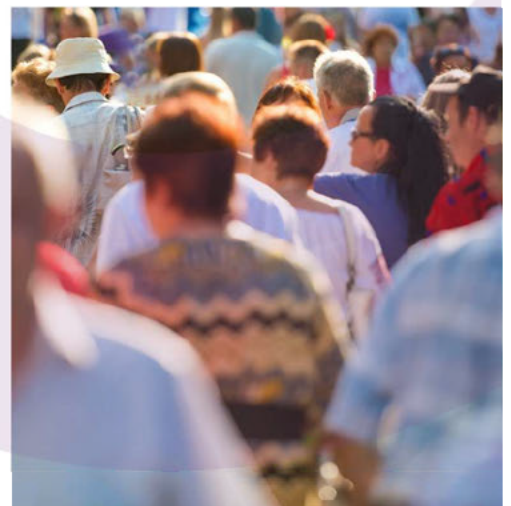
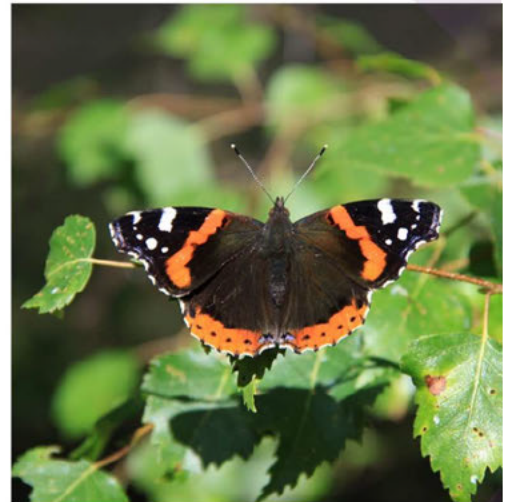


Infinergy

## **Limekiln Wind Farm Section 36C Variation Application**

Peat Management Plan  
Addendum



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Doc Ref. 42129-WOOD-XX-XX-RP-R-0001\_S4\_P01.1

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### Document revisions

No.	Details	Date
P01.1	Draft for comment	10/06/21
P01.2	Final	30/06/21

## Executive summary

This report has been produced with the purpose of updating the Peat Management Plan (PMP) prepared and submitted to discharge one of the planning conditions (the Tony Gee assessment) of the Consented Development. This PMP provides a comparison of the estimated peat extraction volumes for the Consented Development and the Revised Consented Development and provides an outline proposal for the re-use of extracted peat to addresses the principles set out in Scottish Renewables and SEPA guidance. This PMP also provides information on good practice for the handling and storage of peat during construction.

In June 2019, Limekiln Wind Farm gained Section 36 consent from Scottish Ministers. The Applicant is now applying to the Scottish Government for consent under Section 36C of the Electricity Act 1989 for a Revised Consented Development comprising a 21 turbine wind farm on the site of the Consented Development. The revisions include an increase in blade tip height, larger foundations and alterations to the access track layouts.

Soil mapping of the Development Site indicates that Revised Consented Development layout passes through blanket peat as well as pockets of peaty podzols and peaty gley soils. The NatureScot Carbon and Peatland 2016 map (SNH, 2016) indicates that these soils are Class 1 and 2 soils that are defined as carbon-rich and deep peat.

A series of peat depth survey campaigns and a ground investigation have been undertaken at the Development Site since November 2011. The latest survey was undertaken on the Revised Consented Development layout in April 2021. In total 5,363 peat depth measurements have been taken across the Development Site and layouts of the Consented and Revised Consented Development.

The Consented Development was designed through an iterative approach largely undertaken by site surveys, constraints mapping by a number of environmental disciplines, including peat. The findings of peat depth surveys have been considered throughout the layout design process including for the Revised Consented Development, with the aim of minimising peat disturbance and the requirement for peat excavation as far as reasonably practicable. In instances where the access tracks pass through peat depth > 1.0m a floating road technique will be employed to minimise the extraction volumes.

The total estimated volume of excavated peat for the Consented Development based on the Tony Gee assessment and the volumes calculated for the Revised Consented Development herein are presented in Section 4.3. In addition, estimations of the total re-use volumes have been re-calculated based on the proposed re-use methods in Section 3.4 and the assumptions in Section 4.2.

Based on the volume calculations approximately **109,343m<sup>3</sup>** of peat will be excavated from the Revised Consented Development and the proposed reinstatement methods have the potential to result in a small amount of additional capacity to store peat. However, in reality this capacity is so small (~6m<sup>3</sup>) that no additional peat is likely to be required to restore the Revised Consented Development and no surplus waste peat will remain following restoration.

It should be recognised that this PMP provides an outline of the potential re-use opportunities and peat mass balance for the Revised Consented Development. It should therefore be updated at the detailed design/tender stage once the final infrastructure locations are known, and a contractor has been appointed.

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# 1. Introduction

## 1.1 Background

Wood Group UK Limited (Wood) has been commissioned by Limekiln Wind Limited (the Applicant) to prepare a Peat Management Plan (PMP) in support of the Section 36C Variation Application for the proposed Limekiln Wind Farm, south of Reay, Caithness.

The 'Development Site' is located approximately 2km south of Reay at approximate central National Grid Reference (NGR) NC 98270 60620, as illustrated in **Figure 1.0** in **Appendix A**.

In June 2019, Limekiln Wind Farm gained Section 36 consent and deemed planning permission from Scottish Ministers. The 'Consented Development' comprises 21 wind turbines and associated infrastructure. The Applicant is applying to the Scottish Government for consent under Section 36C of the Electricity Act 1989 for the construction and operation of a Revised Consented Development comprising a 21 turbine wind farm on the site of the Consented Development. The revisions to the layout comprise an increase in blade tip height, larger foundations and alterations to the access track layouts.

## 1.2 Scope and Purpose

The purpose of this PMP is to update the PMP prepared and submitted for the discharge of conditions for the Consented Development. This PMP will provide a comparison of the estimated peat extraction volumes for the Consented Development and the Revised Consented Development.

This PMP addresses the principles set out in Scottish Renewables and SEPA guidance<sup>1,2</sup> by providing:

- Information on the geological and pedological setting based on published data;
- Information on the peat conditions based the field surveys and ground investigations undertaken at the Consented Development and assess its suitability for re-use;
- Information on the measures taken to avoid peat;
- Information on the elements of the Revised Consented Development that are likely to require peat extraction;
- An estimation of the peat volumes likely to be extracted at each element of the Revised Consented Development;
- A comparison of the estimated peat extraction volumes from the Consented Development and the Revised Consented Development;
- An estimate of the peat volumes that are anticipated to be suitable for re-use in reinstatements and landscape tie-ins;

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<sup>1</sup> Scottish Renewables and SEPA (2012) Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste.

<sup>2</sup> SEPA Guidance WST-G-052 (May 2017) *Developments on Peat and Off-Site Uses of Waste Peat*.



- Information on the control measures and appropriate management of the peat during handling and storage.

### 1.3 Proposed Development

In June 2019, Limekiln Wind Farm (the "Consented Development") was granted consent under Section 36 of the Electricity Act 1989 and Section 57 of the Town and Country Planning (Scotland) Act 1997 by the Scottish Ministers. The consent is for a wind farm with up to 21 wind turbines with varying tip heights and associated infrastructure. The Applicant is seeking to amend the consent to:

- Increase the height of all turbines to 149.9m (but keep them in their consented locations);
- Reroute the access tracks;
- Remove one borrow pit;
- Increase the period of consent from 30 to 40 years;
- Relocate the construction compound and increase its size from (100m x 100m) to (150 x 100m);
- Relocate five water crossings and insert two more;
- Increase the size of the crane hardstandings from 40 m x 22 m to 40 m x 35 m; and
- Removal of permanent anemometer mast.

Following the granting of consent for the Consented Development in June 2019, the Applicant has carried out the following enabling construction work:

- forming of a temporary construction compound at site entrance;
- creation of the consented access track from the A836 to Borrow Pit Search Area B;
- construction of the substation compound platform; and,
- excavation of Borrow Pit B to meet the rock requirements of the Consented Development enabling works

As the above works have already been consented and fully or partially completed, with the exception of the borrow pit, these elements of the wind farm have not been included in the calculations within this PMP.

A summary of the variations to the Consented Development proposed in the Revised Consented Development are summarised in Table 1.1 below. Note that Table 1.1. only summarises the variations and not the entire development therefore the elements of the Proposed Development that have already been constructed (as listed above) are not included.

Table 1.1 Summary of Consented Development and Revised Consented Development

Component	Consented Description	Revised Consented Description
<b>Wind Turbines</b>	Number: up to 21 turbines Base diameter: 18m	Number: as consented Base diameter: increased to 25m
<b>Crane Pads</b>	Number: up to 21 Dimensions: 22m x 40m	Number: as consented Dimensions: increased to 35m x 40m

Component	Consented Description	Revised Consented Description
<b>Blade Laydown Hardstanding</b>	Not included in Consented Development but included in discharge of conditions PMP.	Number: as consented Dimensions: 55m x 14.5m
<b>Temporary Construction Compound</b>	Location: NC 97995 63016 Dimensions: 100 x 100m	Location: NC 98192 62103 Dimensions: increased to 150 x 100m
<b>Access Tracks (including turning heads)</b>	Length: 15.3km <sup>Note 1</sup> Width: 5.5m	Length: decreased 12.1km Width: increased to 6.0m
<b>Borrow Pits</b> <sup>Note 2</sup>	Total number: 2 Footprint (assumed): 27,165.5m <sup>2</sup>	Total number: 1 Footprint (assumed): 21,575.3m <sup>2</sup>
<b>Cable Trenches</b>	Depth: 1.0m Width: 0.5m Length: 15.3km	Depth: 1.0m Width: increased to 1.2m Length: 12.1km

Notes:

1 – Access track lengths do not include the sections already consented and constructed as detailed above. A 3.1km section of access track has already been constructed.

2 – Although borrow pitting activities have commenced at Borrow Pit B they have only supplied rock for the elements constructed as detailed in Section 1.3. As such, further borrow pitting will be necessary to obtain rock for the Revised Consented Development and therefore it has been included in the calculations.

Collectively, these proposed variations to the Consented Development are referred to as the 'Revised Consented Development', which is shown on **Figure 2.0** in **Appendix A**.

## 1.4 Peat Definitions

Peat is an organic material formed by the accumulation of plant matter at various stages of decomposition, formed over many thousands of years. The characteristics of peat vary widely depending on, but not limited to, the nature of plant material that the peat is derived from, the degree of decomposition, the type of peat bog and the quality of the water sustaining the bog. In Scotland, the Scottish Government defines peat and deep peat as follows (Scottish Government, 2017):

- **Organo-soils (or peaty soils):** soils with an organic horizon <0.5m thick;
- **Peat:** soils with an organic surface horizon greater than 0.5m in thickness and an organic matter content exceeding 60%; and
- **Deep peat:** a peat as defined above, with a depth greater than 1.0m.

There are two distinct types of peat, termed acrotelmic and catotelmic peat. The interface between the two layers is controlled by the position of the water-table. The upper layer of the peat (the acrotelm) is typically fibrous and comprises the living and partially decomposed peat forming plant matter (vegetation). The thickness of the acrotelm is typically controlled by seasonal variations in the water-table that creates cycles of aerobic and anaerobic conditions near the surface. The catotelm is situated below the minimum average depth of the water-table resulting in permanent anaerobic decompositions of the plant matter and the formation of less fibrous sometimes amorphous peat.

