROJECT NU SITE: Clonsu CLIENT: Eler	ra, Co. Wes	stmeath	٦		LOGGE	D BY: M.	4/12/2016 Gill Paul Etherson	EASTING: 242040 NORTHING: 274357 ELEVATION: 105.0mOD
Comments		Sample Number	Sample Type	Water Strikes	Elevation	Meters Below Ground Surface	Lithology	Forn	nation Description
No Water					105.00 104.70 104.60			TOPSOIL/SUBS Orange/brown WEATHERED B Dark grey, sanc COBBLES of we	, slight gravelly CLAY
REMARKS:									PIT LENGTH: 1.9m PIT BREADTH: 1.4m FINAL DEPTH: 0.4m
LEGEND ∇ - Water strike D - Disturbed sample B - Bulk disturbed sample W - Water sample V - Vane test									PAGE 1 of 1
T - No. of threads R - Average length of ribbo Dil - Dilatancy recorded ND - No dilatancy recorde									SCALE

				TRI	al pit l	.0G			TRIAL PIT NUMBER: BP-TP4
HYDRO-ENVIRONMENTAL SERVICES	SITE: Clonsu	UMBER: P132 ura, Co. Wes ment Power	stmeatl	n		DATE STARTED: 14/12/2016 LOGGED BY: M. Gill CONTRACTOR: Paul Etherson			EASTING: 242000 NORTHING: 274262 ELEVATION: 114.1mOD
Comments		Sample Number	Sample Type	Water Strikes	Elevation	Meters Below Ground Surface	Lithology	Form	nation Description
No Wate	ſ				<u>114.10</u> <u>113.80</u> <u>112.70</u> <u>112.60</u>	- 0-		TOPSOIL Brown, sandy, g GLACIAL TILL Orange/brown, Urange/brown, WEATHERED BI Large angular b weathere Limes clay matrix EOH 1.5mbgl Refusal on strong	slighty gravelly CLAY
REMARKS:		<u> </u>			1	1	<u> </u>		PIT LENGTH: 2.3m PIT BREADTH: 1.4m FINAL DEPTH: 1.5m EXCAVATOR: 12 tonne
LEGEND ∇ - Water strike D - Disturbed sample B - Bulk disturbed sample W - Water sample V - Vane test T - No. of threads	2								PAGE 1 of 1
R - Average length of rib Dil - Dilatancy recorded ND - No dilatancy record	ded								SCALE info@hydroenvironmental.ie

				TRI	al pit l	OG			TRIAL PIT NUMBER: BP-TP5
HYDRO-ENVIRONMENTAL SERVICES	PROJECT NU SITE: Clonsu CLIENT: Eler			ו	1	LOGGE	D BY: M.	4/12/2016 Gill Paul Etherson	EASTING: 241921 NORTHING: 274347 ELEVATION: 105.9mOD
Comments		Sample Number	Sample Type	Water Strikes	Elevation	Meters Below Ground Surface	Lithology	Forma	ation Description
					105.90	0-		Gr <b>TOPSOIL</b> Brown, sandy, gra	ound Surface avelly CLAY
No Water					105.50	-		GLACIAL TILL Orange/brown, (	gravelly CLAY
No Water					104.80	1		WEATHERED BE Dark grey, sandy cobbles of limest	, clayey, gravels and
		Bulk Sample BP-TP5-S1 at 1.8mbgl			104.00	2-		WEATHERED BE Cobbles and bo matrix (angular)	DROCK ulders of limestone in clay
					103.50	-		\2.4mbgl	trong Limestone Bedrock at Depth of Trial Pit
REMARKS:						3-			PIT LENGTH: 2.6m PIT BREADTH: 1.4m FINAL DEPTH: 2.4m
LEGEND ∇ - Water strike D - Disturbed sample B - Bulk disturbed sample W - Water sample V - Vane test L - No. of threads									PAGE 1 of 1
T - No. of threads R - Average length of ribbo Dil - Dilatancy recorded ND - No dilatancy recorde									

				TRI	al pit l	OG			TRIAL PIT NUMBER: BP-TP6
HYDRO-ENVIRONMENTAL SERVICES	PROJECT NI SITE: Clonsu CLIENT: Eler	ıra, Co. Wes	stmeatl	ſ		LOGGE	D BY: M.	4/12/2016 Gill Paul Etherson	EASTING: 241862 NORTHING: 274379 ELEVATION: 100.5mOD
Comments		Sample Number	Sample Type	Water Strikes	Elevation	Meters Below Ground Surface	Lithology	Form	ation Description
No Wate	r				100.50			TOPSOIL Brown, sandy, gr WEATHERED BE Weathered angu Weathered angu	EDROCK ular Limestone bedrock
<b>REMARKS</b> : Trial pit in field that	slopes steeply	to west		L	1		<u> </u>		PIT LENGTH: 1.8m PIT BREADTH: 1.4m FINAL DEPTH: 0.35m EXCAVATOR: 12 tonne
IEGEND       ∇ - Water strike       D - Disturbed sample       B - Bulk disturbed sample       W - Water sample       V - Vane test       I - No. of threads									PAGE 1 of 1
R - Average length of rib Dil - Dilatancy recorded ND - No dilatancy record	ded		Streat D			utord Tal. 0	50 44100	ov. 050 44044 5-011	SCALE



				TRI	al pit l	OG			TRIAL PIT NUMBER: TP2-C
	PROJECT NU	JMBER: P132	20-0			DATE ST	ARTED: 1	3/12/2016	EASTING: 239994
	SITE: Coole			th			D BY: M.		<b>NORTHING:</b> 274552
	CLIENT: Eler					CONTR	Actor:	Paul Etherson	ELEVATION: ~70mOD
IYDRO-ENVIRONMENTAL SERVICES									
Comments		Sample Number	Sample Type	Water Strikes	Elevation	Meters Below Ground Surface	Lithology	Form	ation Description
					70.00	0-	*******	G	round Surface
								(Heather and se Soft, wet, brown	dge) woody PEAT (H4/H5)
Small seepage fro //Mineral Soil	m peat to Till			Ţ	69.45	-		WEATHERED BE	DROCK
Could not dig pas -large cobbles and	t 0.65mbgl v. stiff ground				69.35		5 05 05 05 0 05 05 05	Lange angalar e	obbles of rock surrounded dy silt and smaller angular
								Total	Depth of Trial Pit
						1—			
						-			
						2-			
REMARKS:									PIT LENGTH: 2.8m
Solid ground - Shall	ow peat to So	uth of prop	osed c	ompour	nd site				PIT BREADTH: 1.6m
									FINAL DEPTH: 0.65m
EGEND									EXCAVATOR:
<ul> <li>7 - Water strike</li> <li>0 - Disturbed sample</li> <li>3 - Bulk disturbed sample</li> <li>Water sample</li> <li>V - Vane test</li> <li>No. of threads</li> </ul>									PAGE 1 of 1
<ul> <li>No. of threads</li> <li>Average length of ribbo</li> <li>Dilatancy recorded</li> <li>No dilatancy recorded</li> </ul>									SCALE

		WIN	DOW	SAM	ple l	OG		L	og Number: WS1-C
	PROJECT	NUMBER: P1320-0	DA	te sta	RTED:	13/12/2	016	E	ASTING: 240025
	SITE: Coc	le WF, Co. Westmeath	LO	GGED	BY: M	. Gill		Ν	IORTHING: 274562
HYDRO-ENVIRONMENTAL SERVICES	CLIENT: E	lement Power	со	NTRAG	CTOR:	HES		E	LEVATION: ~70 mOD
Well Completion D	escription	Comments		Water Strikes	Elevation	Meters Below Ground Surface	gy	Fc	ormation Description
	<b>−</b> G/L				70.00	0-	<u>an an an an an an an</u> a		Ground Surface
- 0.8 C1-PH1				.95mbgl <sup>−</sup>	<u>69.10</u>			Grey, c	ark brown, woody PEAT ) coarse angular GRAVEL
				0.95		-	200 200 200 200 200 200 200 200 200 200 200 200		U U
					68.77		00,00,00, 20,00,00,00,00,00,00,00,000,00		
C1-	Ψ1					_		10	tal Depth of Borehole
REMARKS	10					1	1		PAGE 1 of 1
C1-PH1 - upstand Drilled at compound	nd site.							_	-
0.72 mbTOC	/2010 - CT-P	H1 - 0.28 mbTOC, C1-P1 -							SCALE
HYDRO-ENVIRONMEN	TAL SERVICES	22 Lower Main Street Dungarvan Co. Wa	terford T	el: 058	44122	Fax: 058	-44244 Er	mail: info@	hydroenvironmental.ie



		W	INDOW SAM	PLE L	OG		LOG NUMBER: WS02	
	PROJECT	NUMBER: P1320-0	DATE STA	RTED:	15/12/2	016	EASTING: 241426 NORTHING: 277287	
	SITE: Coo	le WF, Co. Westmeath	LOGGED	BY: M	. Gill			
DRO-ENVIRONMENTAL SERVICES	CLIENT: EI	ement Power	CONTRA	CTOR:	HES		ELEVATION: 62.0mOD	
Well Completion De	escription	Comments	Water Strikes	no	Meters Below Ground Surface	Lithology	Formation Description	
P1 3.0 4.0	— 19mm PH1 1.0	Couple WS02		<u>62.00</u> 57.80	-		Ground Surface Soft/firm, wet, dark brown, fibrous to woody PEAT Creamy, soft calcareous mud with shell fragments	
				55.95	5		Soft, dark grey lacustrine CLA	
				53.10			EOH 8.9mbgl Total Depth of Borehole	
Piezo installed on h Jpstands: WS02-P1 = 0.8m WS02-PH1 = 0.7m	ead landjus	at north of T02 (241426E 277287N)			-		PAGE 1 of 1 SCALE	

		W	INDOW SAM	iple l	OG		LOG NUMBER: WS03		
	PROJECT	NUMBER: P1320-0	DATE STA	ARTED:	15/12/2	016	EASTING: 241517		
	SITE: Coo	le WF, Co. Westmeath	LOGGED	BY: M	. Gill		NORTHING: 276713		
RO-ENVIRONMENTAL SERVICES	CLIENT: E	lement Power	CONTRA	CTOR:	HES	ELEVATION: 66.0mOD			
Vell Completion De	scription	Comments	Water Strikes	Elevation	Meters Below Ground Surface	Lithology	Formation Description		
				<u>66.00</u> 59.80			Ground Surface Soft/firm, wet, dark brown, fibrous to woody PEAT		
				57.60	-		Creamy, soft calcareous mut with shell fragments		
				57.00			Dark grey lacustrine CLAY		
							EOH 9.0mbgl		
					10—		Total Depth of Borehole		
EMARKS							PAGE 1 of 1		
							SCALE		

		V	/INDOW SAM	1PLE L	OG		LOG NUMBER: WS07	
	PROJECT	NUMBER: P1320-0	DATE STA	ARTED:	15/12/2	016	EASTING: 240950	
	SITE: Coo	le WF, Co. Westmeath	LOGGED	<b>) BY</b> : M		NORTHING: 276633		
RO-ENVIRONMENTAL SERVICES	CLIENT: E	CLIENT: Element Power		CTOR:	HES		ELEVATION: 64.0mOD	
Vell Completion De	scription	Comments	Water Strikes	5	Meters Below Ground Surface	Lithology	Formation Description	
				64.00	-		Ground Surface Soft/firm, wet, dark brown, fibrous to woody PEAT	
				58.00	5-			
				55.00	-		Soft, dark grey, lacustrine CLA - Soft to firm from 8.3-9.0	
					10-		EOH 9.0mbgl Total Depth of Borehole	
EMARKS							PAGE 1 of 1	
							SCALE	

