Cloiche Wind Farm

Additional Information Appendix 7.1: Peat Management Plan

14 July 2022

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Cloiche Wind Farm

Additional Information Appendix 7.1: Peat Management Plan

14 July 2022

Issue and Revision Record

Revision	Date	Originator	Checker	Approver	Description
A	Feb 2020	C Legierski	A Tourish	A Martin	Draft for comments
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C	06 Mar 2020	K Young	A Tourish	A Martin	Final Draft
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E	20 Jun 2022	L Keys	K Young	W MacPherson	Post-submission Updates
F	30 Jun 2022	L Keys	K Young	W MacPherson	Final Post-submission Updates
G	14 July 2022	K Young	K Young	W MacPherson	Final Post-submission Updates

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Contents

1 Introduction

1.1 Background

Mott MacDonald Limited (MML) has been commissioned by SSE Renewables (SSER) to produce a Peat Management Plan (PMP) with respect to the 29 Turbine Proposed Development.

The purpose of this report is to assess the quantities of peat likely to be excavated during construction and identify suitable re-use and management options. Site reconnaissance, comprising walkovers and phased, peat probing surveys, was carried out to collect information on peat depth, stratification, and localised hydrological and geomorphological conditions.

This PMP has been produced in accordance with guidance contained within peat management guidance produced jointly by Scottish Renewables (SR) and the Scottish Environment Protection Agency (SEPA):

- Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste (Ref. 1)
- SEPA Regulatory Position Statement – Developments on Peat (Ref. 2)

This document is part of the Additional Information draft, which has been updated following submission of the Environmental Impact Assessment (EIA) Report in April 2020 and subsequent responses from Consultees on the 36 Turbine Scheme layout, which have resulted in changes to the layout. This PMP will continue to be refined and updated throughout the development of the wind farm. The final PMP will consider detailed construction plans and will be based on information gathered during further site investigation.

The changes to the 36 Turbine Scheme layout (now 29 Turbine Proposed Development) include:

- Reduction in turbine numbers from 36 No. to 29 No. (no changes to turbine locations)
- Associated reduction in track lengths
- Reduction in borrow pit numbers from 9 No. to 8 No

1.2 Site Description

The proposed Cloiche Wind Farm is located approximately 11km to the south-east of the village of Fort Augustus, in the Great Glen, Scottish Highlands. The 29 Turbine Proposed Development covers approximately 21 km^2 and predominantly comprises open upland moorland crossed by rivers and lochans. The 29 Turbine Proposed Development is located in two areas, sitting adjacent to the east and west of the operational Stronelairg Wind Farm.

Access to the site during construction is proposed via the Stronelairg Wind Farm access track, which is located off the B862. The site layout plan is shown in Figure A.1 in Appendix A.

The terrain is varied, with turbines proposed on a number of separate slopes across the site, predominantly proposed in areas of open moorland. The site is crossed by numerous watercourses, the more significant of which including River Tarff, Caochan Uilleim, and Caochan Uchdach. A small number of lochans and lochs are also present on, or in proximity to, the site.

Peat thicknesses vary across the site but are generally between 0.5m and 1.5m, with localised thicker peat accumulations (> 2.0m). Thick peat accumulations have developed in areas where the terrain is relatively flat. The thickest peat encountered during Site Reconnaissance was 4.0m.

The 29 Turbine Proposed Development includes approximately 20.7km of new access track and utilises 29km of existing Stronelairg Wind Farm track (Ref. 3). The track will accommodate a 5.5m wide (cut track) and 4.5m wide (floating track) running surface with 0.5m wide shoulders on each side and incorporate passing places.

1.3 Proposed Development

The 29 Turbine Proposed Development, as shown on Figure A.1 (Appendix A), comprises of:

- Access tracks, leading to turbines and a control building and substation compound, including:
  - upgrade of existing access tracks at discrete locations (existing access tracks 29km)
  - construction of new access tracks and turning points, approximately 20.7km (5.5m wide (cut track) and 4.5m wide (floating track) running surface with 0.5m wide shoulders) and incorporate passing places, watercourse crossings, and any required service diversions
- Construction of temporary access tracks leading to borrow pits
- Excavation for turbine bases to a suitable bearing stratum (anticipated depth of 4.13m and diameter of 22.5m)
- Construction (permanent) of:
  - 29 No. turbine bases and adjacent crane hardstandings (with an area of approximately 1971m^2 (temporary) and 3611m^2 (permanent))
  - foundations for the control building and substation compound (including an energy storage facility)
  - on site underground cabling, connecting the wind turbines to the substation
  - control building and substation compound containing control and substation buildings, battery storage and comms mast
  - Meteorological (met) masts
- Construction (temporary) of:
  - construction compound(s) (with an area of approximately 7500m^2)
  - laydown areas
  - concrete batching plant(s)
- 8 No. borrow pits of varying dimensions

It should be noted that temporary tracks to borrow pits are indicative at this stage. The access points will be confirmed following further detailed site investigation and when a separate application for borrow pit working is submitted to The Highland Council.

1.4 Terminology and Abbreviations

The term ’29 Turbine Proposed Development’ is used in reference to the updated 29 No. turbine Cloiche Wind Farm in the Highland region of Scotland.

The term ’36 Turbine Scheme’ is used in reference to the previous 36 No. turbine layout of Cloiche Wind Farm in the Highland region of Scotland.

'Works' is used to describe the construction of infrastructure elements.