Key aims of this PMP are to set out procedures to minimise excavated volumes of peat and protect peat resources as far as possible, thereby minimising carbon losses. A range of methods and control measures are described in this PMP which are designed to prevent these effects from occurring.



## 1.5 Previous Peat Management Plans

In 2012 the Environmental Statement (the 2012 ES) submitted with the first Limekiln Wind Farm Section 36 Application included a commitment to develop a peat management strategy prior to construction and following completion of detailed ground investigations. In response to the application Scottish Environmental Protection Agency (SEPA) lodged an objection due to a lack of information on the management of peat (PCS/124031, dated 14/02/2013). The objection was addressed through the preparation of a Peat Management Technical Note (ref. 33865CGOS019) which was included as Appendix C of the Further Environmental Information (2013 FEI) submitted in July 2013. The Peat Management Technical Note included calculations of the anticipated peat excavation volumes which indicated that approximately **77,000m<sup>3</sup>** of peat would require extraction and that the proposed re-use/restoration methods had sufficient capacity to re-use all of the extracted peat. Following submission SEPA withdrew their objection (PCS/127959, dated 06/08/2013) subject to the finalised PMP being agreed with the Planning Authority in consultation with SEPA and Scottish Natural Heritage (SNH) (now NatureScot).

In January 2016 the Applicant submitted a Scoping Report for the Limekiln Wind Farm Resubmission and in January 2016 SEPA responded (PCS/144513) with a request that an updated PMP should be submitted. In May 2016 EnviroCentre Ltd produced an Outline PMP in support of the resubmission application (2016 ES) which was based on the results of a site wide and targeted peat depth survey in 2011 and 2013, respectively. The calculations in the Outline PMP indicated that approximately **73,650m<sup>3</sup>** of peat would require extraction and that the proposed re-use/restoration methods have sufficient capacity to re-use all the extracted peat. The Outline PMP stated that it would require updating at the post planning consent, pre- construction phase, to incorporate further ground investigation data, design information and construction method statements. The Planning Application to construct the wind farm was subsequently consented in June 2019.

Following consent Tony Gee and Partners LLP (TGP) were commissioned by Infinergy on behalf of Limekiln Wind Ltd to produce an updated PMP for the Consented Development in support of discharging Planning Condition 19 (relating to the requirement for a Construction Environmental Management Plan). The PMP was based on existing peat depth data, two phases of additional high resolution peat surveys and an intrusive ground investigation undertaken at the Development Site in 2020. The TGP PMP was prepared over a number of revisions in consultation with The Highland Council (THC) and SEPA and concluded that approximately **103,809m<sup>3</sup>** of peat would need to be excavated with **103,807m<sup>3</sup>** being reinstated. The reason for the increased volume of peat extraction was noted to have been due to the increased size of the crane pads and the inclusion of a blade storage area, turning head and a passing place at each turbine increasing the overall footprint of the Consented Development.

For the purpose of this assessment, the PMP prepared by TGP is the basis for comparing the peat extraction and reinstatement volumes anticipated for the Consented Development and the Revised Consented Development.

## 1.6 Sources of Information and Guidance

The following sources of information and guidance have been referenced throughout this PMP:

- Appendix C: Peat Management Technical Note, Limekiln Wind Farm Further Environmental Information, July 2013;
- Appendix 5.B: Peat Slide Hazard & Risk Assessment, Limekiln Wind Farm Resubmission, Environmental Statement, May 2016 (herein referred to as "the 2016 ES");
- Appendix 5.C: Outline Peat Management Plan, Limekiln Wind Farm Resubmission, Environmental Statement, May 2016;

- Appendix 5.A: Preliminary Ground Investigation Factual Report, Limekiln Wind Farm Resubmission Environmental Statement, June 2016 (herein referred to as "the 2016 ES");
- Limekiln Wind Farm, Peat Management Plan, Tony Gee and Partners LLP, document reference S120004-TG-00-XX-C-2001, revision R06, November 2020.
- Limekiln Wind Farm, Phase 1 Factual Ground Investigation Factual Report, reference 1228952, Natural Power, July 2020.
- Limekiln Wind Farm, Phase 2 Factual Ground Investigation Factual Report, reference 1233164, Natural Power, August 2020.
- 2020 Peat Survey Natural Power (no accompanying report, only raw data was received).

The following guidance and best practice documents for peat management have been taken into account through the development of this peat management plan;

- Scottish Renewables, Scottish Natural Heritage, SEPA, Forestry Commission (2019) Good Practice During Wind Farm Construction, 4<sup>th</sup> Edition.
- Forestry Civil Engineering and Scottish Natural Heritage (2010) Floating Roads on Peat.
- Scottish Renewables and SEPA (2012) Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste, Version 1
- SEPA Guidance (2017); WST-G-052: Developments on Peat and Off-Site Uses of Waste Peat, Version 1.

## 2. Peat Conditions

### 2.1 Site Description

The Development Site is located 1.5km to the south of the Village of Reay and 3km south/south west of the Dounreay Nuclear Power Station, in Caithness, Highland. The site extends to approximately 1,140 hectares and largely comprises of a commercial coniferous woodland plantation. The Development Site is bound to the north by undulating moorland and semi-improved agricultural land with the Reay village and dispersed settlements beyond. To the east lies further coniferous woodland while the land to the west and south is largely open moorland. The hill known as Beinn Ratha lies approximately 1.2 km to the west of the site boundary.

### 2.2 Published Geology

#### Pedology

The 1:25,000 Soil Map of Scotland (The James Hutton Institute, 2020) indicates that Revised Consented Development layout passes through blanket peat as well as pockets of peaty podzols and peaty gley soils. The 1:25,000 Soil Map of Scotland is presented as **Figure 3.0 in Appendix A**.

The NatureScot Carbon and Peatland 2016 map (SNH, 2016) is presented as **Figure 4 in Appendix A**. The map indicates that the Revised Consented Development passes through areas of Class 1 and 2 soils that are defined as carbon-rich and deep peat. The Revised Consented Development also passes through a small area of Class 5 (no peatland habitat recorded) adjacent to the borrow pit.

### 2.3 Field Surveys

#### Peat Probing

A summary of the peat depth surveys undertaken at the Development Site is provided in Table 2.1 below.

Table 2.1 Summary of Peat Surveys

Author & Date	Purpose	Scope & Detail
<b>AMEC (now Wood) November 2011</b>	Preliminary assessment for consenting	<ul style="list-style-type: none"> <li>The aim of the survey was to provide a preliminary indication of the likely distribution of peat across the Development Site. However, due to dense forestry a targeted survey was undertaken primarily at turbine locations and en-route along fire breaks and rides where access allowed.</li> <li>A total of 124 no. peat depth measurements were taken using a peat utility probe and a Russian peat sampler where the peat depth was &gt;1.0m.</li> <li>The Russian peat core samples were subject to classification in accordance with the modified von Post classification scheme (Hobbs, 1986)</li> <li>The results of the survey (including coordinates) are presented in Appendix 5.A Preliminary Ground Investigation Factual Report, Limekiln Wind Farm Resubmission, Environmental Statement.</li> </ul>

Author & Date	Purpose	Scope & Detail
<b>AMEC (now Wood)</b> May 2013	Detailed assessment for consenting	<ul style="list-style-type: none"> <li>The aim of the survey was to provide detailed peat depth data across the Development Site as well as at the locations of turbines, existing and new access tracks, borrow pits, substation and construction compound.</li> <li>A total of 129 no. peat depth measurements were taken using a peat utility probe and a Russian peat sampler where the peat depth was &gt; 1.0m.</li> </ul>
<b>Tony Gee and Partners LLP</b> June 2020	Detailed assessment for Phase 1 of construction – access and enabling works	<ul style="list-style-type: none"> <li>A high resolution (closely spaced) peat depth survey was undertaken at the location of proposed wind farm infrastructure to inform the enabling works (the main access, borrow pit, construction compound and control building) and discharge of conditions for the Consented Development.</li> <li>The survey was undertaken alongside the initial tree felling operations to clear routes for the ground investigation.</li> <li>An intrusive ground investigation was also undertaken concurrently with the peat probing that targeted the wind farm infrastructure</li> <li>The proposed access track route and the entire micro-siting buffer zone were probed where tree felling allowed.</li> <li>The scope of peat survey comprised: <ul style="list-style-type: none"> <li>Access Tracks – transects every ~50m perpendicular to the track comprising a minimum of 5 no. probes every 20m from centre line.</li> <li>Construction compound – grid of probes spaced at 25m centres across the entire footprint.</li> <li>Control building – grid of probes at 20m centres across the entire footprint.</li> <li>Borrow Pit B – transects every 20m along existing rides or felled corridors within the borrow pit footprint where possible (the number of probes depended on the cleared area).</li> </ul> </li> </ul>
<b>Tony Gee and Partners LLP</b> July & August 2020	Detailed assessment for Phase 2 of construction – access and turbine construction	<ul style="list-style-type: none"> <li>A high resolution (closely spaced) peat depth survey was undertaken at all remaining wind farm infrastructure to inform the construction of remaining access routes and discharge of conditions for the Consented Development.</li> <li>The survey was undertaken alongside the tree felling operations to clear routes for the ground investigation.</li> <li>The scope of peat survey comprised: <ul style="list-style-type: none"> <li>Access Tracks – transects every ~50m perpendicular to the track comprising a minimum of 5 no. probes every 20-50m from centre line.</li> <li>Crane pads and turbines – grid of probes spaced at approximate 25m centres across the entire footprint where possible.</li> <li>Borrow Pit A – transects every 20m along existing rides or felled corridors within the borrow pit footprint where possible (the number of probes depended on the cleared area).</li> </ul> </li> </ul>

Author & Date	Purpose	Scope & Detail
<b>Natural Power April 2021</b>	Update of TGP PMP to support Section 36C application.	<ul style="list-style-type: none"> <li>● A scope of detailed peat depth survey was developed by Natural Power in general accordance with guidance published by the Scottish Government et al (2017)<sup>3</sup></li> <li>● The survey targeted on the varied elements of Revised Consented Development layout including the turbine location and access tracks. The unaltered elements of the Consented Development were not probed.</li> <li>● The scope of the survey comprised: <ul style="list-style-type: none"> <li>○ Access Track – the access tracks south of Borrow Pit A were surveyed at 50m intervals with a probe also placed ~15m perpendicular to either side of the access track.</li> <li>○ Turbines – a crosshair of probes orientated to grid north-south were undertaken at 10m intervals from the location of the turbine up to 100m.</li> </ul> </li> </ul>

Reference: partly adapted from Limekiln Wind Farm Peat Management Plan, Tony Gee and Partners LLP, reference S12004-TG-00-XX-RP-C-2001

## Ground Investigation

The TGP PMP provides information on the intrusive ground investigation undertaken at the site by Natural Power under the supervision of engineers from TGP. The ground investigation is summarised as follows:

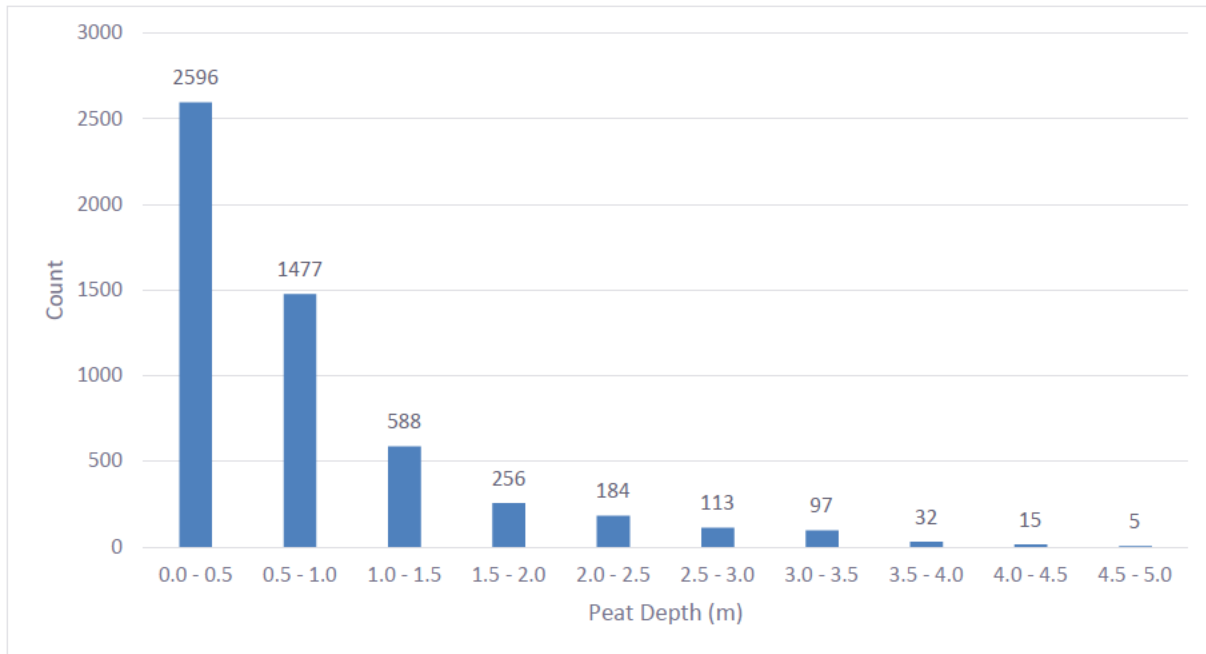
- 54 no. boreholes (29 no. rotary percussive boreholes with follow on rotary core drilling, 25 no. windowless boreholes);
- 192 no. machine excavated trial pits, 3 no. hand dug trial pits;
- 5 no. pavement cores;
- In-situ testing (dynamic cone penetrometer testing; standard penetration testing and undisturbed sampling, hand shear vane tests in peat in trial pits);
- Groundwater and ground gas monitoring; and
- Geotechnical and geochemical laboratory testing.

## 2.4 Peat Depth & Distribution

In total 5,363 peat depth measurements have been taken across the Development Site and layouts of the Consented Development and Revised Consented Development. The peat probing campaigns and ground investigation reveal that peat depths range between 0.00m and 4.90m. A total of 2,767 (~51%) recorded peat depths  $\geq 0.5$ m and the calculated mean of all peat depths  $\geq 0.5$ m is 1.17m. Figure 2.1 below summarises the distribution of peat depth measurements for the Development Site.

<sup>3</sup> Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland, on-line version only

Figure 2.1 – Summary of all peat depth data



A summary of the peat depths recorded at the Consented Development and Revised Consented Development is provided in Table 2.2 below.

Table 2.2 Summary of peat depths

	Consented Development	Revised Consented Development
<b>Number of measurements</b>	2,620	1,780
<b>Minimum</b>	0.00m	0.00m
<b>Maximum</b>	4.00m	4.60m
<b>Mean</b>	0.72m	0.81m

#### Notes

These values relate to the probing locations along the Consented and Revised access tracks leading from BP-B only. The probing locations at turbines and crane pads are also included.

The peat depths recorded during the peat survey of the Revised Consented Development are presented as **Figures 5.0 to 5.8**. A composite of all peat depths survey results, include the ground investigation are presented in **Figures 6.0 to 6.11**

The peat depth measurements from all sources have been combined to create an interpolated peat depth map showing the extent and variation in thicknesses of peat across the Development Site. **Figure 7.0** in **Appendix A** shows the interpolated peat depths with the Consented Development and Revised Consented Development overlain.

The interpolated peat depth map indicates that approximately one third of the Development Site contains peat depths <0.5m. In the west of the site between T26 and T43 the proposed access passes through a large area of peat with thicknesses in excess of 2.0m, ranging up to approximately 4.5m. In addition, further pockets of peat with thicknesses >2.0m are identified throughout the site in or near the location T25, T54, T55, T30 and T57.



## 2.5 Peat Characteristics

A total of 74 peat cores were logged according to the von Post scale of humification during the peat depth surveys undertaken in 2011 and 2013. The coring revealed a typical one or two layer profile with generally low moisture content values (typically B2). The humification values were typically less than H5 with H values up to H7 rarely recorded. The investigation also attempted to estimate the thickness of the acrotelmic layer, which revealed thicknesses vary from approximately 0.3m to 0.5m. However, as noted in the Peat Management Technical Note, the commercial forestry plantation has resulted in the peat being densely planted and with trees along deeply ploughed furrows. As a consequence of the planting, the increased drainage and evapotranspiration of the surface peat has resulted in the peat being reasonably dry. It was noted that the characteristics of the surface peat have been altered to such a degree that there was no clear distinction between acrotelmic and catotelmic peat. The peat was described as exhibiting 'haplotelmic' peat conditions in which the acrotelm has been degraded through drainage, compaction and oxidative wastage.

The TGP PMP reveals that the intrusive ground investigation undertaken on the Consented Development encountered fibrous to pseudofibrous (H3-H6) peat, with localised areas of amorphous peat (H7-H9). As identified by previous surveys, the distinction between the acrotelmic and catotelmic peat was difficult to distinguish. The distinction was especially difficult in areas where trees had been felled, and brash had to be removed prior to trial pitting. However, where identifiable, the acrotelmic layer generally varied in thickness from 0.1m-0.7m.

## 3. Peat Management

### 3.1 Peat Management Principles

A hierarchy of peat management approaches is provided in Scottish Renewables and SEPA guidance documents<sup>4,5</sup> that recommend the following:

- **Prevention** – prevent or minimise peat excavation/disturbance through considered design that avoids or minimises wind farm infrastructure within areas of peat. Where avoidance is not possible, minimise excavation of peat using engineering solutions such as floating roads.
- **Re-Use/Reinstatement** – re-use extracted peat close to its original location in the reinstatement or restoration of temporary infrastructure, road verges and borrow pits. Peat may also be used where appropriate to improve or restore peatland habitats.
- **Recycle/Recover/Treat** – while the priority should always be to prevent and re-use peat on site there may be situations in which there may still be a surplus of excavated peat. Where demonstrated that it is suitable for use peat, may be blended, dewatered or treated to improve its properties to support re-use on site.
- **Temporary storage** – store the peat temporarily during construction prior to re-use in on site reinstatement or restoration activities.

The design of the wind farm layout evolved throughout the assessment of the Development Site in response to consultations, desk studies, field surveys and technical assessments undertaken by a range of disciplines in support of the ES and Further Environmental Information (FEI).

### 3.2 Construction Activities & Effects

The following construction activities will require the stripping of peat and peaty soils down to the underlying substrate and formation level of the infrastructure at the Revised Consented Development layout;

- Cut access tracks (where peat depths are <1.0m; where peat depths are >1.0m access tracks will be floated);
- Wind Turbine Generator (WTG) foundation excavations;
- Crane pads;
- Cable trenches;
- Temporary construction compound hard standings; and,
- Removal of overburden to facilitate further borrow pitting

Other construction activities that have the potential to disturb peat include:

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<sup>4</sup> Scottish Renewables and SEPA (2012) Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste.

<sup>5</sup> SEPA Guidance WST-G-052 (May 2017) *Developments on Peat and Off-Site Uses of Waste Peat*.

- Trafficking of plant and machinery over areas underlain by peat and peaty soils;
- Laydown of materials (including excavated peat and mineral soils) on peat and peatland vegetation; and
- Reinstatement of peat and peaty soils and/or other re-vegetation activities to reinstate or tie pre-construction peatland habitats into the Revised Consented Development.

These activities have the potential to cause a range of effects during construction and operation including loss of integrity and vegetation, drying, erosion, oxidation and interruption of the peat hydrology,

### 3.3 Minimising Peat Excavation

The Consented Development was designed through an iterative approach largely undertaken by site surveys, constraints mapping by a number of environmental disciplines, including peat. The proposed alignment of access tracks for the Revised Consented Development has sought where possible to minimise the overall track length and avoid identified constraints.

The findings of peat depth surveys have been considered throughout the layout design process for the Consented Development, with the aim of minimising peat disturbance and the requirement for peat excavation as far as reasonably practicable. For the access track layout in the Revised Consented Development, where avoidance of peat has not been possible due to the need to avoid the Core path, a floating road technique will be employed to minimise the extraction volumes. While there are a range of factors that influence the decision on whether to float a road (Forestry Commission Scotland and SNH, 2010), for the purpose of this assessment a floating road technique will be employed where the peat depth exceeds 1.0m in thickness.

Table 3.1 below summarises the wind farm infrastructure elements in each peat depth definition.

Table 3.1 Summary of peat depth definitions at wind farm infrastructure

Peat Depth	Consented Development	Revised Consented Development
<b>Peaty soils (&lt;0.5m)</b>	Turbines: 25, 26, 31, 35, 42, 56 Crane pads at turbines: 26, 35, 42 Blade laydown: n/a <sup>Note 1</sup> Temporary construction compound Cut access track: 5.5km <sup>Note 2</sup>	Turbines: 25, 26, 31, 35, 42, 44, 54, 56 Crane pads at turbines: 26, 27, 35, 42 Blade laydown at turbines: 35, 42 Temporary construction compound Cut access track: 3.3km
<b>Peat (&gt;0.5 and &lt;1.0m)</b>	Turbines: 22, 23, 32, 33, 36, 43, 44, 51, 54, 61 Crane pads at turbines: 22, 23, 25, 26, 27, 30, 31, 36, 43, 44, 56, 51, 61 Blade laydown: n/a Cut access track: 7.2km	Turbines: 22, 23, 32, 33, 36, 43, 51, 61 Crane pads at turbines: 22, 23, 25, 30, 31, 36, 43, 44, 51, 56, 61 Blade laydown at turbines: 23, 30, 36, 27, 33, 44, 60, 51, 56, 61, 26, 25, 31, 55 Cut access track: 5.1km
<b>Deep Peat (&gt;1.0m)</b>	Turbines: 27, 30, 55, 57, 60 Crane pads at turbines: 32, 33, 54, 55, 57, 60 Blade laydown: n/a Cut access track: n/a Floating access track: 2.5km	Turbines: 27, 30, 55, 57, 60 Crane pads at turbines: 32, 33, 54, 55, 57, 60 Blade laydown at turbines: 22, 57, 32, 43, 54 Cut access track: n/a Floating access track: 3.7km

Notes:

1 – Blade laydown areas were not proposed in the Consented Development but were included in the TGP PMP.

2 – Access track lengths do not include the sections already consented and constructed as detailed in Section 1.3.