		W	/INDOW SAM	iple l	OG		EASTING: 240568		
	PROJECT	NUMBER: P1320-0	DATE STA	ARTED:	14/12/2	016			
	SITE: Clon	sura, Co. Westmeath	LOGGED	BY: M	NORTHING: 276013				
RO-ENVIRONMENTAL SERVICES	CLIENT: E	ement Power	CONTRA	CTOR:	HES		ELEVATION: 61.0mOD		
Vell Completion Des	scription	Comments	Water Strikes	ы	Meters Below Ground Surface	Lithology	Formation Description		
				61.00	0-	**	Ground Surface		
				60.20	0	APA A CONTRACTOR AND A CONTRACTOR	Soft, wet, dark brown,fibrous woody PEAT		
				58.52	_		Soft, creamy,calcareous muc with shell fragments		
							Soft, dark grey, lacustrine CLA with interbedded soft and firr clay/silt layers		
				52.90			Loose, wet, grey sandy GRAV		
				<u>51.92</u>			EOH 9.08mbgl Total Depth of Borehole		
EMARKS efusal on gravels at	t 9.08mbgl				_		<b>PAGE</b> 1 of 1		
							SCALE		



		WIND	OW SAN	iple l	OG		LOG NUMBER: WS11
	PROJECT	NUMBER: P1320-0	DATE STA	RTED:	15/12/2	016	EASTING: 239871
	SITE: Clor	nsura, Co. Westmeath	LOGGED	BY: M	. Gill	NORTHING: 275103	
DRO-ENVIRONMENTAL SERVICES	CLIENT: E	lement Power	CONTRA	CTOR:	HES		ELEVATION: 67.0mOD
Well Completion De	escription	Comments	Water Strikes	Elevation	Meters Below Ground Surface	Lithology	Formation Description
		Water strike in gravels overflowing at ground lev	el	67.00 60.78 60.22 59.68			Slighty harder at depth
REMARKS • Very high water pr • Water spilting from	hole after	drilling		1	1	<u> </u>	PAGE 1 of 1
Refusal on gravels	at 7.32mbç	gl					SCALE

		WIN	IDOW	SAM	ple l	OG		LOG NUMBER: WS13
	PROJECT	NUMBER: P1320-0	DA	TE STA	RTED:	15/12/2	016	EASTING: 240855
	SITE: Clor	nsura, Co. Westmeath	LO	GGED	BY: M	. Gill		NORTHING: 275030
HYDRO-ENVIRONMENTAL SERVICES	CLIENT: E	lement Power	со	NTRA	CTOR:	HES		ELEVATION: 68.0mOD
Well Completion De	scription	Comments		Water Strikes	noi	Meters Below Ground Surface	<u> </u>	Formation Description
					68.00			
					58.95 58.65 58.35			Firm, grey lacustrine CLAY Dense, grey, clayey, silty GRAVEL EOH 9.65mbgl Total Depth of Borehole
<b>REMARKS</b> Refusal on gravels a	at 9.65mbgl							PAGE 1 of 1
								SCALE
HYDRO-ENVIRONMENTA	AL SERVICES 2	22 Lower Main Street Dungarvan Co. Wa	aterford T	el: 058	-44122	Fax: 058	-44244 Er	mail: info@hydroenvironmental.ie

		WIND	OW SAN	iple l	.OG		LOG NUMBER: WS100	
	PROJECT	NUMBER: P1320-0	DATE STA	ARTED:	15/12/2	016	EASTING: 241441	
	SITE: Coo	le WF, Co. Westmeath	LOGGED	BY: Ⅳ	I. Gill	NORTHING: 277395		
RO-ENVIRONMENTAL SERVICES	CLIENT: EI	ement Power	CONTRA	CTOR:	HES		ELEVATION: 63.0mOD	
Vell Completion D	escription	Comments	Water Strikes	Elevation	Meters Below Ground Surface		Formation Description	
P1	1.55	Couple WS100 Located on high bank at edge of peat works		<u>63.00</u> 57.40 57.00	- 0		Ground Surface Soft, wet, dark brown, fibrous PEAT. Slightly stiffer at depth. Creamy, soft calcareous mud with shell fragments EOH 6.0mbgl Total Depth of Borehole	
EMARKS iezometers installe	ed between	T02 and Lough Bane					<b>PAGE</b> 1 of 1	
pstands: WS100-P1 = 0.05m WS100-PH1 = 0.05							SCALE	

		WIN	DOW SAM	iple l	OG		LOG NUMBER: WS101
	PROJECT	NUMBER: P1320-0	DATE STA	RTED:	15/12/2	016	EASTING: 240833
	SITE: Coo	le WF, Co. Westmeath	LOGGED	BY: M	. Gill	NORTHING: 277407	
VDRO-ENVIRONMENTAL SERVICES	CLIENT: E	ement Power	CONTRA	CTOR:	HES		ELEVATION: 64.0mOD
Well Completion De	scription	Comments	Water Strikes	Elevation	Meters Below Ground Surface	Lithology	Formation Description
				64.00	0-	at at at at at at at	Ground Surface
1m P1 P1 4.0 5.0 19mm	— 0.1 — 19mm PH1 1.35	Couple WS101 Located between T01 and lake to north		58.60			Soft, wet, brown fibrous Peat
<b>REMARKS</b> Upstands: WS101-P1 - 1.0m							PAGE 1 of 1
WS101-PH1 - 0.1m							SCALE



Date:19/08/2020

- --POSTAL ADDRESS: Building 4200 Cork Airport Business Park Cork Ireland T12 D23C
- -- PHONE: +353 21 242 7786
- -- INTERNET: www.statkraft.com

E-MAIL: post@statkraft.com

-- VAT REG.NO.: 3447216VH

# **Ref: Coole Windfarm Limited Site Investigation Works Note**

The site investigations work commenced in Coole Wind farm on the 30/6/20 works were completed on 24/7/20. The works comprised of completed 14 bore holes, there was also so geophysics studies with Peat probes carried out on certain locations in Coole wind farm site outline in the maps below. No works were carried out in the Borrow Pit for the site.

# **Definitions:**

## Boreholes

- A borehole is a narrow shaft bored in the ground, either vertically or horizontally.
- Shallow drilling for site investigation and construction to provide information for the design specification for construction of structures. The information gather will provide a geotechnical designer
- Soil conditions for construction
- Engineering properties physical and chemical
- Contamination natural & man-made
- Geology

## Geophysics Survey

- Geophysical survey is the systematic collection of geophysical data for spatial studies. Detection and analysis of the geophysical signals forms the core of Geophysical signal processing. This survey is completed use probes and cables with current run through the cables to gather measurements
- The purpose of the geophysical investigation is to provide information of the sub-soil conditions at the turbine bases including the depth to bedrock and stiffness of the overburden material
- Estimate the overburden stiffness
- Assess the depth to bedrock and the weathering and excavatability of the bedrock.

There were samples of material extracted from the borehole's diameter was 68mm and this material was taken away for testing as part of the site investigations works to for part of the geotechnical report. The amount of material taken from the site for testing was estimated at between 8kg - 14kg samples from all 14 boreholes completed on site so in total between 100kg to 200kg of material has been taken from whole site for testing.

Drilling rig for Boreholes



Example of Borehole logs



Geophysics study



Coole Windfarm Limited Registered Office: Building 4200, Cork Airport Business Park, Cork, Ireland | Company Number: 590543 Directors: Kevin O'Donovan (Irish), Alan Goggin (Irish), Donal O Sullivan (Irish)



Machine : Beretta T44 Flush : Water Core Dia: 63.5 mm Method : Rotary Cored			WWW.gii.ie Casing Diameter 102mm to 23.00m Location 240910 E 277329 N			Ground Level (mOD)           62.24           Dates           22/07/2020-           23/07/2020		Client Statkraft Project Contractor Gll			BHT01 Job Number 9373-01-20 Sheet 1/3	
0.00	15						(3.50)	Poor Recovery. Driller notes: Black PEAT. Recovery consists of Black slightly silty PEAT. (Very soft)	۲ مالد مالد مالد مالد مالد ۲ مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد			
2.00 2.00-2.45	50				0,1/2,1,1,1 SPT(C) N=5				بد یکھ ملاح ملاح ملاح ملاح ملاح ملاح ملاح ملاح ملاح ملاح ملاح ملاح ملاح ملاح		2. 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (2014) 0.0 (	
3.50 3.50-3.95	43				0,0/0,1,1,1 SPT(C) N=3	58.74	<b>—</b> —	Poor Recovery. Driller notes: Yellowish brown PEAT. Recovery consists of brown slightly sandy slightly clayey PEAT. (Very soft)		<u> </u>	(5) Order V. S. Conder V. S.	
5.00 5.00-5.45	47				1,1/0,0,0,1 SPT(C) N=1	57.24	5.00 (1.50)	Very soft light brownish grey sandy slightly gravell clayey SILT with shells.				
6.50 6.50-6.95					0,0/1,1,1,1 SPT(C) N=4	55.74	6.50 (1.50)	Soft grey slightly sandy clayey SILT.			1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	
8.00 8.00-8.45	73				2,1/2,2,3,2 SPT(C) N=9	54.24		Firm grey slightly sandy silty CLAY.			<sup>2</sup> 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.00 × 2.	
9.50 9.50-9.95	53				2,2/3,3,3,3 SPT(C) N=12		(3.00)				წიფებილი და კალი კალი და კალი და კალი კალი და იამი მარია და გადიმი და და და გადი მა და იამი მარია და მარი მა და და მა და და მხიდნებალი მიზი იმ და და და მხიდნებელი მხიდნებალი მიზი მხადნებალი და მხადი და გა ამხათვებილი მიზი მა და მა და მა მა და მა და მა და მხათვებილი მა და მა და და მა და მა და მა და მა და მა და ამხათვებილი მა და და ამხათვებილი მა და და მა და მა და მა და მა და მა და მა და ამ და მა და და მა და და მა და ა და მა და მ	
Remarks									Scale		aaed	
Standpipe ir surround, fir	nstalled, slo nished with	tted from a rasied o	14.00m to cover.	1.00m E	GL with a pea gravel	surround,	sealed from 1	.00m to GL with plain pipe and a benthonite	Scale (approx)	B	ogged Y	
SI	(	Grou	nd In		igations Ire vw.gii.ie	land	Ltd	Site Coole Wind Farm		N	orehole umber HT01	
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Machine : Be Flush : Wa			Casing	Diamete 2mm to 2			Level (mOD) 62.24	Client Statkraft			umber	
Core Dia: 63							-				/3-01-20	
lethod : Ro	otary Corec	Ł	Locatio 24		77329 N		/07/2020- /07/2020	Project Contractor GII		SI	1 <b>eet</b> 2/3	
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr	
1.00 1.00-11.45 2.50 2.50-12.95 4.00 4.00-14.04 4.75 5.50 6.00 7.00 8.50	93 80 33 70 100 100	27 87 97 97	13         60         80	7	3,2/3,5,4,4 SPT(C) N=16 3,4/9,9,13,13 SPT(C) N=44 25/50 SPT(C) 25*/20 50/20	51.24 49.74 47.49 46.24	(1.50) 12.50 (2.25) 14.75 (1.25)	Stiff grey slightly sandy silty CLAY.         Poor Recovery. Driller notes: GRAVEL and COBBLES. Recovery consists of grey sub-angular Cobbles of Limestone. (Very dense)         Weak to medium strong thinly bedded dark grey fine grained LIMESTONE with some mudstone laminations. Partially weathered.         (14, 75m - 16.00m) Two fracture sets. F1: 0-10 Degrees, very close to close, planar smooth-rough with black clay infilling. F2: 75-85 Degrees, Undulating rough with clay infill.         Medium strong to strong thickly bedded dark grey fine grained LIMESTONE with some black mudstone laminations. Partially weathered to unweathered.         (16,00m - 23.00m) One fracture set. F1: 0-10 Degrees, close to medium, planar to undulating rough with some clay smearing.				
20.00 Remarks							-		Scale (approx)	Le	ogged y	
									1:50		Tmcl	
									Figure N 9373-01			