Acronyms and Abbreviations

- m AOD – meters Above Ordnance Datum
- EIA-R – Environmental Impact Assessment Report
- MML – Mott MacDonald Limited
- PSRA – Peat Stability Risk Assessment
- SNH – Scottish Natural Heritage
- SEPA – Scottish Environment Protection Agency
- SSER – SSE Renewables

1.5 Approach to Minimising Peat Excavation

With reference to Figure A.2 in Appendix A, several steps were taken during the preliminary design stages of the 36 Turbine Scheme, and subsequent 29 Turbine Proposed Development in order to minimise the likely peat excavation required. These steps are detailed in Chapter 2 of the EIA Report (April 2020).

- The iterative development of a layout which initially used gridded information on peat depths to inform the location of tracks, turbines, and other components
- A sequential phase of targeted peat depth probing to confirm peat depths, characteristics, and stability at locations of proposed infrastructure
- The use of floating roads has been proposed where deemed practicable to avoid excavating areas of deeper peat
- Cognisance of identified constraints when identifying potential temporary and permanent storage areas, including hydrology buffer zones as shown on Figure A.2 in Appendix A

Prior to and during the execution of the 29 Turbine Proposed Development, all reasonable measures will be taken to avoid or minimise excavations and minimise disturbance to peat, including:

- Maximisation of batter angles in cuttings, where appropriate
- The use of appropriate plant to avoid unnecessary disturbance to the ground surface
- The use of floating track in areas of deeper peat

Despite the measures described above, there is still a residual requirement to excavate peat as part of the 29 Turbine Proposed Development due to the presence of peat across the 29 Turbine Proposed Development. This document details the estimated peat volumes and proposals for the management of excavated peat.

2 Aims and Objectives

2.1 The Need for a Peat Management Plan

As noted in the peat management guidance by Scottish Renewables and SEPA (Ref. [1]), at the EIA stage, the developer must show:

- Thorough post-consent field surveys, data collection and iterative design, ensuring that the infrastructure layout of the 29 Turbine Proposed Development has been refined to minimise the quantity of peat which will be excavated
- The volume of peat anticipated to be excavated by the 29 Turbine Proposed Development has been considered
- How excavated peat will be managed and reused

2.2 Objectives of this Peat Management Plan

The aim of the PMP is to outline how peat which is expected to be excavated during the construction of the 29 Turbine Proposed Development will be managed and reused. The aims of the PMP are achieved through completion of the following objectives, as noted in the peat management guidance (Ref. 1):

- Objective 1: Description of the peat conditions at the 29 Turbine Proposed Development and how this was determined
- Objective 2: Calculating expected volumes of peat to be excavated and reused
- Objective 3: Classification of excavated material
- Objective 4: Considering the use of appropriate peat type in borrow pit restoration
- Objective 5: Describing how excavated peat will be handled to ensure suitability for reused
- Objective 6: Describing if temporary storage of peat will be required during construction and how this will be done to ensure suitability for reuse
- Objective 7: Considering the potential volume of peat which may not be suitable for reuse and development of a Waste Management Plan for the 29 Turbine Proposed Development

3 Details to Inform the Peat Management Plan

3.1 Peat Depth at the Site (Objective 1)

Site reconnaissance surveys with peat depth probing were undertaken between April and November 2019 based on the layout developed for the 36 Turbine Scheme. The purpose of the survey work was to confirm Desk Study findings and provide information on the nature of peat depth and hydrological conditions. The results of the peat depth probing are described in the Peat Stability Risk Assessment, Appendix 11.2 of the EIA Report (April 2020).

Two phases of peat depth probing were carried out, with a total of 3188 peat depth probes undertaken:

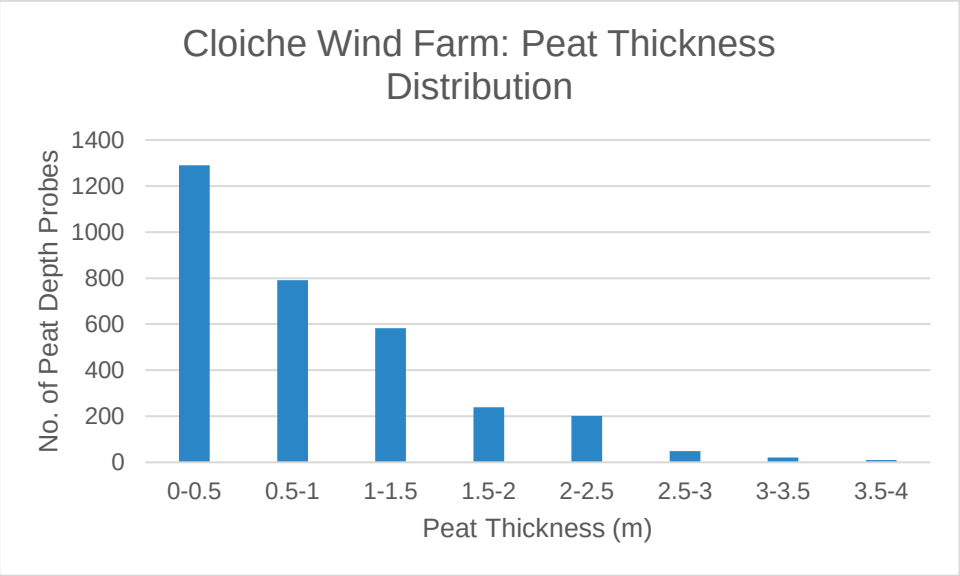
- Phase 1: Peat depth probing (944 probes) was undertaken by Mott MacDonald in April 2019 based on a 100 m grid
- Phase 2: Additional probing (2251 probes) was undertaken by Mott MacDonald in November 2019, targeting the 36 Turbine Scheme turbine layout and associated infrastructure

A visual assessment of peat conditions and estimated peat extents across the study area was carried out during the surveys, with pertinent features such as active, incipient, or relict instability recorded. Peat probing was undertaken using a gouge auger to identify the depth of peat deposits, as well as providing an indication of peat stratification and localised surface hydrological conditions.