### 3.4 Proposed Re-Use

While the guiding principle has been to avoid peat and therefore peat excavation, for engineering, logistical and due to other environmental constraints (e.g. ecological or hydrological) the placement of wind farm infrastructure in areas of peat has been unavoidable. The next best solution is to reinstate or re-use the peat at its original position wherever this is possible. Table 3.2 outlines how excavated peat and peaty soils will be reused/reinstated and also provides the assumptions used for the peat excavation calculations detailed in Section 4.

Table 3.2 Proposed Re-Use

Infrastructure Element	Proposed Re-Use
<b>Turbines</b>	<p>Reinstatement of peat over the portion of the turbine excavation not connected to the crane pad and/or blade laydown area (i.e. approximately half of the excavated area of the circular excavation). An additional 2m around the reinstatement area will be reinstated to ensure a suitable tie with the surrounding vegetation and habitats.</p> <p>Where the peat depth is &lt;0.5m it will be reinstated with 0.5m of peat. Where the peat depth is &gt;0.5m in depth the peat will be reinstated to its original average depth.</p>
<b>Crane Pads</b>	<p>In accordance with best practice guidance<sup>6</sup> the crane pad shall not be reinstated or reduced in size following construction but shall be retained for future turbine maintenance. The crane pad batters are to be reinstated at the edges of the pad to create a suitable tie-in with the surrounding vegetation on two sides (i.e. those not connected to the track and turbine).</p> <p>Where the peat depth is &lt;0.5m it will be reinstated with 0.5m of peat. Where the peat depth is &gt;0.5m in depth the peat will be reinstated to its original average depth plus 0.5m to tie the batter in with the surrounding vegetation. The width of the reinstatement will be 3.5m.</p>
<b>Blade Laydown Hard standings</b>	<p>It has been assumed that the blade laydown areas adjacent to the crane pad are temporary and will be completely reinstated following construction of the turbine. The blade laydowns will be slightly over excavated to remove all stone and create a minimum restoration thickness of at least 1.0m at each laydown. This will minimise transport of excess catotelmic peat from the turbine bases</p>
<b>New Cut Assess Tracks</b>	<p>The verge shall be reinstated to ensure that a suitable visual tie-in with the surrounding vegetation and habitats is created. The reinstatement area will be 0.5m deep and 3m wide along either side of the track. The turning heads and arcs will be reinstated to a width 2.5m along the outer edge of the arc.</p>
<b>New Floating Access Tracks</b>	<p>The verge can be reinstated to ensure that a suitable visual tie-in with the surrounding vegetation and habitats is created. Any verge reinstatement will be up to 0.5m deep (to avoid any over-depositing of peat which would create high verges that could prevent water draining off the road) and up to 2m wide on either side of track.</p>
<b>Cable Trenches</b>	<p>The cable trenches will be reinstated with the peat that was extracted to a depth of between 0.5m and 0.95m. Where the access track will be floated it is assumed that cabling will be laid directly onto the undisturbed peat and buried within the verge reinstatement (see new floating access track above). As such, no excavation for cable trenches will be required adjacent to sections of floated track.</p>
<b>Temporary Construction Compound</b>	<p>The temporary construction compound will be reinstated to a thickness of 0.5m.</p>
<b>Borrow Pits</b>	<p>The borrow pit shall be restored with 1.20m of peat.</p>

<sup>6</sup> Scottish Renewables, SNH, SEPA, Forestry Commission Scotland and Historical Environment Scotland (2015) Good practice during Wind Farm Construction

### 3.5 Suitability for Re-use

The characteristics of the excavated peat (e.g. fibrosity and water content) determines its suitability for re-use with the wettest most amorphous peat generally being the least suitable.

The von Post classification undertaken during previous investigation of the Consented Development indicate that humification values were typically less than H5 in areas of shallow peat and that the peat is fibrous to pseudofibrous. In areas of deeper peat H values ranged between H7 to H9 and localised areas of amorphous peat were identified.

The depth of the acrotelmic layer, where identifiable in previous investigations, generally varied in thickness from 0.1m-0.7m. For the purpose of this PMP it has been assumed that the top 0.5m will be acrotelmic peat consisting of fibrous peat and the surface vegetation.

The following assumptions have been made with regard the characteristics of the peat and the intended suitable reuses at the Revised Consented Development:

- **Acrotelmic peat / peat soils** – when stripped with the vegetation, intact curves of acrotelmic peat or peaty soils will be suitable for surface reinstatement, dressing back and tying in infrastructure to the surrounding vegetation and habitats.
- **Fibrous catotelmic peat** – most suitable for reinstatement beneath the replaced acrotelm. It may also be used as a surface layer with careful site selection and management to control erosion and encourage vegetation recovery (e.g. seeding, translocation of vegetation and fencing to deter deer grazing)
- **Amorphous peat** – peat of this type will only be suitable for reinstatement of excavations beneath a surface vegetation layer. The peat may also be used in the restoration of the borrow pit beneath an acrotelmic layer to create conditions which will support development of a mire habitat. However, the volume of amorphous peat that will require removal is anticipated to be small given that infrastructure has avoided the need to excavated deep peat where possible.

### 3.6 Temporary Storage

The selection of temporary peat storage locations shall consider the environmental constraints, peat landslide risk and avoid placing peat on top of sensitive peatland habitats and near watercourses. In addition, the stockpiles shall be designed to include measures that avoid instability of the stockpiles and the run-off of peat laden sediment into watercourses. As far as possible excavated peat from the access tracks and cable trenches shall be temporarily stored adjacent to the excavation or re-used immediately in the restatement of the track verges and trench.

The outline PMP submitted with the 2016 ES and the TGP PMP submitted to discharge planning conditions, identify locations for temporary storage using the criteria in Table 3.3 below. For the purpose of this assessment, the same criteria have been utilised to identify suitable locations for temporary storage at the Revised Consented Development layout as shown in **Figure 8** in **Appendix A**.

Table 3.3 Temporary storage criteria

Suitability	Criteria
<b>High</b>	<ul style="list-style-type: none"> <li>• Less than 75m from proposed infrastructure (to minimise extent of construction envelope).</li> <li>• More than 50m from watercourses.</li> <li>• Located on peat that is less than 1.5m thick.</li> <li>• Located on slopes which are less than 5°.</li> <li>• Avoiding groundwater dependent terrestrial ecosystems (GWDTEs).</li> </ul>
<b>Moderate</b>	<ul style="list-style-type: none"> <li>• Defined in the same way as High but GWDTEs are present.</li> </ul>
<b>Low</b>	<ul style="list-style-type: none"> <li>• Areas which do not meet one or more of the defined criteria (excluding the presence of GWDTEs).</li> </ul>

Although **Figure 8** in **Appendix A** identifies potentially suitable storage locations, the exact location and dimensions of the temporary storage stockpiles shall be determined on site during construction. Each storage location will be assessed by the Site Environmental Engineer, Geotechnical Engineer and the Environmental Clerk of Works (EcoW) to determine whether they are suitable. The Site Engineer will consider each location's suitability in terms of its environmental impact, safety, constructability and whether special mitigation measures will be required (e.g. orientation of the stockpile, levelling/benching, bunding to contain stored materials and site-specific drainage to ensure that runoff waters are sufficiently controlled).

The peat will be temporarily stored in the following general arrangement:

- Peat stripped to construct the new cut access tracks will be re-used as the construction progresses. The intact surface turves will be placed on roadside verges during construction and will not need to be temporarily stored elsewhere.
- At turbines, crane pads, blade laydowns and the construction compound peat will be temporarily stored in designated locations as close to its original location as possible.
- At the borrow pit, peat will be stripped and temporarily stored as close as possible to the borrow pit, within the borrow pit search area.
- At the control building and substation peat will be temporarily stored within a purpose-built peat storage area or the borrow pit search area and then re-used for reinstatement at other parts of the Revised Consented Development.



## 4. Peat Mass Balance

### 4.1 General

The peat extraction volumes for the Revised Consented Development have been estimated from data gathered during the field surveys described in Section 2.3 and the dimensions of the infrastructure components shown Table 1.1. In each case, the average peat depths for the calculations have been derived from the average of all 5m cell centres of the interpolated peat depth map (**Figure 7.0 in Appendix A**) that fall within each element using ESRI ArcGIS.

The interpolated peat depth map has used the Spline method of interpolation. While it is recognised that this method may exaggerate the troughs and peaks where there are large distances between sample points (i.e. the peat depth measurements) it plots the modelled surface exactly through the sample point value. Other methods such as Natural Neighbour apply weightings to the values which may result in over or under estimation of the modelled surface value at the sample points. Given the density of the sample points along proposed infrastructure (except for the sections mentioned in Section 4.2) the Spline method is considered an appropriate model of the peat depths at infrastructure locations. An interpolated peat depth map resolution of 5m is considered appropriate given the distance between sample points is between 10 and 50m with the highest resolution of sample points at the turbines and related infrastructure. This method of determining the average peat depth considers the modelled spatial variation in peat depths between sample points rather than relying on just the sample points that fall within the footprint of proposed infrastructure.

The access tracks are long linear features that pass over a large range of peat depths. The use of a single average for the access tracks would not therefore represent the peat depth variability. As such, the access tracks have been divided into chainages typically 50m long, though depending on their location some chainages may be longer or shorter (i.e. the ends of the track may be shorter or longer depending how the preceding chainages are aligned).

The peat extraction volumes have been estimated for the Revised Consented Development and compared against the estimated volumes for the Consented Development for the site as a whole as presented in Table 15 of the TGP PMP. The layouts of the Consented Development and Revised Consented Development to which the calculations relate are presented in **Figure 2.0 in Appendix A**.

### 4.2 Key Assumptions and Limitations

The following key assumptions for the excavated and reinstated peat volumes are as presented in Table 3.2 and as follows:

- The extraction volumes in Table 15 of the Limekiln Wind Farm, Peat Management Plan (Tony Gee and Partners LLP, document reference S120004-TG-00-XX-C-2001, revision R06, November 2020) include the entirety of the main access track from the A836 to Borrow Pit B which has already been constructed. The peat extraction volume for this section of access track is given in Table 7 of the TGP PMP as 2,267m<sup>3</sup> which has been subtracted from the value presented in Table 15 of the TGP PMP. The values presented for the Revised Consented Development tracks therefore relate to the tracks leading away from Borrow Pit B to the turbines.
- The calculations presented herein do not include the elements of the Proposed Development that have already been constructed, as detailed in Section 1.3. It is assumed that the peat excavated for these elements has already been/is being managed appropriately.