Machine : B	eretta T44	Fou	Casing	WV Diamete		Ground	Level (mOD)			B	umber HT01 ob umber
Flush : W Core Dia: 63 Method : R	3.5 mm	ł	Locatio	2mm to 2 <b>n</b> 0910 E 2		Dates	62.24 2/07/2020- 3/07/2020	Statkraft Project Contractor Gll			73-01-2 heet 3/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legen	ater	Instr
21.50	100	93 97	80			39.24		Complete at 23.00m		30	
Remarks									Scale (approx) 1:50 Figure 9373-0	- No.	oggec y Tmcl

		Grou		W	igations Ire ww.gii.ie			Site Coole Wind Farm		N B	orehole umber HT02
Machine : B Flush : W	eretta 144 /ater		-	Diamete 2mm to 2			Level (mOD) 62.60	Client Statkraft		N	ob umber
Core Dia: 6	3.5 mm					Datas					73-01-20
Method : R	otary Core	d	Locatio 24		277251.2 N		/07/2020- 2/07/2020	Project Contractor Gll		3	<b>heet</b> 1/2
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00	50						(3.50)	Very soft dark brown slightly silty fibrous PEAT.			
2.00 2.00-2.45	20				1,1/1,0,0,0 SPT(C) N=1				× غلار علام علام علام علام × غلار علام علام علام علام علام علام على علام على		
3.50 3.50-3.95	73				1,1/2,1,1,1 SPT(C) N=5	59.10	3.50	Soft light greyish brown slightly sandy silty CLAY with shells.	× 300 × 340 × 340 × × · · · × · · · × × · · · × · · · · × × · · · × · · · ·		
5.00 5.00-5.45	76				2,1/2,3,1,2 SPT(C) N=8	57.60	5.00 (1.50)	Firm grey silty CLAY.			
6.50 6.50-6.63	60				19,6/50 SPT(C) 25*/95 50/30	56.10	6.50	Very dense dark grey sub-angular to sub-rounder medium to coarse GRAVEL with occasional cobbles.			
8.00 8.00-8.29					12,16/16,34 SPT(C) 50/135	54.70		Very dense dark grey sub-angular to sub-rounde coarse GRAVEL with many cobbles.	0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,		مايادون في طويقيد في المايون في طويقيد في مايون مع دارد معلومات بكت منذ معلومات بكت مع د مع دارد معلومات مايو دارد مع دارد معلومات دارد مع دارد معلومات مع مع دارد معلومات دارد مع دارد معلومات مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع مع دارد مع دارد مع مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد مع دارد م
9.50 9.50-9.78 9.80	47				15,12/12,38 SPT(C) 50/130	52.80	(1.90)	Weak to medium strong medium bedded dark g	rey		
Remarks	etelle d'	ttod fr	0.50	1 00- 5							ogged
Standpipe in surround, fin	istalled, slo hished with	tted from a raised o	8.50m to cover.	1.00m B	GL with a pea gravel	surround, s	sealed from 1.	00m to GL with plain pipe and a benthonite	Scale (approx)	Ē	ogged Y
									1:50 <b>Figure N</b> 9373-01	lo.	Tmcl BHT02

Machine : B					gations Ire /w.gii.ie r		Level (mOD)	Coole Wind Farm Client		Bl	
Flush : V	Vater		10	2mm to 2	3.00m	(	62.60	Statkraft			u <b>mber</b> '3-01-2
Core Dia: 6 Method : R		ł	Locatio		277251.2 N		/07/2020- /07/2020	Project Contractor GII		Sł	neet 2/2
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	87	13	0	NI			(0.70)	fine grained LIMESTONE with some mudstone beds. Distinctly weathered. Non-Intact			
10.50						52.10	10.50	Medium strong thin to thickly bedded dark grey fine grained LIMESTONE. Partially weathered. (10.50m - 14.50m) Three fracture sets. F1:			
11.00	87	40	20					Ò-10 Degrees, clośe to medium, undulating rough with some clay infill. F2: 40-50 Degrees, medium spacing, undulating rough, clean. F3: 80-90 Degrees, undulating to stepped rough.			
12.50				. 11			(4.00)				
	83	56	43								
14.00											
14.50	80	60	30					Weak to medium strong medium bedded grey/da grey fine grained LIMESTONE. Partially weather to unweathered. (14.50m - 17.00m) Two fracture sets. F1: 0-10 Degrees, close to medium, undulating rough with some brown clay staining. F2: 75-85 Degrees, undulating rough with some brown	ark		
15.50	80	43	17	7			(2.50)	sandy clay infill.			
17.00						45.60	17.00	Medium strong thickly bedded dark grey fine			
	90	80	73	7			(1.60)	grained LIMEŠTONE. Partially weathered to unweathered. (17.00m - 18.60m) One fracture set. F1: 0-10 Degrees, medium to widely spaced, planar to undulating rough with some black clay staining.			
18.50				-							
8.60	100	60	47	13		44.00		Weak to medium strong medium to thickly bedde grey/brown fine grained LIMESTONE. Distinctly weathered to partially weathered. (18.60m - 20.00m) Two fracture sets. F1: 0-10 Degrees, very close to medium, planar to undulating rough with some brown clay staining. F2: 80-90 Degrees, undulating rough with some clay smearing.	d		
20.00						42.60	20.00				
Remarks			1	1	l	1 -12.00	20.00		Scale		ogaed
									(approx)		ogged Y
									1:50		Tmcl
									Figure N 9373-01		

Machine : Be			Casing				Level (mOD) 64.52	Coole Wind Farm Client Statkraft		Jo Ni	HT03
Core Dia: 63 Method : R		d	Locatio				)/07/2020-	Project Contractor			73-01-20 heet
			24	1521 E 2	276690.1 N	21	/07/2020	GII			1/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00	50							Soft Dark brown slightly silty PEAT.	×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×         ×		
2.00 2.00-2.45	37				1,2/2,1,2,2 SPT(C) N=7				الله عنه ال علق عليه عليه عنه الله عنه الله عليه عليه الله عنه ال عليه الله الله عنه الله عنه الله عنه الله الله عنه الله الله عنه الله عن عليه الله الله عنه الل عليه الله عنه الله ع عليه الله عنه الله على الله عنه الله على الله عنه الله على الله الله عنه الله عنه الله عنه الله عنه الله عنه الله على الله عنه الله عنه الله عنه الله على الله عنه الله على الله عنه الله على الله عنه الله عنه الله على الله عنه الله على الله على الله على الله على الله على الله الله عنه الله عنه الله عنه الله عنه الله عنه الله على ال		
3.50 3.50-3.95	37				1,0/1,2,1,1 SPT(C) N=5				× غَلاد ملاد ملاد ملاد ملاد ملاد علاد × غلاد ملاد ملاد × ملاد ملاد ملاد × ملاد		2012 2012 2012 2012 2012 2012 2012 2012
5.00 5.00-5.45	53				0,0/0,0,1,0 SPT(C) N=1	59.52	<u>–</u>	Very soft light brown slightly sandy SILT.			
6.50 6.50-6.95					0,0/0,0,0,0 SPT(C) N=0	58.02		Very soft light brownish grey slightly sandy SILT with shells.			
8.00 8.00-8.45	57				1,2/2,2,3,2 SPT(C) N=9	56.52		Firm grey silty CLAY			ن کې
9.50 9.50-9.95	63				1,2/2,2,2,4 SPT(C) N=10		(3.00)				
Remarks Standpipe in	stalled, slo	tted from	14.00m to	0 1.00m	BGL with a pea grave	el surround.	sealed from 1	1.00m to GL with plain pipe and a benthonite	Scale (approx)	Lo	ogged Y
surround, fin	ished with	a rasied o	cover.			-,			1:50		<b>y</b> Tmcl
									1.00	1	

S		Grou	nd In		igations Ire vw.gii.ie	land	Ltd	Site Coole Wind Farm		Nu	rehole mber IT03
Machine : Be	eretta T44		Casing	Diamete	-	Ground	Level (mOD)	Client		Jol	b mber
Flush : Wa			10	2mm to 2	21.50m		64.52	Statkraft			3-01-20
Core Dia: 63			Locatio	n		Dates		Project Contractor		Sh	eet
Method : Ro	otary Corec	1	24	1521 E 2	76690.1 N		/07/2020- /07/2020	GII			2/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness	Description	Legend	Water	Instr
11.00 11.00-11.45 12.50 12.50-12.95 13.60 14.00 15.50 16.90 17.00	73 77 40 87 93 100	90 100 93	73 73 63 97 83	6	2,2/3,7,9,7 SPT(C) N=26 5,9/9,7,12,12 SPT(C) N=40	50.92		Medium strong thinly to medium bedded dark fine grained LIMESTONE with some mudston beds laminations. Partially weathered to unweathered. (13.60m - 16.90m) Two fracture sets: F1: 0- Degrees, close to medium spacing, planar t undulating rough with some black clay infill. F2: 80-90 Degrees, undulating rough, clean			
20.00 Remarks			-				<b></b>		Scale		0004
									Scale (approx)	By	gged
									1:50	Т	mcl
									Figure N		

Machine : Be	4			VESU WV Diamete	gations Ire w.gii.ie		LLU Level (mOD)	Coole Wind Farm			mber HT03
Flush : W				2mm to 2			64.52	Statkraft		Nu	<b>b</b> I <b>mber</b> 3-01-2
Core Dia: 63	8.5 mm					Datas		Paris ( Dan frantsa			
Method : R	otary Cored	d	Locatio 24		76690.1 N	<b>Dates</b> 20 21	/07/2020- /07/2020	Project Contractor GII			<b>eet</b> 3/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
21.50	100	93	80			43.02		Complete at 21.50m			
Remarks									Occub		
									Scale (approx)	By	gged
									1:50	т	mcl
									Figure N	۰ اo.	