A histogram showing the distribution of peat depths encountered is presented in Figure 3.1.

Peat depths vary across the 29 Turbine Proposed Development but are generally between 0m and 2.0m, with localised deeper peat accumulations of thicker peat. Thick peat (>2.0m) was logged within 20m of the centre of turbines C1 and C14 and at locations along the access tracks across the 29 Turbine Proposed Development. Probing was undertaken to a maximum depth of 4.0m below ground level using a gouge auger.

Figure 3.1: Peat Depth Distribution



3.2 Classification and Observation Gathered During Peat Surveys (Objective 2)

As part of the peat depth probing surveys, an indication of the nature of the peat (fibre content), the peat depth in each category along with information on slope, moisture content and surface hydrology conditions was collected.

Peat deposits can be broadly subdivided into two layers: the acrotelm (upper layer) and the catotelm (lower layer); the boundary between the two layers is generally defined by the lowest level of the water table. Acrotelm represents the upper fibrous vegetation mat where accretion of material is occurring, with the decomposing vegetation below this comprising catotelm. Catotelm peat is variable in characteristics, with the decomposition of fibres generally increasing with depth, ranging from semi-fibrous in nature through to amorphous where the original structure of the plant is completely decomposed. Water content can be highly variable and, as fibre content, affects structural strength of the material.

Samples of peat were observed in the field as part of the peat depth probing surveys, and descriptions noted with respect to its characteristics, including fibre content, decomposition, and moisture content. Observations were also made regarding surface hydrology, terrain type and slope angle.

Shear strength tests were undertaken on the peat deposits encountered in areas of proposed new access tracks. From site specific data (in-situ Hand Shear Vane Testing data collected by MML), undrained shear strengths for the peat ranges between 5kN/m^2 and 95kN/m^2, though readings were generally between 10kN/m^2 and 40kN/m^2.

It is considered from field observations that all excavated catotelm peat will have sufficient structural strength to be able to be used in verge restoration i.e., it can be excavated in intact ‘lumps’ and it will not be ‘fluid’. This semi-fibrous catotelm peat will be dressed with a surface layer of acrotelm to re-establish the peat vegetation.

The layout of the wind farm has sought to avoid deep wet peat deposits, however, if any fluid-like wet catotelm peat is encountered then it would be placed in appropriate locations such as

the base of the borrow pit and dressed with a sequence of semi-fibrous catotelm and fibrous acrotelm peat.

Further information is provided in the PSRA (Ref. 4), which concludes that the risk of a peat slide in areas of infrastructure is Very Low to Low provided suitable construction methodologies and control measures are adopted.

3.3 Excavation Calculation and Peat Reuse Requirements (Objective 3)

Table 3.1 shows the construction activities that will generate excavated peat, and the expected volumes of peat produced from each activity. The peat volume estimates have been derived by Tony Gee for the tracks and crane hardstandings from data gathered during the peat survey programme described in Section 3.1, and dimensions of the components used in the infrastructure layout design. Peat volume estimates for the wind turbine foundations, borrow pits and founded turning heads have been derived by MML.

For the purpose of calculations, it has been assumed that all soil cover across the site is peat. It has been suggested that soil depths of less than 0.5m are not peat, however, at this stage it is considered impracticable to differentiate different soil types.

Table 3.1: Peat Excavation by Infrastructure Component

Infrastructure Component	Anticipated Volume of Acrotelm Peat (m^3)	Anticipated Volume of Catotelm Peat (m^3)	Total Anticipated Volume of Peat (m^3)
Wind Turbine Foundations	8,026	24,079	32,105
Crane Hardstandings and Substation Compound	28,767	86,302	115,070
Access Tracks	45,336	136,007	181,343
Borrow Pits	37,956	113,869	151,825
Founded Turning Heads	745	2,234	2,979
Total	**120,831**	**362,492**	**483,322**

Source: Calculations compiled by Tony Gee and MML

Notes and assumptions regarding the excavation of peat as summarised in Table 3.1:

1. Refer to Appendix B for a further breakdown of peat excavation by infrastructure component
2. The calculations are based on the planning layout and typical design assumptions and are therefore subject to minor amendment during the detailed design of infrastructure
3. Surfaces have been assumed as flat or planar in terms of peat quantification
4. No stone will be generated from foundation excavations
5. The volume ratio of acrotelm to catotelm has been assumed as 1:3 (25% acrotelm and 75% catotelm) as a general rule
6. Calculations do not include Control Building, temporary construction compounds, temporary tracks and hardstandings associated with power performance masts
7. No allowance has been made for transitions between floating and cut tracks
8. Crane hardstandings are assumed to be excavated to a suitable soil stratum below bottom of peat
9. Temporary side slopes are generally 1:2 for excavations less than 1.0 m deep and 1:4 for other depths
10. Further details are included in Appendix B

Table 3.2 shows the requirements for reinstatement of peat for the 29 Turbine Proposed Development including the demand for acrotelm and catotelm peat and summarises the total peat balance for the 29 Turbine Proposed Development.