- The excavated peat volumes have been divided into acrotelmic and catotelmic peat. It is assumed that all peat of thickness up to 0.5m are acrotelmic, and anything >0.5m in thickness is catotelmic.
- The estimated extraction volumes at the turbines have been calculated slightly differently to the method adopted in the TGP PMP. In addition to wider base diameters (25m) the top diameter of the excavation has been calculated based on the average peat depth at each turbine location and a batter angle of 27° (1:2). However, it assumed that excavations in peat depths less than 0.5m will not require the peat to be battered back. This has been adopted for the purpose of these calculations but in practice would need to be assessed by the Site Engineer based on the characteristics of the peat at each turbine.
- The depth of crane pad and blade laydown hardstanding excavations are assumed to be to the underlying peat substrate with a batter angle of 27°. It is assumed that hard standings in peat depths less than 0.5m will not require the peat to be battered back. This has been adopted for the purpose of these calculations but in practice would need to be assessed by the Site Engineer based on the characteristics of the peat at hard standing.
- The reinstatement batter for the crane pad has been assumed to be the width of the excavation batter plus 1m to provide a suitable tie in with the surrounding vegetation. It is assumed that reinstatement will be on the two sides (short and long) of the hardstanding not facing the turbine or access track.
- The calculations for access tracks includes the turning heads and junction arcs.
- Cable trenches have been assumed to be 1.0m deep and 1.2m wide. It is assumed that cable trenches will be located alongside the access tracks in the verge. Where the access track will be floated it is assumed that cabling will be laid directly onto the undisturbed peat and buried within the verge reinstatement. As such, no excavation for cable trenches will be required adjacent to sections of floated track. The reinstatement thickness has been assumed to be 0.9m.
- It has been assumed that 21,575.3m<sup>2</sup> of the Borrow Pit B search area will be excavated to extract stone. It has been assumed that the entire footprint of the borrow pit shall be reinstated with up to 1.00m depth of peat.
- Where the access tracks pass turbines, crane pads and blade laydown areas the estimated values have been adjusted accordingly to avoid double counting.
- No allowance has been made for the assist pad and turning head footprint included in the TGP PMP. It is assumed that these will not be required in the Revised Consented Development layout.
- Excavation and reinstatement volumes associated with drainage ditches and areas of cut and fill for the access tracks have not yet been calculated as the dimensions shall depend on the final alignment of the track and dimensions of the drainage ditches.
- The peat balance calculations are in the context of the Revised Consented Development layout, guidance, and literature sources available at the time of writing. New information, improved practices and changes in guidance or significant alterations to the Revised Consented Development layout post-consent may necessitate a re-interpretation of the assessment in whole or in part after its original submission.

- It should be recognised that the surveys and interpolations based on those surveys provide information characterising the variation of peat depths and that different conditions may be present between survey locations.
- The calculations are based on peat depth data obtained by third parties and provided to Wood. Wood has assumed that the data are true and correct at the time of use and cannot provide any warranty or accept any liability for their accuracy. Wood has not verified any of the peat depth measurements obtained by third parties.

### 4.3 Peat Extraction Volumes

Table 4.1 below summarises the estimated excavations volumes of peat that will be extracted across the Consented Development compared to the Revised Consented Development (excluding the main access from the north).

Table 4.1 Assessment of peat extraction volumes

Infrastructure	Total Extraction Volume (m <sup>3</sup> )	
	Consented Development	Revised Consented Development
<b>Turbine bases</b>		9,254
<b>Crane pads</b>		26,849
<b>Blade laydown</b>	56,395	16,280
<b>Turning head and assist pad</b>		Not required
<b>New cut access tracks</b>	11,231 <sup>Note 1</sup>	34,631
<b>Upgraded access tracks</b>	4,880	0
<b>Floating access track</b>	0	0
<b>Cable trenches</b>	2,570	5,567
<b>Construction compound</b>	2,500	3,600
<b>Borrow pit</b>	13,162	13,162 <sup>Note 2</sup>
<b>Total Volume</b>	<b>90,738</b>	<b>109,343</b>

Notes

1 – The estimated volume of cut tracks in the TGP PMP has been reduced by 3,900m<sup>3</sup> to account for the approximate volume of extraction along the main access track from the B836.

2 – The location of borrow pit search area BP-B has not been revised. The value presented here has been calculated by TGP in Table 11.

The volume estimations indicate that an additional **18,605m<sup>3</sup>** of peat will be excavated by the Revised Consented Development. This is due to the following:

- 18,520m<sup>3</sup> due to the construction of additional new cut access tracks and the removal of upgraded tracks;
- 2,997m<sup>3</sup> due to wider cable trenches;
- 1,100m<sup>3</sup> due to the increased size of the Temporary Construction Compound; and

The increases are offset by a reduction of 4,012m<sup>3</sup> in the total volume of excavated peat associated with turbine bases, crane pads, blade laydown areas and turning heads/ assist pads. Although there will be increases in the size of crane pads and the turbine foundations (and therefore the excavation diameter), this is more than offset by the removal of turning heads and assist pads from the Revised Consented Development; and

The additional volume of excavated peat is largely due to the re-designed access tracks, which have been driven by the need to avoid Core Path CA11.03 through Limekiln Forest. This core path was proposed for use as the main access track in the Consented Development but the Section 11 application was refused by The Highland Council (THC). The alternative routes in the Revised Consented Development have been designed to minimise the extraction of peat but it is accepted that these tracks are in areas of deeper peat than the consented track. However, it is of note that the excavated peat will be quickly reinstated in verges alongside the access tracks and to infill the cable trenches. Control measures outlined in Section 5 of this PMP will ensure that the peat is temporarily stored and reinstated in a manner that will minimise damage.

A summary of the peat extraction volumes for the Revised Consented Development split by acrotelmic and catotelmic peat are presented in Table 4.2 below.

Table 4.2 Summary of peat extraction volumes by peat characteristics

Infrastructure	Total Extraction Volume (m <sup>3</sup> )	
	Acrotelmic Peat	Catotelmic Peat
<b>Turbine bases</b>	5,403	3,852
<b>Crane pads</b>	15,256	11,593
<b>Blade laydown</b>	9,141	7,138
<b>New cut access tracks</b>	27,526	7,105
<b>Upgraded access tracks</b>	0	0
<b>Floating access track</b>	0	0
<b>Cable trenches</b>	4,484	1,083
<b>Construction compound</b>	3,600	0
<b>Borrow pit</b> <sup>Note 1</sup>	9,170	3,992
<b>Total Volume</b>	<b>74,580</b>	<b>34,762</b>

Notes

1 – The location of borrow pit search area BP-B has not been revised. The value presented here has been calculated by TGP.

The spreadsheet calculations for the estimated extraction volumes are presented in Appendix B.

## 4.4 Peat Reinstatement Volumes

Table 4.3 below summarises the volumes of peat that will be re-used across the Revised Consented Development (excluding the main access) as per the methods outlined in Table 3.2 and the assumptions in Section 4.2.

Table 4.3 Summary of reinstatements/re-use volumes

Infrastructure	Total Re-Use Volume (m <sup>3</sup> )		
	Acrotelmic Peat	Catotelmic Peat	Total
Turbine bases	3,220	2,003	5,224
Crane pads	3,344	4,125	7,469
Blade laydown	9,580	14,854	24,434
New cut access tracks	26,732	0	26,732
Upgraded access tracks	0	0	0
Floating access track	8,230	0	8,230
Cable trenches	5,185	3,002	8,187
Construction compound	7,500	0	7,500
Borrow pit	10,787	10,787	21,573
<b>Total Volume</b>	<b>74,578</b>	<b>34,771</b>	<b>109,349</b>

Table 4.4 below summarises the peat mass balance for the Revised Consented Development. Note that this excludes the main access track from the north.

Table 4.4 Summary of peat mass balance

Infrastructure	Total Re-Use Volume (m <sup>3</sup> )		
	Acrotelmic Peat	Catotelmic Peat	Total Balance
Turbine bases	2,182	1,848	4,031
Crane pads	11,912	7,469	19,381
Blade laydown	-439	-7,716	-8,155
New cut access tracks	794	7,105	7,899
Upgraded access tracks	0	0	0
Floating access track	-8,230	0	-8,230
Cable trenches	-701	-1,919	-2,621
Construction compound	-3,900	0	-3,900
Borrow pit	-1,617	-6,795	-8,411
<b>Total Volume</b>	<b>+2</b>	<b>-8</b>	<b>-6</b>

#### Notes

Positive values denote a surplus of peat for those elements that will be taken up elsewhere.  
Negative values denote that there is capacity to take more peat at those elements.

The spreadsheet calculations for the re-use volumes are presented in Appendix B.

Table 4.1 indicates that the total volume of peat that will be stripped and excavated from the Revised Consented Development during construction will be approximately **109,343m<sup>3</sup>**. Using the proposed scheme in **Error! Reference source not found.** and considering the assumptions in Section 4.2 the total volume of peat that could be re-used for reinstatement at and alongside the Revised Consented Development is **109,349m<sup>3</sup>**. The method of calculating peat reinstatement has used the average peat depths and indicative batter and track verge widths, but these figures show that there is scope within the Revised Consented Development for the complete re-use of all stripped and excavated peat. Although there is the potential for there to be a small amount of additional capacity to store peat (~6m<sup>3</sup>), in reality this capacity is so small that no additional peat is likely to be required to restore the Revised Consented Development and no surplus waste peat will remain following restoration.

It should be recognised that this PMP provides an outline of the potential re-use opportunities and peat mass balance for the Revised Consented Development. It should therefore be updated at the detailed design/tender stage once the final infrastructure locations are known, and a contractor has been appointed. The final PMP should be updated in accordance with Stage 3 of the development process and should form the basis against which the site will be monitored by the ECoW and Site Construction Manager.



## 5. Control Measures

### 5.1 General

The purpose of this section of the PMP is to describe how the management of peat will be controlled and to specify how peat will be protected and peat integrity conserved throughout all stages of the construction works.

Where possible during detailed design the excavated peat volumes will be minimised by micro-siting wind farm infrastructure to avoid areas of deeper peat.

Where peat excavation is unavoidable care must be taken when handling, transporting and stockpiling peat to protect the peat structure and strength as far as possible. Where possible the movement of peat over long distances will be minimised and peat will be stored locally for re-use as soon as possible. Furthermore, double handling will be avoided as much as possible and a robust planning and monitoring programme will be developed to ensure that peat and mineral soils are not mixed.

### 5.2 Minimising Disturbance of In Situ Peat

The acrotelmic layer of the peat contains the living plant matter that protects the underlying catotelmic peat from drying and erosion. Therefore, it is important that measures are taken to avoid ripping up or rutting of the surface peat. In addition, unnecessary trafficking and appropriate scale plant will be used, such as 360° diggers rather than bulldozers to minimise any unnecessary compaction.

An Access Plan following the consented access track routes will be developed and physically demarcated by temporary fencing. The Access Plan and demarcated route will provide a designated controlled route and a permissible corridor within which service vehicles and plant can operate prior to peat and topsoil stripping. The purpose of this is to protect *in situ* peat in areas that will not be affected by the Revised Consented Development layout and prevent unnecessary damage.

Access routes and working areas will be clearly delimited throughout the construction phase to ensure that peat compaction and damage in areas not directly involved in the works will be avoided. The construction works will be phased to ensure that peat is stripped in each part of the Development Site ahead of the mineral substrate.

### 5.3 Methods for Stripping and Excavation of Peat

Peat stripping and excavation will generally follow the methodologies recommended for mineral soil by Ministry of Agriculture Fisheries and Food (MAFF) (2000) and the Department for Environment Food and Rural Affairs (DEFRA) (2009). However, it is recognised peat is a very different material compared to mineral soils, particularly wet amorphous peat. As a result, the stripping and excavation method(s) to be used in each part of the Development Site will be agreed in advance. Wherever possible, a 360° excavator will be used to strip the widest peat turves possible, with their vegetation intact. Ideally the turves should be a minimum of 0.5m deep and with an area up to a maximum of 1m<sup>2</sup>. However, the depth and scale will depend on the depth, consistency and condition of the peat at each location and the plant used for stripping.

For the laying of electrical cables, it is anticipated that the cable trench will be excavated by stripping surface peat and laying the turves separately to catotelmic peat temporarily on a geotextile to protect the underlying

vegetation. Where required, the mineral soils should be segregated from the peat and also placed on a barrier material prior to reinstatement.