Image: Number	Machine : B		Grou			igations Ire vw.gii.ie <sup>,</sup>		Ltd	Site Coole Wind Farm Client		N B	orehole umber HT04
Detacline : Product Contractor         Detacli	Flush : W	/ater							Statkraft			
100       18       100       101       100       101       100       101       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       100       10			d			276890.1 N	23		-		SI	
000         18         100         101         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100         100	Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
43       43       65.30       6.50         150.3.95       50       1.00(1.0.1         50       50       50       50         100.5.45       50       50         73       6.50       50         100.5.45       73       6.50         66       66       6.50         1.002.1.1       58.29       5.30         50.0.8.45       5.30       5.70         66       1.02.1.1.1       58.29         50.0.8.45       5.30       5.100         1.002.1.1.1       57.09       6.50         Firm light grey/ah brown slightly silty CLAY.       1.02.1.1.1         582.92       5.30       5.30         1.008.45       1.02.1.1.1       582.92         1.008.45       1.02.1.1.1       582.92         1.008.45       1.02.1.1.1       57.09         1.008.45       1.02.1.1.1       57.79         1.002.1.1.1       54.74       8.85         Meduum strong to strong think to thickly bedded data grey fine grained LMESTONE with some black day staining.       1.100         1.002.1.1.1       54.74       8.85       1.02.2.1.1.1         1.002.1.1.1       54.74       8.85       1.02.2.1.1.1	0.00	18		_					Soft dark brown fibrous PEAT.	shke shke shke shke shke shke shke shke shke shke shke shke shke shke shke shke		
1.50-3.95       50       1.00.1.0.1       SPTIC) N=2       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50       50	2.00 2.00-2.45	43				2,2/1,0,1,2 SPT(C) N=4		-		ડપ્રેટ ડપ્રેટ કર્યોટ ડપ્રેટ ડપ્રેટ ડપ્રેટ ડપ્રેટ ડપ્રેટ ડપ્રેટ ડપ્રેટ ડપ્રેટ ડપ્રેટ		1.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2.2
100       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00       5.00	3.50 3.50-3.95	50				1,0/0,1,0,1 SPT(C) N=2				2014 2014 2014 2014 2014 2014 2014 2014 2014 2014 2014 2014 2014 2014 2014 2014 2014		
1:50-6.95       66       1.0/2,1,1,1         1:00-8.45       1.0/2,1,1,1         1:85       93       30         3:00       54.74         8:85       Medium strong to strong thinly to thickly bedded dark grey fine grained LIMESTONE with some mudstone laminations. Partially weathered to unweathered to unweathered to unweathered to undulating rough with some black clay staining. F. 27:540 Degrees, very close to wide, planar to the strong with some black clay staining.         Remarks       Standpipe installed, slotted from 8.50m to 1.00m BGL with a pea gravel surround, sealed from 1.00m to GL with plain pipe and a benthonite       Scale (approx) tips)       bg/gec         1:50       Tmcl	5.00 5.00-5.45	73					58.29			یناند مناند مناند مناند مناند مناند مناند مناند		
8.85       93       30       30       54.74       8.85       Medium strong to strong thinly to thickly bedded dark grey fine grained LIMESTONE with some mudstone laminations. Partially weathered to undweathered.       (8.85m - 17.00m) Two fracture sets. F1: 0-10       1000000000000000000000000000000000000	6.50 6.50-6.95					2,2/3,3,3,3 SPT(C) N=12	57.09		Firm grey slightly silty CLAY.			
8.85       93       30       30       54.74       8.85       Medium strong to strong thinly to thickly bedded dark grey fine grained LIMESTONE with some mudstone laminations. Partially weathered to undweathered.       (8.85m - 17.00m) Two fracture sets. F1: 0-10       1000000000000000000000000000000000000	3.00 3.00-8.45	66				1,0/2,1,1,1 SPT(C) N=5		(2.35)		× × × × × × × × × × × × × × × × × × ×		
Remarks       Staining. F2: 75-80 Degrees, undulating rough with some black clay staining.         Standpipe installed, slotted from 8.50m to 1.00m BGL with a pea gravel surround, sealed from 1.00m to GL with plain pipe and a benthonite urround, finished with a rasied cover.       Scale (approx)         1:50       Tmcl	3.85 9.50	93	30	30		-	54.74		dark grey fine grained LIMESTONE with some mudstone laminations. Partially weathered to unweathered. (8.85m - 17.00m) Two fracture sets. F1: 0-10 Degrees, very close to wide, planar to			<u>;;;;</u> ;
1:50 Tmcl	Remarks		44	0.50	1.00 D				staining. F2: 75-80 Degrees, undulating rough with some black clay staining.	Scale	L	ogged
	standpipe in surround, fin	istalled, slo iished with	tted from a rasied o	8.50m to cover.	1.00m B	L with a pea gravel	surround, s	sealed from 1.	uum to GL with plain pipe and a benthonite	(approx)		
										1:50 Figure N		Tmcl

Machine : B		Grou		WV	gations Ire /w.gii.ie			Site Coole Wind Farm		B	orehole umber HT04
Flush : W				Diamete 2mm to 1			Level (mOD) 63.59	Client Statkraft		N	ob umber
Core Dia: 63											73-01-20
Method : R	otary Corec	ł	Locatio 24		76890.1 N	<b>Dates</b> 23 24	9/07/2020- 9/07/2020	Project Contractor GII		Sł	heet 2/2
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	100	90	53								
11.00	100	93	67	9							
12.50 13.00				-			(8.15)				
13.00	100	90	77	3							
14.00	100	93	56								
15.50	100	90	67	9							
17.00						46.59		Complete at 17.00m			
Remarks									Soala		
									Scale (approx)		ogged Y
									1:50 Figure N 9373-01	lo.	Tmcl BHT04

Machine : B		Grou		VEST WV Diamete	igations Ire vw.gii.ie r		Ltd Level (mOD)	Site Coole Wind Farm Client		N B	orehole umber HT06
	/ater		-	2mm to 7			63.34	Statkraft		N	umber 73-01-2
Core Dia: 63			Locatio	n		Dates		Project Contractor		S	heet
Method : R	otary Core	d	24	1225.9 E	276051.5 N	07	7/07/2020	GII			1/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00	30							Soft dark brown slightly sandy fibrous PEAT	Alle Alle Alle		
2.00 2.00-2.45	67				0,1/2,2,1,1 SPT(C) N=6	61.34	2.00 (1.50)	Firm light greyish brown slightly sandy silty CLAY			
3.50 3.50-3.95	60				1,2/2,4,3,3 SPT(C) N=12	59.84	3.50	Stiff grey slightly sandy silty CLAY	00000000000000000000000000000000000000		(1) A set of the se
5.00 5.00-5.45	40				6,5/4,4,6,8 SPT(C) N=22	58.34		Poor recovery. Driller notes: Brown sandy CLAY. Recovery consists of grey subangular to subrounded fine to coarse Gravel (Very stiff)			ကို
6.50 6.50-6.95	20				5,6/6,5,6,7 SPT(C) N=24						1. 0.1.1.0.1.1.0.1.0.1.0.1.0.1.0.1.0.1.0
8.00 8.00-8.20	30				15,10/50 SPT(C) 50/50						
9.50 9.50-9.95					9,9/13,13,17,7 SPT(C) N=50				(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)		
Remarks Standpipe in	stalled, slo	tted from	15.00m to	0 1.00m E	3GL with a pea grave	I surround	, sealed from 1	.00m to GL with plain pipe and a benthonite	Scale (approx)	Lo B	ogged y
sanounu, III									1:50	.	Tmcl
									Figure N		

Machine : Be		Grou		W	igations Ire vw.gii.ie			Site Coole Wind Farm		BI	orehole umber HT06
Machine:Be Flush :Wa			Casing 10	Diamete 2mm to 1			Level (mOD) 63.34	Client Statkraft			ob umber '3-01-20
Core Dia: 63	.5 mm		Locatio	n		Dates		Project Contractor			neet
Method : Ro	otary Corec	1			276051.5 N	07	7/07/2020	GII			2/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00 11.00-11.38	27 30				14,13/14,18,18 SPT(C) 50/225	52.34		Poor recovery. Driller notes CLAY. Recovery consists of grey very gravelly slightly sandy Clay (Very stiff)	<u> </u>	עניין אין אין אין אין אין אין אין אין אין	
12.50 12.50-12.88	47				12,14/14,15,18,3 SPT(C) 50/230					עישיה הראשוני היה משיה היה משות היה מש משות היה משות	র্জেক সিংক্ষর সমূহত হৈ ক্ষেত্র স্বায় করে সিংক্ষর সিংক্ষর সিংক্ষর সিংক্ষর সিংক্ষর সিংক্ষর সিংক্ষর সিংক্ষর সিংক এক নির্বাচন প্রথমের পির্বি নার্শ্ব প্রথমের সিংক্ষর সিংক্রে সিংক্রে সিংক্রি এক নির্বাচন প্রথমের পির্বি নার্শ্ব প্রের প্রায় প
14.00	37						E-		<u>াকলকলকলকল</u> বিজ্ঞানন বিজ্ঞান বিজ্ঞান বিজ্ঞান বিজ্ঞান	UVA finance and the second	
15.50	93	43	27			46.44		Weak to medium strong thinly bedded dark grey			
17.00	80	41	23	10				fine grained LIMESTONE partially weathered. (16.90m - 19.35m) Two fracture sets. F1; 10 to 25 degrees, close to medium spaced, undulating, rough with some clay smnearing. F2: 70 to 80 degrees, close to medium spaced, undulating, rough with some clay smearing			
18.50	100	87	60	12		43.39	(3.05)				
Remarks			1		1			1	Scale (approx)	Ļ	ogged
									1:50		Tmcl
									Figure N 9373-01		BHT06

		Grou		WV	gations Ire w.gii.ie			Site Coole Wind Farm		Nu Bł	orehole imber HT06
Machine : B Flush : W	/ater			Diamete 2mm to 1			Level (mOD) 63.34	Client Statkraft			<b>b Imber</b> 3-01-2
Core Dia: 63 Method : R		d	Locatio		276051.5 N	Dates 07	7/07/2020	Project Contractor GII		Sh	eet 3/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
20.00 21.50 23.00	100	97 80 97	80 73 90	4				Medium strong to strong thinly bedded dark grey fine grained LIMESTONE with some Mudstone laminations partially weathered (19.95m-27.50m) Two fracture sets. F1: 10 to 25 degrees, close to medium spaced, undulating, rough with some clay infil and smearing. F2: 65 to 75 degrees, close to medium spaced undulating rough with some clay smearing			
24.50	100	97	90								
26.00	100	66	43								
27.50						35.84		Complete at 27.50m			
Remarks	·			<u>.</u>		1		1	Scale (approx) 1:50 Figure N 9373-01	T No.	<b>gged</b> <sup>-</sup> mcl 3HT06

20         23         23         23         23         24         25         Very soft dark brown fibrous PEAT.         36, 36, 46, 46, 46, 46, 46, 46, 46, 46, 46, 4		Vater		Casing 10	Diamete 2mm to 2			Level (mOD) 62.97	Client Statkraft			ob umber '3-01-2
2.3         2.3         2.3         2.3         2.5         3.3         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50         3.50<			d			276632.8 N	Dates 07	7/07/2020			Sh	
23         23         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         122:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:1         123:11:	Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
3.30     3.30     3.30     1.172.1,1     Soft uging greyten brown CLAY with strends       3.30     3.30     3.30     1.172.1,2     (3.00)       3.50     3.50     1.172.1,2     (3.00)       3.50     53     1.172.1,2     (3.00)       3.50     53     1.172.1,2       3.50     53     1.172.1,2       3.50     53     1.172.1,2       3.50     53     1.172.1,2       3.50     53     1.172.1,2       3.50     564.7     6.50       500     500 to firm grey silty CLAY.       4     4       4     4       53     1.172.1,2.3       80     1.172.1,2.3       80     1.172.1,2.3       80     1.172.1,2.3       9.50     507(C) N=8       9.50     2.2/1.3,2.2       9.50     507(C) N=8		23							Very soft dark brown fibrous PEAT.	λίλε	0 U U U U U U U U U U U U U U U U U U U	2000 2000 2000 2000 2000 2000 2000 2000
3:30     3:30     3:30     1:1/2:1,2:2     (3:00)       3:00     5:00     5:00     5:00     1:1/2:1,2:2       3:50     5:00     5:00     5:00       3:50     5:00     1:1/2:1,2:2     5:00       3:50     5:00     5:00       3:50     5:00     5:00       3:50     5:00     5:00       3:50     1:1/2:1,2:3     5:6:47       8:0     1:1/2:1,2:3     5:6:47       8:0     1:1/2:1,2:3     5:6:47       8:0     1:1/2:1,2:3     5:6:47       9:00-9:45     5:00     5:00       2:     5:00     5:00       3:00-9:45     2:     2:       3:50     2:     2:       3:50     5:00     5:00       3:00-9:45     5:00       3:00-9:45     2:		33								ג'זארי ג'זארי גזארי גזארי גזארי גזארי גזארי גזארי גזארי גזארי גזארי גזארי גזארי גזארי	a000 - 2000 0 - 2000 0 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000	ი ფრიფლი სარალი ს ფრიფლი ს და
53     53     12/3.2.2.1     56.47       350     50.0.95       80     12/3.2.2.1       300     11/2.1.2.3       300     11/2.1.2.3       300     11/2.1.2.3       SpT(C) N=8     1	3.50 3.50-3.95	33				1,1/1,2,1,1 SPT(C) N=5	59.47	<u> </u>	Soft light greyish brown CLAY with shells	×	00000000000000000000000000000000000000	9. No with a North of No with a North of Nort
3.50     3.50     56.47     6.50       80     1,2/3,2,2,1     Soft to firm grey silty CLAY.       80     1,1/2,1,2,3       3.00     1,1/2,1,2,3       3.00     1,1/2,1,2,3       SPT(C) N=8     1,1/2,1,2,3       2-     2-       0.50     2,2/1,3,2,2       SPT(C) N=8     4       0.50     2,2/1,3,2,2       SPT(C) N=8     4	5.00 5.00-5.45	53				1,1/2,1,2,2 SPT(C) N=7		È		×× ××	00 00 00 00 00 00 00 00 00 00 00 00 00	ყილ წერთვე ერილ გერთვე ერილ გერთვე ერილ ი. ირი და ფილი იკილი და იკილი გერთვე ი ამის ირი ფილი იკილი ფილი იკილი იკილი იკილი ამის გერთველი იკილი იკილი იკილი იკილი იკილი იკილი ამის გერთველი იკილი იკილი იკილი იკილი იკილი იკილი
3.00 3.00-8.45 2- 2- 2- 2- 2- 2- 2- 2- 2.2/1,3,2,2 SPT(C) N=8 2.2/1,3,2,2 SPT(C) N=8 2.2/1,3,2,2 SPT(C) N=8 2.2/1,3,2,2 SPT(C) N=8 2.2/1,3,2,2 SPT(C) N=8 2.2/1,3,2,2 SPT(C) N=8	3.50 3.50-6.95	80				1,2/3,2,2,1 SPT(C) N=8	56.47		Soft to firm grey silty CLAY.	×	00000000000000000000000000000000000000	ી કેમ્બે છે. ગે બેમથે છે કે મેન્સ્ટ્રે કે બેમથે છે. ગે કેમ્બે છે કે બેમથે છે. આ ગે કે બેમથે છે કે બેમથે છે. આ ગે છે બેમથે છે બેમથે છે. આ ગે બેમથે બેમથે છે બેમથે છે. આ ગે છે બેમથે છે બેમથે છે આ ગે બેમથે છે બેમથે છે. આ ગે બેમથે છે બેમથે છે. આ ગે બેમથે છે.
1.50 1.50-9.95 1.50-9.95 1.50-9.95 1.50-9.95	.00 .00-8.45	2-				1,1/2,1,2,3 SPT(C) N=8				x x x x x x x x x x x x x x x x x x x x	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
	.50 .50-9.95					2,2/1,3,2,2 SPT(C) N=8		(6.00)			000 v sd 00 v 00 v sd v s -	