Table 3.2: Reinstatement Requirements and Estimated Peat Volume Requirement

Infrastructure Component	Acrotelm Demand (m^3)	Catotelm Demand (m^3)	Total Demand Estimate (m^3)	Assumed Depth of Reuse (m)	Assumptions
Wind Turbine Foundations	3,814	11,441	15,255	0.5m	Peat to be used to return ground to undisturbed level. Turbine base diameter of 26.6m, 1 in 1 side slopes offset by 2m from foundation base
Crane Hardstandings and Substation Compound	2,157	6,471	8,628	*Varies*	-
Access Tracks	25,420	76,260	101,680	*Varies*	-
Borrow Pits	87,290	261,870	349,160	Average 2.15m: 0.5m acrotelm, 1.65m catotelm	Maximum peat depth varies by borrow pit however restored surface profile will be below the original surface profile.
Founded Turning Heads	0	0	0	-	-
Total	**118,681**	**356,042**	**474,723**		

Source: Calculations compiled by Tony Gee and MML

Notes and Assumptions regarding the re-use of excavated peat:

1. Refer to Appendix B for full details of volume calculation and the figures in Appendix A for details of peat reuse
2. Peat will be placed with sufficient depth and at a suitably gentle slope to maintain hydrology with adjacent deposits to minimise the risk of drying out and encourage growth. Peat placed along track edges and around hard standings will be dressed with acrotelm peat, and will not be used as a thin veneer on steeper non-peat slopes
3. Final reinstatement has been proposed as close to the excavation location as possible to minimise double handling and desiccation of peat during temporary storage
4. Mounds and verges for both floating and cut tracks have been sized at 5m width and a maximum of 1m deep with batters back to existing ground level (Figure A.2 Appendix A). As the track edges will have graded slopes, peat depths will vary across the profile of the final track edges to tie into existing ground form and to create screening mounds as its final use to minimise future disturbance (Ref.1) and Figure A.3 Appendix A
5. Peat will not be placed / stored within hydrology buffer zones
6. Blade laydown areas have been assumed to have no storage capacity
7. Borrow pits will be restored to a ground surface profile below that of the undisturbed ground and will be reinstated using peat at stable slope angles

A more detailed summary of peat excavation and reuse volumes is provided in Appendix B.

Table 3.3: Summary of Demand and Supply

	Total Peat Demand Estimate for Reinstatement (m^3)	Total Peat Supply from Excavation (m^3)	Surplus (+) or Deficit (-) (m^3)
Acrotelm	118,681	120,831	(+) 2,150
Catotelm	356,042	362,492	(+) 6,450
Total	**474,723**	**483,322**	**(+) 8,599**

Source: Calculations compiled by Tony Gee and MML

The results of the peat balance calculation show the total estimated supply (as shown in Table 3.3) exceeds demand for peat. However, the surplus can be dealt with locally increasing the thickness of deposited peat layer in borrow pits, as well as use within the proposed Habitat Management Area as described in Appendix 8.6: Outline Habitat Management Plan. Additionally, the surplus amount is marginal in comparison to total excavated and reinstated peat.

It should be noted that these calculations are approximate in relation to both the volume of peat that will be generated and the volume of peat that can be reused, in all cases the calculations are thought to be conservative. Further, these calculations are considered conservative as it is expected that peat excavation will be minimised further during construction by track micro-siting.

3.4 Use of Peat in Borrow Pit Restoration (Objective 4)

Eight potential borrow pit areas of search have been identified, however, it is not yet known which will be utilised as part of the development. If all eight borrow pits are utilised, the total worked excavation area will be approximately 162,400m^2. On the basis of data gathered during peat probing, this is estimated to generate approximately 150,000m^3 of peat.

The final design of the borrow pits will be confirmed prior to construction and may be subject to further detailed ground investigation once the infrastructure contractor is appointed.

The following principles will be adopted in the final method statements for borrow pit restoration:

- All peat and soil excavated from the borrow pit will be replaced within the same borrow pit footprint where possible
- Temporary storage locations, to be agreed with the Ecological Clerk of Works and Geotechnical Advisor, will be appropriately located and designed to minimise the impact on sensitive habitats and species, prevent risks from material instability and run-off into watercourses
- Wet, structurally poor peat will be placed at the bottom of any restoration profile, followed by more fibrous peat with turf material from the source borrow pit placed on top
- Borrow pits will be restored to a ground profile below that of the previous undisturbed ground using appropriate shallow slope angles that the peat is stable at. A 0.5m layer of acrotelm peat will be placed on the surface of the reinstated borrow pits
- Restoration activities will be overseen by the Ecological Clerk of Works to ensure methods are properly adhered to

If these principles are followed, further material treatment or specific engineering of borrow pits will not be required to ensure suitability for use for restoration purposes.