## 5.4 Temporary Storage and Stockpiles

The temporary storage of peat for long durations should be avoided where possible to minimise drying, weathering and erosion of the peat. Where possible the peat should be transported from the point of extraction to its re-use or reinstatement location. However, there are likely to be instances during construction where the peat will need to be temporarily stored prior to re-use or reinstatement (e.g. near the turbine for later reinstatement of the turbine base). The following general principles will be applied for temporary peat storage areas and peat stockpile stability:

- Peat turves will be temporarily stored in designated locations as close as possible to the area from which they have been cut;
- The number and locations of temporary peat storage areas will be chosen to minimise the distance that stripped and excavated peat will have to be transported;
- Peat will be excavated and reinstated as quickly as possible in a progressive manner in order to minimise the area required for temporary storage at any one time;
- Storage and stockpiles will avoid sensitive peat vegetation, areas of existing peat erosion and locations with moderate or high risk of peat landslide;
- The selection of temporary peat storage areas will be cognisant of other environmental constraints and shall be more than 50m from watercourses and functioning drainage ditches;
- Peat turves will be transferred intact to their temporary storage location where they will be stored, with vegetation upright, in a single layer on geotextile material (to protect underlying vegetation as much as possible). Peat turves may be stored in double layers (separated by geotextile) provided that such storage does not extend beyond two months;
- The Site Construction Manager, with advice as necessary from the ECoW and/or Site Engineer, will determine whether special mitigation measures are required, such as orientation of the stockpile, levelling/benching to level the surface, bunding to contain stored materials and site-specific drainage to ensure that runoff waters are sufficiently controlled;
- Catotelmic peat that is not overly wet can be locally stored in stockpiles up to a maximum height of 2m. Catotelmic peat that is very wet and/or amorphous would need to be stored in purpose-built, bunded locations with a final peat depth no greater than 1m;
- Any bunded storage area would need to be designed with a sedimentation/settling pond to de-water wet peat and aid sediment containment. Each settling pond must be designed with appropriate filtration treatment facilities prior to connection into the construction-phase surface water drainage scheme and Sustainable Drainage System (SuDS) for the Development Site;
- Peat turves and stockpiles will be regularly managed and inspected throughout their lifetime to ensure maintenance of stockpile stability and integrity. Depending on the length of storage and weather conditions, regular watering may be required to protect the peat;
- Measures to manage and treat run-off, and prevent erosion during peat stripping and storage will be developed through a series of specific control measures relating to surface water management (e.g. SuDS as noted earlier) which will be described in a Drainage Management Strategy and the Construction Environmental Management Plan.

- Temporary drainage of peat stockpiles will be inspected regularly to ensure that it is fit for purpose, that runoff from stockpiles is being appropriately managed and mitigated and that it is not draining directly into any watercourse; and
- Should any problems be observed during regular visual inspections of peat stockpiles, this would invoke implementation of an appropriate corrective action (see Section 5.6) which would be recorded and monitored for effectiveness.

Although, a number of potential temporary storage sites have been identified in **Figure 8.0** in **Appendix A** the final locations and design of each temporary storage area will be determined by the Site Construction Manager with advice as necessary from the ECoW and/or Site Engineer.

## 5.5 Peat Reinstatement / Restoration

Dressing back site infrastructure and the creation of verges along access tracks will involve the laying of peat turves in a single layer up to 0.5m deep.

Reinstatement of blanket peat will be achieved by replacing the stripped peat. Firstly, the catotelmic peat will be laid followed by the replacement of peat turves at the surface to create conditions that promote the regrowth of peatland vegetation. Where possible the aim should be to achieve approximately the same peat profile depths as prior to construction. It is anticipated that, if peat turf has been correctly stored, no further re-seeding will be required. However, re-seeding will be carried out if judged to be necessary by the ECoW and Site Construction Manager.

Where there is a shortage of peat turves excess turves should be brought from elsewhere on the Revised Consented Development and placed on areas of bare peat. If this is not possible the ECoW and Site Construction Manager shall determine the measures necessary to promote re-vegetation and minimise erosion by rainfall, frost and wind.

In order to ensure that the minimum amount of peat compaction occurs during re-use/reinstatement, the appointed contractor will develop a method for peat tipping and spreading at each location. Where possible this will include working back from the furthest location to avoid or minimise tracking over reinstated peat. In addition, spreading and very light tamping down of placed peat is likely to be, for example, by use of the bucket on a long reach excavator.

Peat handling and placement during reinstatement activities should be carried out while the peat and weather is as dry as possible. Replaced turves may therefore need to be regularly watered.

## 5.6 Monitoring and Inspection

During construction the ECoW and Site Construction Manager will perform routine inspections of all temporary peat storage areas. These inspections will assess the peat conditions to determine whether any significant deleterious change has occurred during storage. The integrity of containment, temporary drainage conditions and the stockpile design and management will also be assessed to determine whether it is adequate to prevent erosion and peat landslide.

The ECoW shall also regularly inspect reinstatements as they progress and immediately after completion to monitor the success of reinstatement and vegetation re-establishment. If the ECoW determines that there is a need for further reinstatement or corrective actions, the ECoW and Site Construction Manager shall develop a method for correcting any defects that encourages the regeneration of the vegetation cover. Methods for enhancement and restoration should be carried out in accordance with NatureScot guidance (SNH, 2015) and will be further monitored for effectiveness.



## 6. Bibliography

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# Appendix A

## Figures

## Appendix B

### Volume Calculations

#### Introduction

This Appendix provides the raw data used to calculate peat excavation volumes for all elements of the Proposed Development's infrastructure. All calculations are based on an interpolation of the peat depths across the site. For the purposes of these calculations the average depth within the infrastructure elements have been used to calculate the extraction volumes.

#### Turbines

Table B 2.1 Revised Consented Development Turbines

Turbine Number	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
22	1638.0	1.02	819.0	851.8	1670.8
23	1517.0	0.51	758.5	15.2	773.7
25	1400.0	0.47	658.0	0.0	658.0
26	1400.0	0.36	504.0	0.0	504.0
27	1638.0	1.05	819.0	900.9	1719.9
30	1601.3	0.91	800.6	656.5	1457.2
31	1400.0	0.39	546.0	0.0	546.0
32	1905.1	2.12	952.6	3086.3	4038.9
33	1839.9	1.85	920.0	2483.9	3403.9
35	1400.0	0.41	574.0	0.0	574.0
36	1540.9	0.65	770.4	231.1	1001.6
42	1400.0	0.27	378.0	0.0	378.0
43	1589.1	0.81	794.6	492.6	1287.2
44	1400.0	0.47	658.0	0.0	658.0
51	1400.0	0.40	560.0	0.0	560.0
54	1528.9	0.59	764.5	137.6	902.1
55	1589.1	0.83	794.6	524.4	1319.0
56	1564.9	0.75	782.5	391.2	1173.7
57	1601.3	0.88	800.6	608.5	1409.1

Turbine Number	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
60	1638.0	1.04	819.0	884.5	1703.5
61	1564.9	0.71	782.5	328.6	1111.1
Total Volume			5,403	3,852	9,254

## Crane Pads

Table B 2.2 Revised Consented Development Crane Pads

Turbine Number	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
22	982.7	1.09	491.4	579.8	1071.2
23	797.5	0.48	382.8	0.0	382.8
25	797.5	0.39	311.0	0.0	311.0
26	901.2	0.62	450.6	108.1	558.7
27	883.5	0.53	441.8	26.5	468.3
30	892.3	0.55	446.2	44.6	490.8
31	901.2	0.65	450.6	135.2	585.8
32	1257.1	2.56	628.6	2589.7	3218.2
33	910.1	0.69	455.0	172.9	628.0
35	797.5	0.37	295.1	0.0	295.1
36	946.1	0.89	473.0	369.0	842.0
42	797.5	0.30	239.3	0.0	239.3
43	1067.5	1.55	533.8	1120.9	1654.6
44	797.5	0.44	350.9	0.0	350.9
51	797.5	0.47	374.8	0.0	374.8
54	973.5	1.06	486.8	545.2	1031.9
55	946.1	0.89	473.0	369.0	842.0
56	901.2	0.63	450.6	117.2	567.7
57	883.5	0.51	441.8	8.8	450.6
60	1001.3	1.20	500.6	700.9	1201.5
61	928.0	0.77	464.0	250.6	714.6
Total Volume			15,256	11,593	26,849

## Blade Laydowns

Table B 2.3 Revised Consented Development Blade Laydowns

Turbine Number	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Acrotelmic	Volume (m <sup>3</sup> )	
				Catotelmic	Total
22	982.7	1.09	491.4	579.8	1071.2
23	797.5	0.48	382.8	0.0	382.8
25	797.5	0.39	311.0	0.0	311.0
26	901.2	0.62	450.6	108.1	558.7
27	883.5	0.53	441.8	26.5	468.3
30	892.3	0.55	446.2	44.6	490.8
31	901.2	0.65	450.6	135.2	585.8
32	1257.1	2.56	628.6	2589.7	3218.2
33	910.1	0.69	455.0	172.9	628.0
35	797.5	0.37	295.1	0.0	295.1
36	946.1	0.89	473.0	369.0	842.0
42	797.5	0.30	239.3	0.0	239.3
43	1067.5	1.55	533.8	1120.9	1654.6
44	797.5	0.44	350.9	0.0	350.9
51	797.5	0.47	374.8	0.0	374.8
54	973.5	1.06	486.8	545.2	1031.9
55	946.1	0.89	473.0	369.0	842.0
56	901.2	0.63	450.6	117.2	567.7
57	883.5	0.51	441.8	8.8	450.6
60	1001.3	1.20	500.6	700.9	1201.5
61	928.0	0.77	464.0	250.6	714.6
Total Volume			9,141	7,138	16,280

## Cut Access Tracks

Table B 2.4 Revised Consented Development Cut Access Tracks

Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Acrotelmic	Volume (m <sup>3</sup> )	
				Catotelmic	Total
ARC02	943.6	0.64	471.8	134.1	605.9

Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
ARC05	950.3	0.70	475.1	193.0	668.1
ARC06	852.2	0.77	426.1	234.2	660.2
ARC07	855.3	0.51	427.6	6.8	434.4
ARC08	949.8	0.49	469.8	0.0	469.8
ARC10	2571.1	0.62	1285.6	297.5	1583.1
ARC11	506.8	0.35	176.6	0.0	176.6
ARC12	399.2	0.40	159.1	0.0	159.1
ARC15	517.8	0.84	258.9	177.6	436.5
ARC16	1119.3	0.70	559.6	225.5	785.2
ARC17	555.8	0.80	277.9	168.0	445.9
ARC18	441.7	1.14	220.8	283.6	504.5
CH-001	300.0	0.72	150.0	66.0	216.0
CH-002	268.7	0.38	102.4	0.0	102.4
CH-003	300.0	0.58	150.0	24.6	174.6
CH-004	300.0	0.16	47.1	0.0	47.1
CH-005	98.3	0.56	49.1	6.0	55.1
CH-006	300.0	0.34	101.4	0.0	101.4
CH-007	300.0	0.44	130.7	0.0	130.7
CH-008	300.0	0.52	150.0	4.6	154.6
CH-009	300.0	0.70	150.0	60.0	210.0
CH-010	300.0	0.54	150.0	11.5	161.5
CH-014	320.5	0.47	150.9	0.0	150.9
CH-016	300.1	0.51	150.0	3.7	153.7
CH-017	346.4	0.53	173.2	10.2	183.4
CH-018	300.0	0.69	150.0	57.1	207.1
CH-019	57.5	0.93	28.7	24.4	53.2
CH-020	299.9	0.51	149.9	4.1	154.1
CH-021	299.6	0.28	83.1	0.0	83.1
CH-022	299.6	0.55	149.8	14.4	164.3

Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
CH-023	299.6	0.82	149.8	97.1	246.9
CH-024	329.0	0.64	164.5	44.5	209.1
CH-026	263.4	0.48	125.7	0.0	125.7
CH-027	66.1	0.64	33.1	9.5	42.5
CH-028	116.0	0.83	58.0	37.8	95.8
CH-029	300.0	0.10	31.3	0.0	31.3
CH-031	300.0	0.18	53.3	0.0	53.3
CH-032	107.3	0.72	53.6	23.8	77.5
CH-035	300.0	0.34	101.2	0.0	101.2
CH-038	364.4	0.71	182.2	77.9	260.1
CH-042	300.0	0.72	150.0	65.4	215.4
CH-043	398.2	0.61	199.1	45.1	244.2
CH-044	300.0	0.49	146.4	0.0	146.4
CH-045	300.0	0.43	129.2	0.0	129.2
CH-046	300.0	0.59	150.0	25.9	175.9
CH-047	299.5	0.77	149.7	80.7	230.4
CH-048	109.3	0.84	54.6	37.3	91.9
CH-049	299.7	0.64	149.8	40.9	190.7
CH-050	300.0	0.69	150.0	56.7	206.7
CH-051	299.8	0.88	149.9	114.7	264.6
CH-052	151.4	0.58	75.7	12.6	88.3
CH-053	300.0	0.89	150.0	115.8	265.8
CH-054	300.0	0.39	116.1	0.0	116.1
CH-055	307.1	0.58	153.6	24.1	177.7
CH-056	307.6	0.68	153.8	53.9	207.7
CH-057	300.0	0.74	150.0	72.2	222.2
CH-058	310.1	0.78	155.0	86.3	241.4
CH-059	299.7	0.47	140.7	0.0	140.7
CH-060	300.0	0.76	150.0	76.8	226.8



Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
CH-061	300.0	0.81	150.0	92.0	242.0
CH-062	307.7	0.28	84.9	0.0	84.9
CH-063	300.0	0.78	150.0	82.7	232.7
CH-064	300.0	0.58	150.0	23.9	173.9
CH-065	300.0	0.50	150.0	1.3	151.3
CH-067	300.0	0.50	150.0	1.3	151.3
CH-068	300.0	0.38	114.8	0.0	114.8
CH-069	300.0	0.34	103.3	0.0	103.3
CH-070	300.0	0.65	150.0	44.7	194.7
CH-071	107.4	0.43	46.6	0.0	46.6
CH-072	300.0	0.68	150.0	52.7	202.7
CH-074	35.6	0.36	12.9	0.0	12.9
CH-075	300.0	0.57	150.0	19.9	169.9
CH-076	300.0	0.44	133.3	0.0	133.3
CH-077	112.2	0.82	56.1	35.8	91.8
CH-079	299.9	0.58	149.9	23.5	173.5
CH-080	299.9	0.51	150.0	4.4	154.4
CH-081	300.1	0.49	147.2	0.0	147.2
CH-082	300.0	0.57	150.0	21.3	171.3
CH-083	300.0	0.31	94.0	0.0	94.0
CH-085	300.1	0.52	150.0	6.3	156.3
CH-086	300.0	0.76	150.0	78.8	228.8
CH-087	300.0	0.42	125.9	0.0	125.9
CH-088	300.0	0.72	150.0	66.6	216.6
CH-089	300.1	0.51	150.0	2.2	152.2
CH-090	300.0	0.22	67.0	0.0	67.0
CH-091	300.0	0.80	150.0	88.7	238.7
CH-093	156.6	0.72	78.3	35.2	113.5
CH-094	175.0	0.86	87.5	62.9	150.4

Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
CH-095	300.0	0.87	150.0	112.1	262.1
CH-097	72.3	0.73	36.1	16.5	52.7
CH-099	300.0	0.38	115.3	0.0	115.3
CH-100	299.8	0.31	94.3	0.0	94.3
CH-101	93.9	0.99	47.0	46.0	92.9
CH-102	300.0	0.89	150.0	118.0	268.0
CH-103	300.0	0.95	150.0	134.6	284.6
CH-104	300.0	0.59	150.0	27.4	177.4
CH-105	300.0	0.56	150.0	18.5	168.5
CH-106	299.8	0.51	149.9	2.0	151.9
CH-107	300.0	0.85	150.0	105.8	255.8
CH-108	124.8	0.66	62.4	19.8	82.2
CH-110	300.0	0.65	150.0	45.4	195.4
CH-112	300.0	0.92	150.0	127.4	277.4
CH-113	300.0	0.44	132.1	0.0	132.1
CH-116	299.6	0.53	149.8	8.0	157.9
CH-117	210.9	1.03	105.4	112.6	218.0
CH-119	272.3	0.75	136.1	69.4	205.5
CH-120	300.0	0.96	150.0	139.0	289.0
CH-122	371.4	0.41	152.8	0.0	152.8
CH-123	299.8	0.88	149.9	114.2	264.1
CH-125	146.5	0.93	73.3	62.3	135.6
CH-127	299.7	0.42	126.1	0.0	126.1
CH-129	299.2	0.36	108.8	0.0	108.8
CH-131	140.8	0.95	70.4	64.0	134.4
CH-132	299.7	0.44	130.7	0.0	130.7
CH-133	332.1	0.75	166.1	82.1	248.2
CH-139	299.3	0.72	149.7	65.0	214.7
CH-140	300.2	0.62	150.1	34.9	185.0

Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
CH-142	300.0	0.71	150.0	64.2	214.2
CH-143	79.7	0.99	39.8	39.1	78.9
CH-144	300.0	0.82	150.0	95.8	245.8
CH-145	300.1	0.90	150.0	119.9	270.0
CH-151	189.7	0.45	85.8	0.0	85.8
CH-152	299.4	0.64	149.7	41.5	191.2
CH-155	300.0	0.73	150.0	68.7	218.7
CH-156	196.7	0.90	98.4	78.4	176.8
CH-158	228.9	0.75	114.5	58.2	172.6
CH-159	299.5	0.42	125.5	0.0	125.5
CH-160	300.0	0.27	81.8	0.0	81.8
CH-161	300.0	0.56	150.0	16.9	166.9
CH-162	299.9	0.52	150.0	7.1	157.1
CH-163	299.6	0.28	84.0	0.0	84.0
CH-164	300.0	0.48	144.8	0.0	144.8
CH-167	300.0	0.69	150.0	57.6	207.6
CH-168	300.0	0.29	87.2	0.0	87.2
CH-169	300.0	0.72	150.0	66.7	216.7
CH-171	299.9	0.75	150.0	74.2	224.2
CH-173	156.4	0.34	52.6	0.0	52.6
CH-174	300.1	0.82	150.0	96.5	246.6
CH-176	300.0	0.37	112.3	0.0	112.3
CH-182	99.6	0.48	47.6	0.0	47.6
CH-183	171.3	0.81	85.6	52.8	138.4
CH-184	51.8	0.66	25.9	8.2	34.1
CH-185	299.6	0.54	149.8	12.0	161.7
CH-186	299.6	0.37	111.2	0.0	111.2
CH-187	299.5	0.38	114.5	0.0	114.5
CH-188	300.0	0.56	150.0	18.7	168.7

Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
CH-189	300.0	0.61	150.0	34.5	184.5
CH-190	300.0	0.88	150.0	115.4	265.4
CH-191	299.6	0.46	137.8	0.0	137.8
CH-192	300.0	0.35	104.5	0.0	104.5
CH-193	300.0	0.38	114.3	0.0	114.3
CH-194	302.3	0.58	151.2	22.7	173.9
CH-195	300.0	0.67	150.0	51.9	201.9
CH-196	300.0	0.52	150.0	4.7	154.7
CH-197	300.0	0.55	150.0	16.3	166.3
CH-198	300.0	0.66	150.0	47.7	197.7
CH-199	299.9	0.53	149.9	8.6	158.5
CH-200	300.0	0.59	150.0	25.8	175.8
CH-201	300.0	0.55	150.0	14.5	164.5
CH-202	300.0	0.54	150.0	11.5	161.5
CH-203	300.0	0.57	150.0	22.4	172.4
CH-204	300.0	0.40	121.2	0.0	121.2
CH-205	300.0	0.44	132.6	0.0	132.6
CH-206	299.9	0.17	50.6	0.0	50.6
CH-207	300.0	0.45	136.3	0.0	136.3
CH-208	300.0	0.29	87.3	0.0	87.3
CH-209	300.0	0.31	92.2	0.0	92.2
CH-210	389.1	0.46	178.0	0.0	178.0
CH-211	300.0	0.23	69.4	0.0	69.4
CH-212	300.0	0.42	125.3	0.0	125.3
CH-213	300.0	0.13	37.8	0.0	37.8
CH-214	300.0	0.34	101.8	0.0	101.8
CH-215	300.0	0.23	67.9	0.0	67.9
CH-216	300.0	0.50	150.0	0.7	150.6
CH-217	300.0	0.72	150.0	66.5	216.5

Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
CH-218	210.1	0.44	92.1	0.0	92.1
CH-219	300.0	0.44	133.2	0.0	133.2
CH-221	252.3	0.65	126.1	38.3	164.4
CH-222	300.0	0.45	133.9	0.0	133.9
CH-223	299.9	0.37	111.3	0.0	111.3
CH-224	300.2	0.20	60.6	0.0	60.6
CH-225	300.1	0.43	130.4	0.0	130.4
CH-226	300.0	0.61	150.0	33.1	183.1
CH-227	300.0	0.43	128.3	0.0	128.3
CH-228	299.9	0.20	60.7	0.0	60.7
CH-229	299.8	0.23	69.9	0.0	69.9
CH-230	288.6	0.27	76.9	0.0	76.9
CH-231	160.5	0.61	80.3	17.2	97.4
CH-232	299.9	0.30	89.5	0.0	89.5
CH-233	300.2	0.25	76.3	0.0	76.3
CH-238	300.1	0.50	149.8	0.0	149.8
CH-241	300.1	0.26	78.1	0.0	78.1
CH-244	300.3	0.67	150.1	51.8	201.9
CH-245	300.0	0.52	150.0	4.9	154.9
CH-246	300.1	0.72	150.0	64.6	214.7
CH-248	127.0	0.39	49.8	0.0	49.8
Total Volume			27,526	7,105	34,631

## Temporary Construction Compound

Table B 2.5 Revised Consented Development Temporary Construction Compound

Compound	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
22	15,000	0.24	3,600.0	0.0	3,600.0
Total Volume			3,600	0.0	3,600

## Control Building and Substation Compound

Not calculated, see the TGP PMP Table 15.

## Borrow Pit

Not calculated, see the TGP PMP Table 11.