SI		Grou	nd In		igations Ire ww.gii.ie	eland l	_td	Site Coole Wind Farm		N	orehole umber HT07
Machine : Be			Casing				Level (mOD)			Jo	ob umber
Flush : Wa			10	2mm to 2	21.50m	6	52.97	Statkraft		1	73-01-20
Core Dia: 63			Locatio	n		Dates	10710000	Project Contractor		SI	heet
Method : Ro	otary Corec	1	24	0949.9 E	276632.8 N	07/	/07/2020	GII			2/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00 1.00-11.45	20				2,2/2,1,2,1 SPT(C) N=6						
12.50 12.50-12.95	80				2,3/2,3,3,3 SPT(C) N=11	50.47	12.50 (1.50)	Firm grey silty CLAY.			وار می در در محمد کرد. کرد معکستان مردوس و کردیک در معکستان مردوس و کردیک در محمد کرد کردیک مردوس مردوس و کردیک در معکستان مردوس و کرد کردیک مردوس مردوس و کردیک در معکستان مردوس و کرد مردوس مردوس و کردیک در معکستان مردوس و کردیک در معکستان مردوس مردوس و کردیک در معکستان مردوس و کردیک در معکستان مردوس و کرد مردوس و کردیک در معکستان مردوس و کردیک در معکستان مردوس و کرد مردوس و کردیک در معکستان مردوس و کردیک در معکستان مردوس و کردیک در معکستان مردوس و کردیک مردوس و کردیک در مردوس و کردیک در معکستان مردوس و کردیک در معکستان مردوس و کردیک در معکستان مردوس و کردیک در معکستان مردوس و کردیک در معکستان مردوس و کردی مردوس و کردیک در معرس و کردیک در معرف در معرس مردوس و کرد در معمل و کردیک در معمل و کردیک در معرف و کردیک در و معکست و ک
4.00	37	10	10			48.97	(1.35)	Poor Recovery. Driller notes: Boulder CLAY. Recovery consists of grey slightly clayey sub-angular to sub-rounded fine to coarse Grave and cobbles.	× ×		
5.35 5.50	100	77	47			47.62	15.35	Medium strong thickly bedded dark grey fine grained LIMESTONE with mudstone laminations. Partially weathered to unweathered. (15.35m - 21.40m) Two fracture sets. F1: 0-10 Degrees. close to medium, undulating rough with some clay infill. F2: 75-85 Degrees, undulating rough with some clay infill and staining.			
7.00	100	93	83	0			(6.05)				
3.50	97	87	50	9							
0.00 Remarks				L	1			1			pabac
									(approx)	B	ogged Y
									1:50	_ ·	Tmcl
									Figure N	lo.	

	Vater		1	Diamete 2mm to 2			Level (mOD) 62.97	Client Statkraft		Jo Ni	htto7 bb umber 73-01-2
Core Dia:6 Method :R	3.5 mm Rotary Corec	ł	Locatio		276632.8 N	Dates 07	7/07/2020	Project Contractor GII		Sł	h <b>eet</b> 3/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
21.50	100	80	60			41.57		Complete at 21.50m			
Remarks									Scale (approx)	Lc B	ogged y
									1:50 Figure I 9373-01	1 No.	Tmcl

Open Torial         TCR         SCR         ROD         Fill         Field Records         Involves         Peor recovery. Recovery consists of Very soft means of Very soft m	Flush : W			Casing 10	<b>Diamete</b> 2mm to <i>1</i>			Level (mOD) 60.96	Client Statkraft			<b>b umber</b> 3-01-2
22         22         0.011.013         57.46         3.60           360         0.011.013         57.46         3.60           360         0.011.013         57.46         3.60           360         0.011.013         57.46         3.60           360         0.011.013         57.46         3.60           360         0.011.013         57.46         3.60           360         0.011.013         57.46         3.60           360         0.011.013         57.46         3.60           360         0.011.013         57.46         3.60           360         0.011.013         57.46         3.60           360         0.011.013         57.46         3.60           360         0.011.013         57.46         3.60           360         0.011.013         57.46         3.60           360         0.011.013         57.46         0.011.013           580.011.010         0.011.013         57.46         0.011.013           580.011.010.011.010         0.011.010         0.011.010         0.011.010           580.011.010.011.010         0.011.010         0.011.010         0.011.010           580.011.010.011.010			ł			276015.5 N	02				Sh	1/2
22     22     001012     (3.50)       200-2.45     36     36     0010112       350     36     1101111     57.46     3.50       350     80     1101111     57.46     3.50       500-2.45     36     1101111     57.46     3.50       80     112111     57.46     3.50       80     112111     57.46     3.50       80     112111     57.46     3.50       800-05     112111     57.46     1.50       800-05     1122111     53.86     7.30       800-05     1222218     53.96     1.222218       800-05     1222218     53.86     1.222118       800-05     1222218     53.86     1.222118       800-05     1222110     53.86     1.222118       800-05     1222118     53.86     1.222118       800-05     1222118     1222118     1.222118       800-05     1222118     1222118     1.222118       800-05     1222118     1222118     1.222118       800-05     1222118     1222118     1.222118       800-05     1222118     1222118     1.222118       800-05     1222118     1222118     1.222118       8	Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
3.50         3.50         3.50         Poor recovery Recovery consists of: Soft grey           5.00         5.00         5.00         1.1/2.1.1.1         SPT(C) N=3         3.50           5.00         5.00         1.1/2.1.1.1         SPT(C) N=5         (3.50)         Image: Second constraints of: Soft grey         Image: Second constraints of: Soft grey           5.00         5.00         5.00         1.1/2.1.1.1         SPT(C) N=5         (3.50)         Image: Second constraints of: Soft grey         Image: Second constraited constraints of: Soft grey<		22							Poor recovery. Recovery consists of: Very soft brown slightly sandy SILT with some organic material		נוט ער מייה מיט מיע אין מיט מיין מיט מיין מיט מיים מיין מיין מיין מיין מיין מיין מיין	
3.33     3.30     3.30     3.30     9     Poor recovery, Recovery consists of: Solid givy significance       5.00     5.00     1.122,1,11     SPT(C) N=3     (3.50)       5.00     7.3     1.122,2,1,5     (3.50)       5.00     5.00     1.122,2,1,5     (3.50)       5.00     5.00     SPT(C) N=10     53.96       5.00     53.96     7.00       8.00     60     53.96       8.00     60       8.00     6.644,7,4.6       SPT(C) N=21     53.96		36				0,0/1,0,1,2 SPT(C) N=4					0 , 0 5 80, 0 0 , , 0 5 80 , 0 0 , , , 0 5 80 , 0 , , , , 0 5 80 , 0 , , , , , , , , , , , , , , , ,	
500	3.50 3.50-3.95	80				1,1/0,1,1,1 SPT(C) N=3	57.46		Poor recovery. Recovery consists of: Soft grey slightly sandy SILT		<u>a 0 5 90 a 0 0 5 a 0 5 90 a 0 a 0 a 0 a 0 a 0 a 0 a 0 a 0 a 0 </u>	6 "0.000 "2.000" (0.000") (0.000") (0.000") (0.000") (0.000" "2.00" (0.000") (0.000") (0.000") (0.000") (0.000" "2.00" (0.000" "2.00" (0.000") (0.000") (0.000" "2.00" (0.000" (0.000" (0.000" (0.000")) (0.000" (0.000" (0.000" (0.000" (0.000"))) (0.000" (0.000" (0.000" (0.000" (0.000"))) (0.000" (0.000" (0.000" (0.000" (0.000"))) (0.000" (0.000" (0.000")) (0.000" (0.000" (0.000")) (0.000" (0.000")) (0.000")) (0.000" (0.000")) (0.000" (0.000")) (0.000" (0.000")) (0.000" (0.000")) (0.000" (0.000")) (0.000")) (0.000" (0.000")) (0.000")) (0.000") (0.000")) (0.000") (0.000")) (0.000") (0.000") (0.000")) (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000") (0.000")
3.50     3.50     53.96     7.00       60     60     53.96     7.00       60     60     53.96       8.00     8.3/3.4.5.6       3.00-8.45     8.3/3.4.5.6       26     6.6/4.7.4.6       9.50     9.50       9.50     6.6/4.7.4.6       SPT(C) N=21     53.96	5.00 5.00-5.45	73				1,1/2,1,1,1 SPT(C) N=5		<u> </u>			,0 8 80,0 0 70 ,0 0 8 90,0 0 7 ,0 0 8 40,0 0 7 × .0	2. S. Starting Science, S. S. Science, S. S. Starting, S. S. Starting, S. S. S. Starting, S.
3.00     3.00     8,3/3,4,5,6     SPT(C) N=18     Image: specific s	5.50 5.50-6.95					1,2/2,2,1,5 SPT(C) N=10	53.96		Poor recovery. Recovery consists of: Stiff to very stiff grey sandy gravelly CLAY with many angular		00000000000000000000000000000000000000	و کولیت کا مورک و کولیت کا کولیت کا محلا کا کولیت کا کولیت کا محلا کا کولیت کا کولیت کا کولیت کا کولیت کا کولیت کولیت محلا کولیت کولیت کا کولیت کولیت کولیت کولیت کولیت کولیت کولیت کولیت کولی کولیت کولیت کول
9.50 9.50-9.95 6.6/4,7,4,6 SPT(C) N=21	3.00 3.00-8.45	60				8,3/3,4,5,6 SPT(C) N=18			to subangular cobbles of limestone	6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00	000 - 000 - 0000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 000 - 00	როგმებებლო ე ცებოვე იებიო ე იკიდე სი ფევიკი იმე მიი იფეი 32 ინვე ივი იმხიიფი იკო იმე მიი იფეი 32 ინვე ივი იმხიიფიკო იძვი იმხიივი იკო იძვი ივი იმხიაფიკო იკო იმხიივი იკო იძვი იმ
9.50     6,6/4,7,4,6       9.50-9.95     SPT(C) N=21		26								0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 50 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(2) (2) (3) (3) (3) (3) (3) (3) (3) (3) (3) (3
Remarks	9.50 9.50-9.95					6,6/4,7,4,6 SPT(C) N=21				0 <u>0</u> 0 0000 0000 0000 0000	10 P P0 00 0 V - 0 0 V -	
tandpipe installed, slotted from 13.00m to 1.00m BGL with a pea gravel surround, sealed from 1.00m to GL with plain pipe and a benthonite (approx) By surround, finished with a rasied cover.	Remarks Standpipe in:	stalled, slo	tted from	13.00m to	1.00m E	3GL with a pea grave	l surround,	sealed from 1	.00m to GL with plain pipe and a benthonite	Scale (approx)	Lo By	ogged