3.5 Handling and Storage of Excavated Peat (Objectives 5 & 6)

It will be necessary for the final construction PMP to prescribe precise methods and timing involved in excavating, handling, and storing peat for use in reinstatement. A method statement to govern the process will be produced and will be based on the following principles:

- The surface layer of peat and vegetation (acrotelm) will be stripped separately from the catotelm peat. This will involve an excavation depth generally between 0.3m and 0.5m
- Acrotelm material will be stored separately from catotelm material
- Careful handling is essential to retain any existing structure and integrity of the excavated materials and thereby maximise the potential for excavated material to be reused
- Less humified catotelm peat (consolidated peat) which maintains its structure upon excavation will be kept separate from any highly humified amorphous peat
- Acrotelm material will be replaced as intact as possible once construction is complete
- To minimise handling and transportation of peat, acrotelm and catotelm material will be replaced, as far as is reasonably practicable, in the location from which it was removed; Acrotelm material will be placed on the surface
- Additional peat required in order to address local deficits in relation to track screening or dressing will be taken from the closest possible source of peat excavation
- Temporary storage of peat will be minimised, the size and location of these areas will be considered during the detailed design of the project, accounting for constraints identified within the EIA, e.g. avoiding areas of intact peatland and considering restoration of degraded peatland
- If necessary, temporary stockpiles may be sprayed with water during dry periods of weather to prevent drying out
- Storage areas should be sited in areas with lower ecological value, low stability risk and at a suitable distance from water courses
- Reinstatement will be carried out at the earliest opportunity to minimise storage of turves and other materials
- Timing construction work as much as possible to avoid periods when peat materials are likely to be wetter
- Temporary storage and replacement of peat excavated from borrow pits will be, where possible, located adjacent to and within the source pit
- Transport of peat on site from excavation to temporary storage and restoration will be kept to practicable minimum

3.6 Peat Unsuitable for Reuse (Objective 7)

Based on field observations and calculations there are sufficient and appropriate reuse options for all peat within the 29 Turbine Proposed Development and it is highly unlikely that there will be a surplus of excavated peat. Therefore, it is not anticipated that a Waste Management Plan and license will be required.

4 Conclusions

The following conclusions are drawn regarding the management of peat within the 29 Turbine Proposed Development:

- As a result of the preliminary peat volume calculations undertaken, the overall balance on site suggests that there will be no surplus of excavated peat, and therefore a Waste Management Licence is unlikely to be required.
- While a surplus of peat from excavation has been identified, it is considered that by locally increasing the thickness of reinstated peat in borrow pits and using peat material for habitat restoration will result in no effective peat surplus
- Sufficient procedures will be put in place to ensure that peat can be sensitively handled and temporarily stored on site when, and if required, therefore allowing for effective reuse.
- Both acrotelm and catotelm peat present at the site are considered suitable for restoration purposes. Should fluid like catotelm and amorphous peat be encountered then it would be placed in more appropriate locations i.e., the borrow pits and dressed with a sequence of semi-fibrous catotelm and fibrous acrotelm peat.

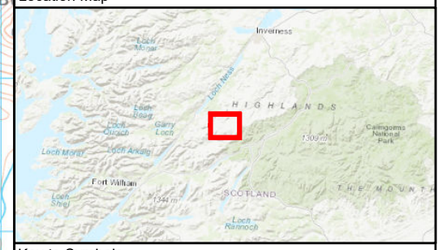
5 References

1. Scottish Renewables, Scottish Environment Protection Agency (SEPA), “Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste,” Scottish Government, January 2012.
2. Scottish Environment Protection Agency (SEPA), “SEPA Regulatory Position Statement - Developments on Peat,” Scottish Environment Protection Agency (SEPA), February 2010.
3. SSE Renewables (SSE), “Cloiche Wind Farm Environmental Statement - Chapter 2 - Design Evolution and Alternatives,” 2020
4. Mott MacDonald, “Cloiche Wind Farm Peat Stability Risk Assessment, Report” February 2020

A. Figures

A.1 Site Layout

Location Map



Key to Symbols

- Site Boundary
- Turbine
- LiDAR

Track

- Cut
- Float
- Temporary Borrow Pit Access
- Borrow Pit
- Compound
- Batching Plant
- Hardstanding
- Substation
- Turning Head

Notes

Rev	Date	Drawn	Description	Ch'k'd	App'd
02	08/06/22	LK	For Information	KY	AT

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Figure A.1
Site Layout Plan
Peat Management Plan
Cloiche Wind Farm

Designed	L Keys		Eng Check	K Young	
Drawn	L Keys		Coordination	K Young	
GIS Check	K Young		Approved	A Tourish	