## Cable Trenches

Table B 2.6 Revised Consented Development Cable Trenches

Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Acrotelmic	Volume (m <sup>3</sup> )	
				Catotelmic	Total
CH-001	60.0	0.72	30.0	13.2	43.2
CH-002	50.9	0.38	19.4	0.0	19.4
CH-003	60.0	0.58	30.0	4.9	34.9
CH-004	60.0	0.16	9.4	0.0	9.4
CH-005	19.7	0.56	9.8	1.2	11.0
CH-006	60.0	0.34	20.3	0.0	20.3
CH-007	60.0	0.44	26.1	0.0	26.1
CH-008	60.0	0.52	30.0	0.9	30.9
CH-009	60.0	0.70	30.0	12.0	42.0
CH-010	60.0	0.54	30.0	2.3	32.3
CH-014	61.3	0.47	28.8	0.0	28.8
CH-016	60.0	0.51	30.0	0.7	30.7
CH-017	69.4	0.53	34.7	2.0	36.7
CH-018	60.0	0.69	30.0	11.4	41.4
CH-019	11.5	0.93	5.7	4.9	10.6
CH-020	60.0	0.51	30.0	0.8	30.8
CH-021	60.0	0.28	16.6	0.0	16.6
CH-022	60.0	0.55	30.0	2.9	32.9
CH-023	60.0	0.82	30.0	19.4	49.4
CH-024	63.0	0.64	31.5	8.5	40.0
CH-026	49.9	0.48	23.8	0.0	23.8
CH-027	13.2	0.64	6.6	1.9	8.5

Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
CH-028	23.2	0.83	11.6	7.6	19.2
CH-029	60.0	0.10	6.3	0.0	6.3
CH-031	60.0	0.18	10.7	0.0	10.7
CH-032	21.5	0.72	10.7	4.8	15.5
CH-035	60.0	0.34	20.2	0.0	20.2
CH-038	72.9	0.71	36.4	15.6	52.0
CH-042	60.0	0.72	30.0	13.1	43.1
CH-043	80.1	0.61	40.1	9.1	49.1
CH-044	60.0	0.49	29.3	0.0	29.3
CH-045	60.0	0.43	25.8	0.0	25.8
CH-046	60.0	0.59	30.0	5.2	35.2
CH-047	60.0	0.77	30.0	16.2	46.2
CH-048	21.9	0.84	10.9	7.5	18.4
CH-049	60.0	0.64	30.0	8.2	38.2
CH-050	60.0	0.69	30.0	11.3	41.3
CH-051	60.0	0.88	30.0	23.0	53.0
CH-052	27.5	0.58	13.7	2.3	16.0
CH-053	60.0	0.89	30.0	23.2	53.2
CH-054	60.0	0.39	23.2	0.0	23.2
CH-055	61.4	0.58	30.7	4.8	35.5
CH-056	61.5	0.68	30.8	10.8	41.5
CH-057	60.0	0.74	30.0	14.4	44.4
CH-058	62.0	0.78	31.0	17.3	48.3
CH-059	59.9	0.47	28.1	0.0	28.1
CH-060	60.0	0.76	30.0	15.4	45.4
CH-061	60.0	0.81	30.0	18.4	48.4
CH-062	61.5	0.28	17.0	0.0	17.0
CH-063	60.0	0.78	30.0	16.5	46.5
CH-064	60.0	0.58	30.0	4.8	34.8



Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
CH-065	60.0	0.50	30.0	0.3	30.3
CH-067	60.0	0.50	30.0	0.3	30.3
CH-068	60.0	0.38	23.0	0.0	23.0
CH-069	60.0	0.34	20.7	0.0	20.7
CH-070	60.0	0.65	30.0	8.9	38.9
CH-071	21.5	0.43	9.3	0.0	9.3
CH-072	60.0	0.68	30.0	10.5	40.5
CH-074	7.1	0.36	2.6	0.0	2.6
CH-075	60.0	0.57	30.0	4.0	34.0
CH-076	60.0	0.44	26.7	0.0	26.7
CH-077	22.4	0.82	11.2	7.2	18.4
CH-079	60.0	0.58	30.0	4.7	34.7
CH-080	60.0	0.51	30.0	0.9	30.9
CH-081	60.0	0.49	29.4	0.0	29.4
CH-082	60.0	0.57	30.0	4.3	34.3
CH-083	60.0	0.31	18.8	0.0	18.8
CH-085	60.0	0.52	30.0	1.3	31.3
CH-086	60.0	0.76	30.0	15.8	45.8
CH-087	60.0	0.42	25.2	0.0	25.2
CH-088	60.0	0.72	30.0	13.3	43.3
CH-089	60.0	0.51	30.0	0.4	30.4
CH-090	60.0	0.22	13.4	0.0	13.4
CH-091	60.0	0.80	30.0	17.7	47.7
CH-093	31.3	0.72	15.7	7.0	22.7
CH-094	35.0	0.86	17.5	12.6	30.1
CH-095	60.0	0.87	30.0	22.4	52.4
CH-097	14.5	0.73	7.2	3.3	10.5
CH-099	60.0	0.38	23.1	0.0	23.1
CH-100	60.0	0.31	18.9	0.0	18.9

Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
CH-101	18.8	0.99	9.4	9.2	18.6
CH-102	60.0	0.89	30.0	23.6	53.6
CH-103	60.0	0.95	30.0	26.9	56.9
CH-104	60.0	0.59	30.0	5.5	35.5
CH-105	60.0	0.56	30.0	3.7	33.7
CH-106	60.0	0.51	30.0	0.4	30.4
CH-107	60.0	0.85	30.0	21.2	51.2
CH-108	25.0	0.66	12.5	4.0	16.4
CH-110	60.0	0.65	30.0	9.1	39.1
CH-112	60.0	0.92	30.0	25.5	55.5
CH-113	60.0	0.44	26.4	0.0	26.4
CH-116	60.0	0.53	30.0	1.6	31.6
CH-117	42.2	1.03	21.1	22.5	43.6
CH-119	54.5	0.75	27.3	13.9	41.2
CH-120	60.0	0.96	30.0	27.8	57.8
CH-122	71.5	0.41	29.4	0.0	29.4
CH-123	60.0	0.88	30.0	22.8	52.8
CH-125	29.3	0.93	14.7	12.5	27.1
CH-127	60.0	0.42	25.2	0.0	25.2
CH-129	60.0	0.36	21.8	0.0	21.8
CH-131	28.2	0.95	14.1	12.8	26.9
CH-132	60.0	0.44	26.2	0.0	26.2
CH-133	66.4	0.75	33.2	16.4	49.6
CH-139	60.0	0.72	30.0	13.0	43.0
CH-140	60.0	0.62	30.0	7.0	37.0
CH-142	60.0	0.71	30.0	12.8	42.8
CH-143	15.9	0.99	8.0	7.8	15.8
CH-144	60.0	0.82	30.0	19.2	49.2
CH-145	60.0	0.90	30.0	24.0	54.0

Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
CH-151	37.9	0.45	17.2	0.0	17.2
CH-152	60.0	0.64	30.0	8.3	38.3
CH-155	60.0	0.73	30.0	13.7	43.7
CH-156	39.3	0.90	19.7	15.7	35.4
CH-158	45.8	0.75	22.9	11.6	34.5
CH-159	60.0	0.42	25.1	0.0	25.1
CH-160	60.0	0.27	16.4	0.0	16.4
CH-161	60.0	0.56	30.0	3.4	33.4
CH-162	60.0	0.52	30.0	1.4	31.4
CH-163	60.0	0.28	16.8	0.0	16.8
CH-164	60.0	0.48	29.0	0.0	29.0
CH-167	60.0	0.69	30.0	11.5	41.5
CH-168	60.0	0.29	17.4	0.0	17.4
CH-169	60.0	0.72	30.0	13.3	43.3
CH-171	60.0	0.75	30.0	14.8	44.8
CH-173	31.3	0.34	10.5	0.0	10.5
CH-174	60.0	0.82	30.0	19.3	49.3
CH-176	60.0	0.37	22.5	0.0	22.5
CH-182	20.0	0.48	9.5	0.0	9.5
CH-183	34.3	0.81	17.2	10.6	27.7
CH-184	10.4	0.66	5.2	1.6	6.8
CH-185	60.0	0.54	30.0	2.4	32.4
CH-186	60.0	0.37	22.3	0.0	22.3
CH-187	60.0	0.38	22.9	0.0	22.9
CH-188	60.0	0.56	30.0	3.7	33.7
CH-189	60.0	0.61	30.0	6.9	36.9
CH-190	60.0	0.88	30.0	23.1	53.1
CH-191	60.0	0.46	27.6	0.0	27.6
CH-192	60.0	0.35	20.9	0.0	20.9

Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
CH-193	60.0	0.38	22.9	0.0	22.9
CH-194	60.5	0.58	30.3	4.6	34.8
CH-195	60.0	0.67	30.0	10.4	40.4
CH-196	60.0	0.52	30.0	0.9	30.9
CH-197	60.0	0.55	30.0	3.3	33.3
CH-198	60.0	0.66	30.0	9.5	39.5
CH-199	60.0	0.53	30.0	1.7	31.7
CH-200	60.0	0.59	30.0	5.2	35.2
CH-201	60.0	0.55	30.0	2.9	32.9
CH-202	60.0	0.54	30.0	2.3	32.3
CH-203	60.0	0.57	30.0	4.5	34.5
CH-204	60.0	0.40	24.2	0.0	24.2
CH-205	60.0	0.44	26.5	0.0	26.5
CH-206	60.0	0.17	10.1	0.0	10.1
CH-207	60.0	0.45	27.3	0.0	27.3
CH-208	60.0	0.29	17.5	0.0	17.5
CH-209	60.0	0.31	18.4	0.0	18.4
CH-210	75.0	0.46	34.3	0.0	34.3
CH-211	60.0	0.23	13.9	0.0	13.9
CH-212	60.0	0.42	25.1	0.0	25.1
CH-213	60.0	0.13	7.6	0.0	7.6
CH-214	60.0	0.34	20.4	0.0	20.4
CH-215	60.0	0.23	13.6	0.0	13.6
CH-216	60.0	0.50	30.0	0.1	30.1
CH-217	60.0	0.72	30.0	13.3	43.3
CH-218	42.0	0.44	18.4	0.0	18.4
CH-219	60.0	0.44	26.6	0.0	26.6
CH-221	50.5	0.65	25.2	7.7	32.9
CH-222	60.0	0.45	26.8	0.0	26.8

Chainage Name	Area of Extraction (m <sup>2</sup> )	Peat Depth (m)	Volume (m <sup>3</sup> )		
			Acrotelmic	Catotelmic	Total
CH-223	60.0	0.37	22.3	0.0	22.3
CH-224	60.0	0.20	12.1	0.0	12.1
CH-225	60.0	0.43	26.1	0.0	26.1
CH-226	60.0	0.61	30.0	6.6	36.6
CH-227	60.0	0.43	25.7	0.0	25.7
CH-228	60.0	0.20	12.1	0.0	12.1
CH-229	60.0	0.23	14.0	0.0	14.0
CH-230	54.9	0.27	14.6	0.0	14.6
CH-231	90.0	0.61	45.0	9.6	54.6
CH-232	60.0	0.30	17.9	0.0	17.9
CH-233	60.0	0.25	15.3	0.0	15.3
CH-238	60.0	0.50	30.0	0.0	30.0
CH-241	60.0	0.26	15.6	0.0	15.6
CH-244	60.1	0.67	30.0	10.4	40.4
CH-245	60.0	0.52	30.0	1.0	31.0
CH-246	60.0	0.72	30.0	12.9	42.9
CH-248	25.4	0.39	10.0	0.0	10.0
Total Volume			4,484	1,083	5,567

**wood.**