<b>S</b>		Grou	nd In		igations Ire ww.gii.ie	eland I	Ltd	Site Coole Wind Farm		Nu	orehole umber HT08
Machine : Be Flush : Wa				Diamete 2mm to <sup>2</sup>			Level (mOD) 60.96	Client Statkraft			umber
Core Dia: 63	8.5 mm										3-01-20
Method : Ro	otary Corec	1	Locatio		276015.5 N	<b>Dates</b> 02 03	/07/2020- /07/2020	Project Contractor Gll		Sł	1 <b>eet</b> 2/2
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00 11.00-11.29	46 86				10,13/19,31 SPT(C) 50/135				ଜୁ ଦୁବର କରି କରି କରି କରି କରି କରି କରି କରି କରି କର		
12.50 12.50-12.78 12.80	100	42	34		17,17/25,25 SPT(C) 50/125	48.16		Medium strong dark grey extremely fine graine LIMESTONE partially weathered (12.80m - 14.50m) One fracture set. F1: Subhorizontal, closely spaced, planar, rough, open with some clay smearing			
14.00				13							
14.50	100	84	76	1	-	46.46	(1.20)	Medium strong light grey extremely fine grained LIMESTONE partially weathered (14.50m - 15.50m) One fracture set. F1: Subhorizontal, widely spaced, planar, rough, open with some clay smearing			
15.50	100	96	90		-	45.26	15.70 15.70 (2.50)	Medium strong dark grey extremely fine graine LIMESTONE partially weathered (15.50m - 19.60m) Two fracture sets. F1: Subhorizontal, closely spaced, planar, rough, open with some clay smearing. F2: 60 - 70 degrees, closely spaced, planar, rough, open with some clay smearing			
17.00	100	28	10	7		42.76		Strong light grey extremely fine grained			
18.50	100	50	44				(1.40)	LIMEŠTŎNĔ pártially weathered			
19.60						41.36	19.60	Complete at 19.80m			
Remarks			1	1	1				Scale (approx)	Lc By	ogged /
									1:50		JD
									Figure N	No.	

1.00     10     10/1,1,1,1     64.18     2.00       1.00     1,0/1,1,1,1     64.18     2.00	Machine : B Flush : W	/ater		Casing 10				<b>Level (mOD)</b> 66.18	Client Statkraft		Ja N	ob umber 73-01-2
0.00         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         1			d			275583.6 N		/08/2020	-		S	
000         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10         10	Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00       2.45       0       1.01', 1, 1, 1.1', SPT(C) N=4       64.18       2.00       Poor Recovery. Driller notes: PEAT. (Very soft)       4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4.	0.00	10							Recovery consists of dark brown fibrous PEAT.	shla shla shla shla shla shla shla shla shla		1, 02,02,02,02,02,02,02,02,02,02,02,02,02,0
0     1,1/0,1,1,1     61.18     5.00       1.00     0.00-5.45     0.00-5.45       30     1,1/0,1,1,1       30     5,1/4/10,25,15       50-6.85     5,1/4/10,25,15       37     5,1/4/10,25,15       37     5,5/6,7,5,5       37     5,5/6,7,5,5       37     5,5/6,7,5,5       37     5,5/6,7,5,5       37     5,5/6,7,5,5       37     5,5/6,7,5,5       37     5,5/6,7,5,5       37     5,5/6,7,5,5       37     5,5/6,7,5,5       37     5,5/6,7,5,5       37     5,5/6,7,5,5       37     5,5/6,7,5,5       37     7,7/9,10,31       50-9,87     7,7/9,10,31       50-9,87     7,7/9,10,31       37     56.86       37     9,50       1.50     7,7/9,10,31       56.90,87     7,7/9,10,31       37     7,7/9,10,31       56.86     9,50       1.50     7,7/9,10,31       56.90,87     9,50       1.50     7,7/9,10,31       56.90,87     9,50       37     7,7/9,10,31       38     9,50       Por Recovery consists of Grey sub-angular to sub-rounded medium to coarse GRAVEL with annotoble in coarse GRAVEL	2.00 2.00-2.45	0				1,0/1,1,1,1 SPT(C) N=4	64.18		Poor Recovery. Driller notes: PEAT. (Very soft)	میلاد میلاد میلاد میلاد میلاد میلاد میلاد میلاد میلاد میلاد	- 	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
100     1.1/0.1.1.1     SPT(C) N=3     61.18     5.00     Poor Recovery. Driller notes: PEAT onto Cobbles. Recovery consists of dak grey sub-angular to sub-rounded Cobbles. (Very soft.)     9.00       150     30     5.14/10.25.15     59.68     6.50     Poor Recovery. Driller notes: Cravel with cobbles. Recovery consists of dak grey sub-angular to sub-rounded medium coarse GRAVEL with costs of grey/dark grey sub-angular to sub-rounded medium dense to dense.)     9.00       150     37     5.566.7.5.5     5.77(C) N=23     56.68     9.50       150     37     5.566.7.5.5     SPT(C) 50/195     56.68     9.50       1.00     5.57(C) N=23     56.68     9.50     Poor Recovery. Driller notes: Gravel with Cobbles. Recovery. Consists of Grey sub-angular to sub-angular to sub-rounded medium to coarse GRAVEL with many cobbard medium to coarse GRAVEL with many cobbard medium to coarse GRAVEL with many cobbard. Recovery. Recovery. Recovery. Recovery. Revealt. Recovery. Reco	3.50 3.50-3.95	0				0,0/1,1,1,1 SPT(C) N=4				2012ء 2012ء 2012ء 2012ء 2012ء 2012ء 2012ء 2012ء 2012ء 2012ء 2012ء 2012ء	) ) )	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
.50       .50       .50       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .51       .		30					61.18		Recovery consists of dak arey sub-angular to	жи		ا مەر مەر مەر مەر مەر مەر مۇر مۇلەر مەر مەر مەر مەر مەر مەر مەر مەر مەر م
.00       .00       .00       .5,5/6,7,5,5       SPT(C) N=23         .37       .37       .37	.50 .50-6.85	37				5,14/10,25,15 SPT(C) 50/195	59.68		Recovery consists of grey/dark grey sub-angular to sub-rounded medium to coarse GRAVEL with			ილი ის თამო ის მარივი ფი და ის თამი ის მა იკი ის მამიი მა ის მა ის მა იკი მა იკი ის მა ის მა ის მა ის მა ის მა ის მა ის მა ის მა ის მა ის ის მა ის მა ის მა ის მა ის მა ის მა ის ის მა ის მა ის ის მა ის მა ის მა ის მა ის მა ის მ ის მა ის მა
1.50       .50-9.87         1.50       7,7/9,10,31         SPT(C) 50/220       56.68         9.50       Poor Recovery. Driller notes: Gravel with Cobbles. Recovery consists of Grey sub-angular to sub-rounded medium to coarse GRAVEL with many cobbles.(Very dense.)         Remarks tandpipe installed. slotted from 14.00m to 1.00m BGL with a pea gravel surround. sealed from 1.00m to GL with plain pipe and a benthonite       Scale (approx)	.00 .00-8.45	37				5,5/6,7,5,5 SPT(C) N=23					2	2012 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
tandpipe installed, slotted from 14.00m to 1.00m BGL with a pea gravel surround, sealed from 1.00m to GL with plain pipe and a benthonite						7,7/9,10,31 SPT(C) 50/220	56.68	9.50	Poor Recovery. Driller notes: Gravel with Cobble Recovery consists of Grey sub-angular to sub-rounded medium to coarse GRAVEL with many cobbles.(Very dense.)	s.	}	250 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -
	tandpipe in	istalled, slo	tted from a rasied o	14.00m to cover.	0 1.00m E	3GL with a pea grave	el surround,	sealed from 1	.00m to GL with plain pipe and a benthonite	Scale (approx)	L B	ogged y

SI		Grou	nd In		gations Ire /w.gii.ie	land	Ltd	Site Coole Wind Farm		Νι	orehole umber HT09
lachine : Be	eretta T44		Casing				Level (mOD)	Client		Jo	b umber
lush : Wa			10	2mm to 1	9.80m		66.18	Statkraft			3-01-2
ore Dia: 63			Locatio	n		Dates		Project Contractor		Sł	neet
lethod : Ro	otary Corec	1	24	0905.6 E	275583.6 N	01	/08/2020	GII			2/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
1.00 1.00-11.19 2.50 2.50-12.72 4.00 4.00-14.21 4.70 5.50 5.80	30 40 83 100	43	30	8	7,18/50 SPT(C) 25*/125 50/60 12,19/50 SPT(C) 50/70 15,18/50 SPT(C) 50/60	53.68 51.48 50.38	(3.00) (3.00) (3.00) (2.20) (2.20) (1.10)	Very stiff dark grey slightly sandy gravelly CLAY with occasional sub-angular cobbles. Medium strong thinly to medium bedded dark gree fine grained LIMESTONE with some thin mudstone beds. Partially weathered. (14.70m - 15.80m) Two fracture sets. F1: 5-15 Degrees, medium, undulating rough with some clay infilling. F2: 70-80 Degrees, planar smooth with some black clay staining. Strong medium to thickly bedded dark grey fine grained LIMESTONE with some mudstone beds.			
7.00	100	90	80	7				(15.80m - 18.50m) Two fracture sets. F1: 0-10 Degrees, close to medium spaced, planar smooth to rough. F2: 40-50 Degrees, close, undulating rough, clean.			
	100	87	77	7							
8.50	100	100	97				(6.50)	(18.50m - 22.30m) One fracture set. F1: 0-10 Degrees, close to wide, planar to undulating rough to smooth, clean.			
Remarks									Scale	Lc	ogged
									Scale (approx)	B	ogged /
									1:50	1	Fmcl

achine : Be				WV Diamete	gations Ire /w.gii.ie <sup>r</sup>		Level (mOD)	Coole Wind Farm Client		B	orehol umber HTOS
lush :W	/ater		10	2mm to 1	9.80m		66.18	Statkraft			umber 73-01-2
ore Dia: 63	3.5 mm		Locatio	n		Dates		Project Contractor		SI	heet
lethod : Ro	otary Corec	ł			275583.6 N	01	/08/2020	GII			3/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legenc	Water	Insti
1.50	100	100	93	5							
	100	100	56							-	
2.30						43.88		Complete at 22.30m		-	
emarks							<b></b>		Scale (approx)	Lc	ogge y
									1:50		, Tmcl
									1.00	No.	