Scale at A3	Status	Rev	Security
1:40,000	FI	02	STD

Drawing Number
MMD-408095-DR-PM-GIS-001

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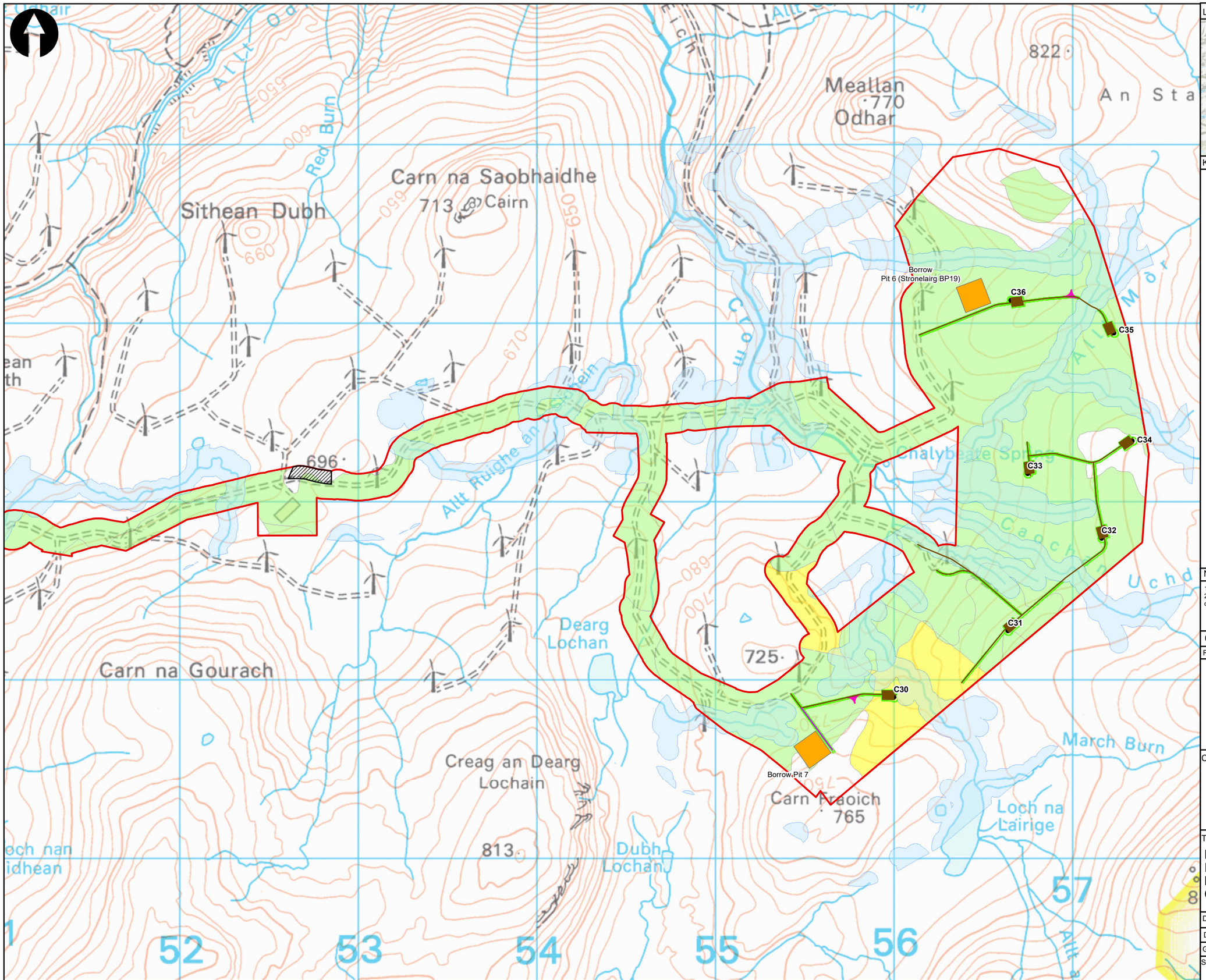
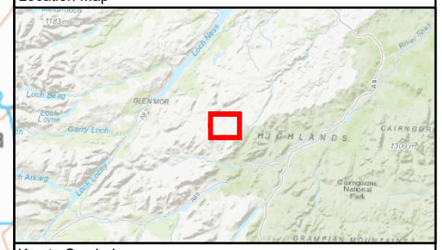
A.2 Indicative Peat Storage Areas



Location Map



Key to Symbols

- Site Boundary
- Turbine
- LiDAR

Track

- Cut
- Float
- Temporary Borrow Pit Access Track
- Borrow Pit
- Compound
- Batching Plant
- Hardstanding
- Substation
- Turning Head
- Watercourse 50m Buffer
- Indicative Peat Storage Area

Carbon and Peatland Classification

- 1
- 2

Notes

1. All dimensions are approximate.
2. The borrow pit area shown is a search area, Actual dimensions will depend on confirmation of material requirements and ground investigation.

Rev	Date	Drawn	Description	Ch'k'd	App'd
02	30/06/22	LK	For Information	KY	AT

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Figure A.2 (East)
Indicative Peat Storage Areas
Draft Peat Management Plan
Cloiche Wind Farm

Designed	L Keys		Eng Check	K Young	
Drawn	L Keys		Coordination	K Young	
GIS Check	K Young		Approved	A Tourish	

Scale at A3	Status	Rev	Security
1:20,000	FI	02	STD

Drawing Number
MMD-408095-DR-BP-GIS-002

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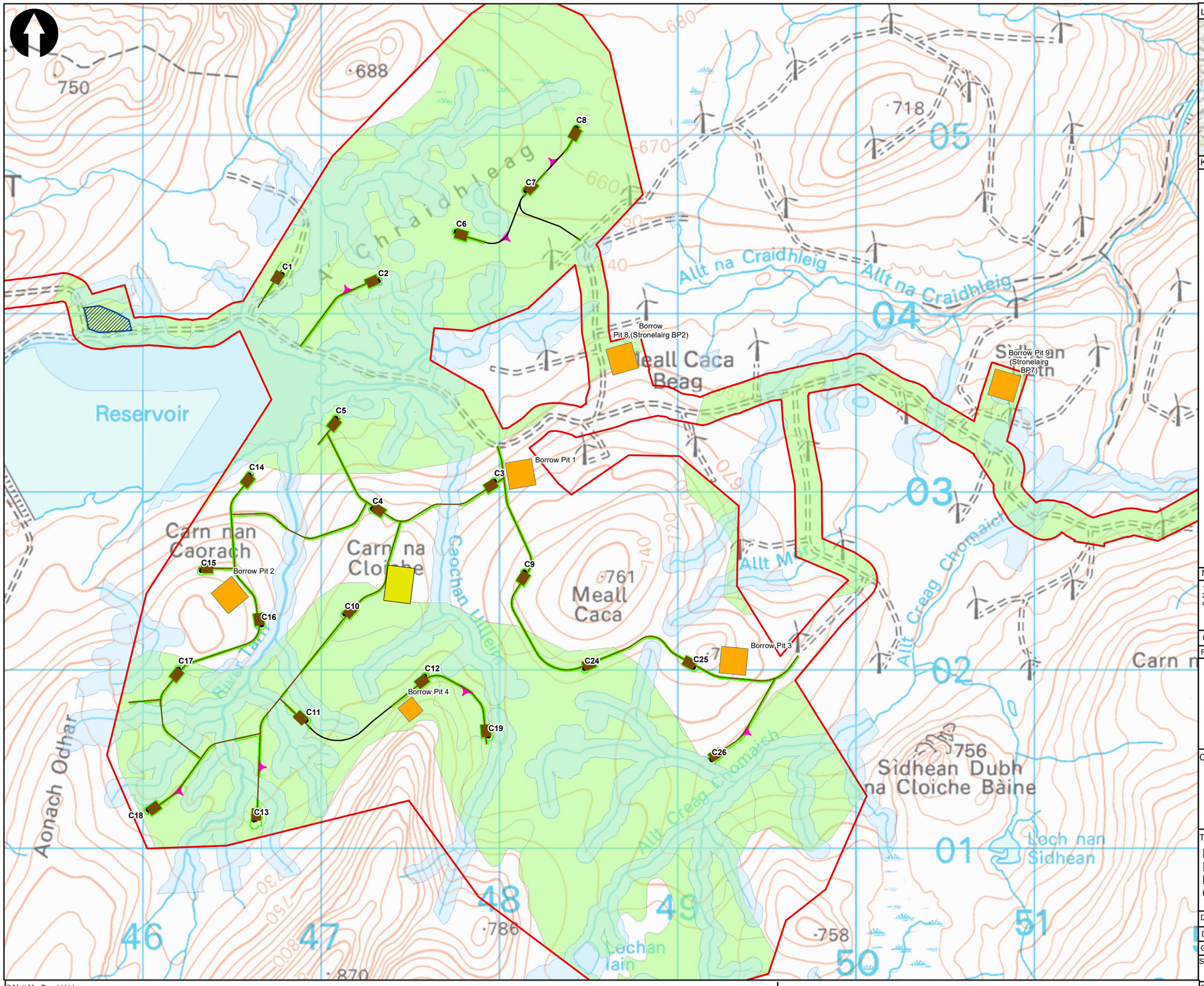
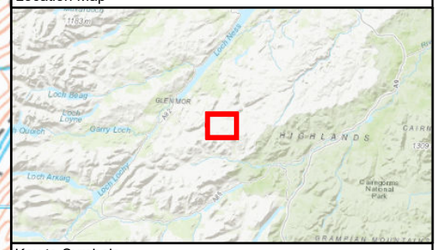


Location Map



Key to Symbols

- Site Boundary
- Turbine
- LiDAR

Track

- Cut
- Float
- Temporary Borrow Pit Access Track
- Borrow Pit
- Compound
- Batching Plant
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- Watercourse 50m Buffer
- Indicative Peat Storage Area

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Figure A.2 (West)
Indicative Peat Storage Areas
Draft Peat Management Plan
Cloiche Wind Farm