Machine : B		JIOU	Casing	W	igations Ire ww.gii.ie <sup>w</sup>		Level (mOD)	Coole Wind Farm			umber HT10
Flush : W	/ater		-	2mm to 2			67.13	Statkraft		Νι	umber 73-01-2
Core Dia: 6	3.5 mm		Lasatia	-		Dates		Breiset Contractor			
Method :R	otary Core	d	Locatio		275429.3 N	02	2/07/2020- 8/07/2020	Project Contractor GII		31	<b>neet</b> 1/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	10						(6.50)	Poor Recovery. Driller notes: Black PEAT. Recovery consists of dark brown fibrous PEAT. (Very soft)	સ્પ્રેસિં સ્પ્રેસિં સ્પ્રેસિં સ્પ્રેસિં સ્પ્રેસિં સ્પ્રેસિં સ્પ્રેસિં સ્પ્રેસિં સ્પ્રેસિં સ્પ્રેસિં સ્પ્રેસિં સ્પ્રેસિં સ્પ્રેસિં સ્પ્રેસિં સ્પ્રેસિં	er or ⊐li Dor or or bed or or union or	
2.00 2.00-2.45	40				0,1/1,1,0,1 SPT(C) N=3				ડોર્સર ડોર્પટ ડોર્પર ડોર્પર ડોર્પર ડોર્પર ડોર્પર ડોર્પર ડોર્પર ડોર્પર ડોર્પર ડોર્પર ડોર્પર ડોર્પર	יייייייייייייייייייייייייייייייייייי	20 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) - 0 (2012) -
3.50 3.50-3.95	53				0,1/2,1,1,1 SPT(C) N=5				مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد	מיטיטיער איז מערייער איז	ი წილები ერიო და ერილი ერილი ერილი ერილი იარი იფირი ერი იფირი კი იკი იკი იკი იკი ი ი იკი იფირი ერი იფირი კი იკი იკი იკი იკი იკი იფირი ფირი ერი იფირი ერი იკი იკი იკი იკი იკი იკი იკი იფირი ერი იკი იკი იკი იკი იკი იკი იკი იკი იკი ი
5.00 5.00-5.45	40				0,0/1,0,1,1 SPT(C) N=3				sites sites sites sites sites sites sites sites sites sites sites sites sites sites		2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 2000 - 20
6.50 6.50-6.95	33				1,1/3,4,3,2 SPT(C) N=12	60.63	6.50	Poor Recovery. Driller notes: Grey boulder CLAY. Recovery consists of grey slighty sandy very clayey sub-angular to sub-rounded fine to coarse Gravel. (Very stiff)			20.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 - 0.000 -
3.00 3.00-8.45					10,9/9,12,17,12 SPT(C) N=50				<u>ଚ</u> ଜୁବୁ ଚୁକୁ ଚୁକୁ ଚୁକୁ ଚୁକୁ ଜୁକୁ ଚୁକୁ ଚୁକୁ ଚୁକୁ ଚୁକୁ ଚୁକୁ ଛୁ ଚୁକୁ ଚୁକୁ ଚୁକୁ ଚୁକୁ		ი წალი არილი არილი არილი არი არილი არილი არილი არილი არი არილი არილი არილი არილი არი არილი არილი არილი არილი არილი არილი არილი არილი არილი არილი
9.50	26				9,9/11,13,12,17		(5.35)			<u>1000000000000000000000000000000000000</u>	
9.50-9.95					SPT(C) N=53				0 <u>00</u> 0		
Remarks Standpipe in surround, fin	stalled, slo iished with	tted from a rasied o	10.00m to cover.	0 1.00m I	3GL with a pea grave	l surround,	sealed from 1	1.00m to GL with plain pipe and a benthonite	Scale (approx)	Lo By	ogged V
									1:50	ז 📙	Tmcl
										lo.	

<b>S</b> I		Grou	nd In		igations Ire vw.gii.ie	land	Ltd	Site Coole Wind Farm		Nu	rehole mber HT10
Machine:Be Flush :Wa			Casing	Diamete 2mm to 2			Level (mOD) 67.13	Client Statkraft			mber
Core Dia: 63	.5 mm		Locatio	n		Dates		Project Contractor			3-01-20
Method : Ro	otary Corec	Ł			275429.3 N	02	/07/2020- /07/2020	GII			2/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	46										
11.00 11.00-11.45	66	36	16		8,10/10,11,11,12 SPT(C) N=44				0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0-0 0-0 0-0-0 0-0 0-0-0 0-0 0-0-0 0-0 0-0-0 0-0 0-0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0-0 0 0-0 0-0 0-0 0 0-0 0 0-0 0 0-0 0 0-0 0 0-0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		
11.85	66	30	16			55.28	11.85	Weak to medium strong thin to medium bedded dark grey fine grained LIMESTONE. Partially weathered. (11.85m - 14.00m) Two fracture sets. F1: 10-30 Degrees, close to medium, undulating			
12.50	100	70	46	9			(2.15)	rough with some clay infill. F2: 70-85 Degrees, stepped rough with clay smearing.			
14.00	100	23	6			53.13		Very weak to weak thinly laminated to thickly bedded dark grey/black calcareous MUDSTONE Partially weathered. (14.00m - 16.80m) Mostly Non-intact.			
5.50	100	40	20	NI			(2.80)				
i6.80	100	93	90	3	-	50.33		Medium strong thickly bedded grey fine grained LIMESTONE. Unweathered. (16.80m - 19.00m) One fracture set. F1: 5-15 Degrees, medium to wide, undulating rough with clay staining.			
8.50 9.00	100	86	80		-	48.13		Weak to medium strong dark thinly laminated to thickly bedded fine grained argillaceous LIMESTONE. Partially weathered. (19.00m - 22.00m) Two fracture sets. F1: 5-25 Degrees, very close to close, planar to undulating rough with some clay infill. F2: 65-75 Degrees, planar to undulating smooth, clean.			
Remarks	I			<u> </u>	1			1	Scale (approx)	Log Bv	gged
									1:50		mcl
									Figure N		
									9373-01		HT10

SI	4	Grou		WV	gations Ire /w.gii.ie			Site Coole Wind Farm		Boreh Numb BHT	ber
Machine : Be Flush : W			-	Diamete 2mm to 2			Level (mOD) 67.13	Client Statkraft		Job Numb 9373-01	
Core Dia: 63	8.5 mm		Locatio	n		Dates		Project Contractor		Sheet	
Method : Ro	otary Corec	Ł			75429.3 N	02	/07/2020- /07/2020	GII		3/3	
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Nater Nater	str
21.50	100	56	30	15							
22.00	100	93	76	4		45.13	22.00	Medium strong to strong thicly bedded grey fin grained LIMESTONE. Unweathered. (22.00m- 23.00m) One fracture set. F1: 0-10 Degrees, medium to widely spaced undulatir rough, clean.			
23.00						44.13		Complete at 23.00m			
Remarks									Scale (approx)	Logge By	ed
									1:50	Tmcl	;
									Figure I	No.	

Machine : B	eretta T44	Grou	Casing	WV Diamete			Level (mOD)			B	umber HT11 ob umber
Flush : W Core Dia: 6	Vater 3.5 mm			2mm to	17.00m		66.75	Statkraft			73-01-2
Method : R	otary Core	d	Locatio		275130.8 N	Dates 07	7/07/2020	Project Contractor GII		5	<b>heet</b> 1/2
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00	10							Dark brown PEAT. (Soft)	مالات مالات مالات مالات مالات مالات ملات مالات مالات مالات مالات مالات مالات مالات مالات مالات		
2.00 2.00-2.45	57				1,2/2,1,1,1 SPT(C) N=5				shka shka shka shka shka shka shka shka shka		ი დერი წელი დერი და იკი და
3.50 3.50-3.95	47				1,1/1,2,1,1 SPT(C) N=5				23420 23420 23420 23420 23420 23420 23420 23420 23420 23420 23420 23420 23420 23420 23420		არი და და მეგილი და მეგილი და მეგილი და მ მეგილი და მეგილი და მ მეგილი და მეგილი და მ
5.00 5.00-5.45	50				1,1/2,1,2,2 SPT(C) N=7				34k2 54k2 54k2 54k2 54k2 54k2 54k2 54k2 54k2 54k2 54k2 54k2 54k2 54k2 54k2 54k2 54k2		2.0.0 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10 ° (10
6.50 6.50-6.95	27				1,2/3,2,2,1 SPT(C) N=8	60.25	6.50	Loose grey sub-angular to sub-rounded fine to coarse GRAVEL with occasional cobbles.			არი სავილი გარი და და და არი და არი არი არი არი არი არი არი არი არი არ
8.00 8.00-8.45					1,1/2,1,2,3 SPT(C) N=8		(2.20)		ဂစ်း (စုစ်) (စုစ်) (စု (စုစ်) (စုရီ) (စုစ်) (စုစ်) (စုရီ) (စုရီ) (စုံ) (စုရီ) (စုရီ)		
8.70 9.50 9.50-9.95	53				- 2,2/1,3,2,2 SPT(C) N=8	58.05		Medium strong thin to thickly bedded dark grey fine grained LIMESTONE with occasional mudstone beds. Partially weathered to unweathered. (8.70m - 17.00m) Two fracture sets. F1: 0-10 Degrees, close to medium, planar to undulating rough with some clay infill. F2: 80-90 Degrees, planar rough with some clay staining.			რად "გადი და "და და "და და დ
Remarks Standpipe in surround, fin	nstalled, slo nished with	tted from a rasied o	15.00m to cover.	) 1.00m I	BGL with a pea grave	el surround	, sealed from 1	l.00m to GL with plain pipe and a benthonite	Scale (approx)		ogged y
									1:50 <b>Figure N</b> 9373-0 <sup>2</sup>	lo.	Tmcl

S		Grou		WV	igations Ire vw.gii.ie			Site Coole Wind Farm		B	orehole umber HT11
Machine:B Flush :W				Diamete 2mm to 1			Level (mOD) 66.75	Client Statkraft			umber
Core Dia: 63								Project Contractor			73-01-20
Method :R	otary Cored	ł	Location 239905.9 E 275130.8 N			Dates 07/07/2020		GII		5	2/2
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	97	80	60								2, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5,
1.00	97	87	73	-							ი სარი სარი სარი სარი სარი სარი სარი სარ
12.50	100	100	93	8							2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2. 2
4.00	93	77	63								
5.50	93	83	73								
17.00						49.75	17.00	Complete at 17.00m			
Remarks							-		Scale (approx)	Lo	ogged y
									1:50		<b>,</b> Tmcl
									Figure N		
									9373-0		.BH11

Machine : Be		rou		W	igations Ire vw.gii.ie			Coole Wind Farm		В	orehole umber HT12
Flush : W			-	Diamete 2mm to 2			Level (mOD) 68.58	Client Statkraft		N	ob umber
Core Dia: 63	3.5 mm										73-01-2
Method : Ro	otary Core	d	Location 240320 E 274754 N			Dates 07/07/2020		Project Contractor GII			<b>heet</b> 1/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.00	20							Poor Recovery. Driller notes: Black PEAT. Recovery consists of dark brown fibrous PEAT. (Very soft.)	3462 3462 3462		
2.00 2.00-2.45	37				0,0/1,1,1,2 SPT(C) N=5				shte stde stde stde stde stde stde stde st		ი მიური და ფარი და მიური და იკი და მიური და
3.50 3.50-3.95	67				1,0/0,2,0,0 SPT(C) N=2				فالد مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد مالد		არი კარი იკო კარი კარი კარი კარი იკო კ იკო კარი კარი კარი კარი კარი კარი კარი იკო კარი ი იკო კარი კარი კარი კარი კარი კარი კარი კარი
5.00 5.00-5.45	67				2,2/1,1,0,1 SPT(C) N=3				میلاد میلاد میلاد میلاد میلاد میلاد میلاد میلاد میلاد میلاد میلاد میلاد		ක් හැක දුරු පැමිණී කරන්න කරන්න සිද්ද කරන්න ක කරන්න කරන්න කරන කරන්න කරන්න කරන කරන්න කරන්න කරන් කරන්න කරන්න ක
6.50 6.50-6.95	20				0,2/1,0,1,0 SPT(C) N=2				shte shte shte shte shte shte shte shte shte shte shte shte shte		ი თუ ი ი ი ი ი ი ი ი ი ი ი ი ი ი ი ი ი ი
8.00 8.00-8.45	20				0,2/0,0,1,0 SPT(C) N=1				stle: stle: stle: stle: stle: stle: stle: stle: stle: stle: stle: stle: stle: stle:		
9.50 9.50-9.95					0,0/0,0,0,1 SPT(C) N=1				5346 5346 5346 5346 5346 5346 5346 5346 5346 5346		
Remarks Standpipe in	stalled, slo	tted from	15.00m to	o 1.00m I	3GL with a pea grave	I surround	, sealed from 1	.00m to GL with plain pipe and a benthonite	Scale (approx)	Lc B	ogged Y
surround, fin	ished with	a rasied o	cover.						1:50 Figure N	-	Tmcl