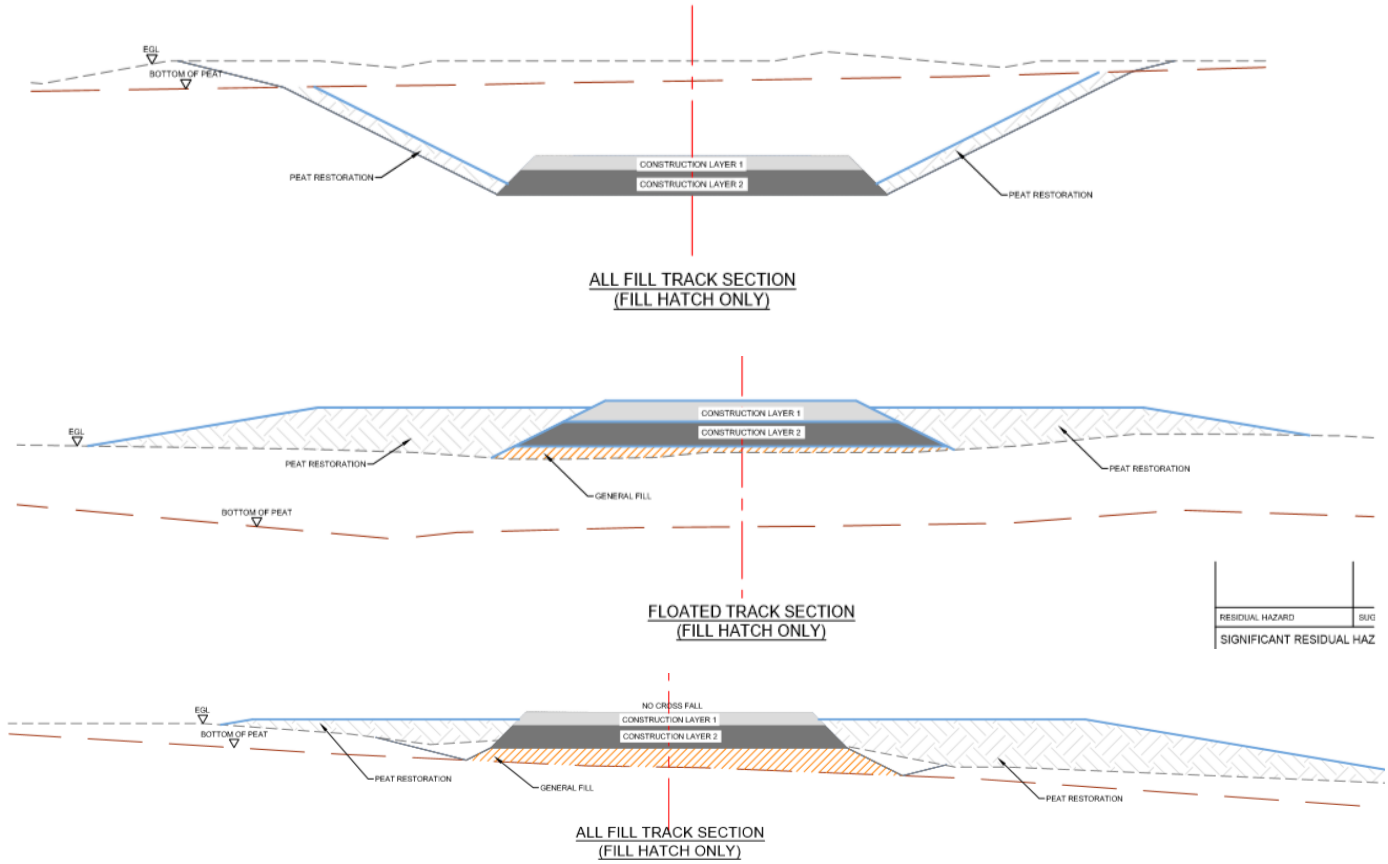
Designed	L Keys		Eng Check	K Young	
Drawn	L Keys		Coordination	K Young	
GIS Check	K Young		Approved	A Tourish	

Scale at A3	Status	Rev	Security
1:20,000	FI	02	STD

Drawing Number
MMD-408095-DR-BP-GIS-002

0 0.5 1 Km

A.3 Indicative Track Profiles with Peat Restoration



B. Calculations

B.1 Borrow Pits

Excavation

Borrow Pit	Assumed Peat Depth (from probing) (m)	Plan area of peat excavation (m2)	Peat Volume (m3)
BP1	0.5	21375	10687.5
BP2	0.5	21900	10950
BP3	1	21675	21675
BP4	1	9250	9250
BP6	1	21750	21750
BP7	1	22275	22275
BP8	1	22050	22050
BP9	1.5	22125	33187.5
		Total Acrotelm (m3)	37956
		Total Catotelm (m3)	113869

1. Peat depths taken as conservative values measured at the borrow pit location

Restoration

Assumed Peat Depth	2.15m
Total Peat Reinstatement Volume	349160m3
As above: acrotelm	87290m3
As above: catotelm	261870m3

B.2 Turbine Foundations

Excavation

Turbine	Peat Depth (m)	Peat Volume (m3)
C1	2.5	1880.49
C2	1.5	1451.43
C3	1	995.38
C4	1	995.38
C5	1.5	1451.43
C6	1.5	1451.43
C7	1	995.38
C8	2	1880.49
C9	0.5	511.77
C10	0.5	511.77
C11	1.5	1451.43
C12	0.5	511.77
C13	1.5	995.38
C14	0.5	511.77
C15	0.5	511.77

Turbine	Peat Depth (m)	Peat Volume (m3)
C16	1	995.38
C17	0.5	511.77
C18	0.5	511.77
C19	2	1880.49
C24	1	995.38
C25	1	995.38
C26	2	1880.49
C30	0.5	511.77
C31	1.5	1451.43
C32	1	995.38
C33	1	995.38
C34	0.5	511.77
C35	1.5	1451.43
C36	1.5	1451.43
	Total Acrotelm (m3)	8026.26
	Total Catotelm (m3)	24078.79

Assumptions:

1. Foundations assumed to be circular of diameter 26.6m and depth of 3m

2. Cut slope assumed at 45deg from horizontal

3. Cut slope toe assumed offset 2m from the foundation base

4. Peat depths taken as conservative values measured at the wind turbine location

Restoration

Assumed Restoration Peat Depth	0.5m
Total Peat Reinstatement Volume	15255.28m3
As above: acrotelm	3813.82m3
As above: catotelm	11441.46m3

B.3 Access Tracks

Excavation

Total Peat Excavation Volume	181,343m3
As above: acrotelm	45,336m3
As above: catotelm	136,007m3

Restoration

Total Peat Restoration Volume	101,680m3

As above: acrotelm	**25,420m3**
As above: catotelm	**76,260m3**

B.4 Hardstandings and Substation Compound

Excavation

Total Peat Excavation Volume	**115,070m3**
As above: acrotelm	**28,767m3**
As above: catotelm	**86,302m3**

Restoration

Total Peat Restoration Volume	**8,628m3**
As above: acrotelm	**2,157m3**
As above: catotelm	**6,471m3**