$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	SI		Grou	nd In		igations Ire vw.gii.ie	land	Ltd	Site Coole Wind Farm		N	orehole umber HT12
under         Total         Total <th< th=""><th>Machine : Be</th><th>eretta T44</th><th></th><th>Casing</th><th>Diamete</th><th>er</th><th>Ground</th><th>Level (mOD)</th><th>Client</th><th></th><th></th><th></th></th<>	Machine : Be	eretta T44		Casing	Diamete	er	Ground	Level (mOD)	Client			
Incremental				10	2mm to 2	24.50m		68.58	Statkraft			
Digit:     Coll				Locatio	n			10710000	Project Contractor		S	heet
20       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10       10 <td< th=""><th>Viethod : Ro</th><th>otary Corec</th><th>3</th><th>24</th><th>0320 E 2</th><th>274754 N</th><th colspan="2">07/07/2020</th><th colspan="3">GII</th><th>2/3</th></td<>	Viethod : Ro	otary Corec	3	24	0320 E 2	274754 N	07/07/2020		GII			2/3
20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     20     <	Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
43         54.56         14.00         54.56         14.00         Contraction of the provide of the pr	11.00 11.00-11.45					0,0/0,0,0,0 SPT(C) N=0				shte shte shte shte shte shte shte shte shte		
100       67       43       43       6       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85       14.85	12.50 12.50-12.95	43					56.08	12.50	Poor Recovery. Driller notes: Grey Silt. Recovery consists of grey silty CLAY. (Stiff)	×		ور کور میں اور کو
1.55       Image: Strong to strong t	14.00	67	43	43		_		(0.85)	Cobbles. Recovery consists of grey sub-angular to sub-rounded coarse GRAVEL with occasional cobbles. (Dense)	0.0		
100       70       33         100       70       33         100       70       33         100       70       33         100       70       33         100       70       33         100       70       33         100       70       33         100       70       33         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100 <t< td=""><td>14.85</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>LIMESTONÉ. Distinctly weathered. (14.85m - 17.00m) One fracture set. F1: 10-30 Degrees, close to medium spaced, stepped rough with some brown clay infill.</td><td></td><td></td><td><u>588 g He</u>e</td></t<>	14.85								LIMESTONÉ. Distinctly weathered. (14.85m - 17.00m) One fracture set. F1: 10-30 Degrees, close to medium spaced, stepped rough with some brown clay infill.			<u>588 g He</u> e
100       70       33         100       70       33         100       70       33         100       70       33         100       70       33         100       70       33         100       70       33         100       70       33         100       70       33         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100       77       53         100 <t< td=""><td></td><td>100</td><td>70</td><td>43</td><td>6</td><td>_</td><td></td><td>(2.35)</td><td>some clay infill. F2: 80-90 Degrees, stepped</td><td></td><td></td><td></td></t<>		100	70	43	6	_		(2.35)	some clay infill. F2: 80-90 Degrees, stepped			
Remarks Logge 1:50 Tmcl	7.00	100	70	33				17.20	fine grained argillaceous LIMESTONE. Partially weathered to unweathered. (20.00m - 24.50m) One fracture set. F1: 0-10			
Remarks Logge 1:50 Tmcl	8.50	100	77	53	15			(2.80)	Degrees, close to wide, planar to undulating rough with some clay staining.			
(approx) By 1:50 Tmcl	0.00					-						
1:50 Tmcl	Remarks									Scale	Ŀ	ogged
												Tmcl

				WV	gations Ire w.gii.ie			Site Coole Wind Farm		B	orehole umber HT12
<b>Machine</b> : B Flush : W				Diamete 2mm to 2			Level (mOD) 68.58	Client Statkraft			ob umber '3-01-2
Core Dia: 6	3.5 mm		Locatio			Dates		Project Contractor			neet
Method : R	Rotary Core	d		0320 E 2	74754 N	07	/07/2020	GII			3/3
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
	93	90	77			48.58		Medium strong to strong thickly bedded dark grey fine grained LIMESTONE. Partially weathered to unweathered.			
21.50	97	93	87	4			(4.50)				
23.00	97	97	93			44.08					
24.50 Pomarks								Complete at 24.50m			
Remarks									Scale (approx) 1:50 Figure M 9373-0	1 No.	BH12

		Grou		WV	igations Ire vw.gii.ie			Site Coole Wind Farm		Nu BH	reho mbe 1T1
<b>lachine</b> : Be	eretta 144		-	Diamete 2mm to 2			Level (mOD) 67.06	Client Statkraft		Jo Nu 9373	mbe
Core Dia: m Method : Re		d	Locatio	n		Dates		Project Contractor		Shee	
		u	240806.7		275031.2 N	09/07/2020		GII		1/2	
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Ins
).00	10							Poor Recovery. Driller notes: Black PEAT. Recovery consists of dark brown fibrous PEAT. (Very Soft)	અપર અપર અપર અપર અપર અપર અપર અપર અપર અપર	b 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ომინ ისტითი წველილი და
2.00 2.00-2.45	40				0,1/0,0,1,1 SPT(C) N=2				shka shka shka shka shka shka shka shka shka	<u>"0 _ 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</u>	ერმან იკოლი აგელან იკოლი კა დამინ მილი იკ სითვები კარი კარი კარი კარი კარი კარი კარი სიავი კარი კარი კარი კარი კარი კარი კარი კარ
3.50 3.50-3.95	53				1,2/1,2,1,1 SPT(C) N=5				sstke sstke sstke stke sstke sstee sstke sstee sstke sstee sstke sstke sstke	<u>, , , , , , , , , , , , , , , , , , , </u>	ერიმ იკული იკული იკული იკული იკული იკული გადიმი გარი გარი ფირი იკული იკული იკული იკული იკული იკული იკული იკული იკული იკული იკული იკული იკული იკული იკული იკული იკული
5.00 5.00-5.45	10				0,0/0,0,0,0 SPT(C) N=0				shka shka ska ska ska ska ska ska ska ska ska s		00 1 1 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
6.50 5.50-6.95	13				0,0/0,1,0,1 SPT(C) N=2				site site site site site site site site site	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	
3.00 3.00-8.45	67				0,1/1,0,1,2 SPT(C) N=4	59.06		Soft light brownish grey slightly sandy SILT.	ىرلى يىلى يىلى	<u>, 2000, 2000, 2000, 2000, 2000, 2000, 2000</u> , 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 2000, 20000, 2000, 2000, 2000, 2	ა წალის და და და აკვლის და და მამი ფავითი თა და თავის და და და და და და და და გამი ფავითი თა და და და და თა ი გავითი და და თა თა და და და და თა თახიაითი და ხაოს იიხიაობი. ზა ის იხხიის და ხაოს
9.50 9.50-9.95					3,3/4,2,3,5 SPT(C) N=14	57.76	-	Poor Recovery. Driller notes: Black gravelly CLA' Recovery consists of dark grey slightly clayey sub-angular to sub-rounded medium to coarse Gravel with many cobbles. (Stiff to very stiff)	× × × × × × × × × * × × × × * × ×		0,000 0,00,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0,000 0
Remarks Standpipe ins surround, fin	stalled, slo ished with	tted from a rasied o	14.00m to cover.	o 1.00m E	3GL with a pea grave	l surround,	, sealed from 1	1.00m to GL with plain pipe and a benthonite	Scale (approx)	Lo By	gge
anound, iil	SHOU WIUI								1:50	т	mcl
									Figure N 9373-01		

Machine : Be		Grou	nd In <sub>Casing</sub>	W	igations Ire ww.gii.ie		Ltd	Site Coole Wind Farm Client		NI Bl Jo	
Flush :			10	2mm to 2	20.00m		67.06	Statkraft			u <b>mber</b> 3-01-20
Core Dia: m		1	Location 240806.7 E 275031.2 N			Dates 09/07/2020		Project Contractor GII	Sh	neet 2/2	
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
11.00 11.00-11.45	37				6,6/2,12,10,26 SPT(C) N=50					00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	ი ის
12.50 12.50-12.95	47				7,7/8,9,12,13 SPT(C) N=42					0 n 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	المحمد في المعهد الم المحمد في المحمد في محمد في المحمد المحمد في المحمد في المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد المحمد في المحمد في ا محمد في المحمد المحمد في المحمد في المحمد في المحمد المحم محمد المحمد ا
14.00 14.05	100	97	90			53.01		Medium strong to strong thinly to thickly beddec dark grey very fine grained LIMESTONE with some mudstone beds and laminations. Partially weathered to unweathered. (14.05m - 20.00m) Two fracture sets.F1: 0-10 Degrees, close to medium, planar to undulating rough with some clay smearing. F2: 80-90 Degrees, undulating rough, clean.			
15.50	100	97	80								
17.00	100	100	90	4			(5.95)				
18.50	100	100	100			47.06					
20.00 Remarks					1	47.00	20.00		Scale (approx)	Lc	ogged /
									(approx) 1:50 Figure N 9373-01	ד No.	ſmcl

Machine : B Flush :			Casing	Diamete	vw.gii.ie er sed to 12.50m		Level (mOD) 65.07	Client Statkraft	Job Numb 9373-0	
Core Dia: r Method :R		1	Location 239944 E 274806.9 N			Dates 01/08/2020		Project Contractor GII		<b>t</b> 2
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	d
0.00	33							Very soft dark brown fibrous PEAT.	>>>>>>>>>>>>>>>>>>>>>>>>>>>>	12 12 12
.00 .00-2.45	60				1,1/3,5,4,4 SPT(C) N=16	63.07		Stiff grey sandy silty CLAY onto a grey sub-angular to sub-rounded Gravel.		• [• ] • [• ] • ] • [• ] • ]
.50 .50-3.64	47				25/50 SPT(C) 25*/75 50/60	61.57		Dense grey sub-angular to sub-rounded medium to coarse GRAVEL with many cobbles.		
.00 .00-5.20 .05	60	23	13		14,25/50 SPT(C) 50/50	59.02		Medium strong thin to thickly bedded dark grey fine grained LIMESTONE with beds of black mudstone. Partially weathered to unweathered.		ø
.50	93	70	53					(6.05m - 12.50m) Two fracture sets. F1: 5-15 Degrees, very close to medium, planar to undulating rough with some clay infill. F2: 75-85 Degrees, undulating rough with calcite precipate on fracture surface.		
.00	100	97	73	10						
Remarks								Scale (approx) 1:50	By Tmc	

SI		Grou	nd In	vesti wv	gations Ire w.gii.ie	land	Ltd	Site Coole Wind Farm			Boreho Number SUBSTATIO
Machine : Be Flush :				Diamete 2mm cas	<b>r</b> ed to 12.50m		Level (mOD) 65.07	Client Statkraft			Job Number 9373-01-3
Core Dia: m Method : Re		ł	Locatio		74806.9 N	Dates 01	/08/2020	Project Contractor Gll			Sheet 2/2
Depth (m)	TCR	SCR	RQD	FI	Field Records	Level (mOD)	Depth (m) (Thickness)		Description		Legend
	100	93	57								
11.00	100	97	63								
12.50						52.57		Complete at 12.50m			
Remarks										Scale (approx) 1:50	Logged By Tmcl
										Figure N	



## **CONSULTANTS IN ENGINEERING, ENVIRONMENTAL SCIENCE & PLANNING**

www.fehilytimoney.ie

**ORK OFFICE** Core House Pouladuff Road, Cork, T12 D773, Ireland +353 21 496 4133

**Oublin Office** 

J5 Plaza, North Park Business Park, North Road, Dublin 11, D11 PXT0, Ireland +353 1 658 3500

**Q** Carlow Office Unit 6

Bagenalstown Industrial Park, Bagenalstown, Co. Carlow, R21 XA00, Ireland +353 59 972 3800



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