

Appendix K. Peat Management Plan

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Kergord Access Track

Viking Energy Wind Farm

Peat Management Plan

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Kergord Access Track

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Executive Summary

In April 2012, Viking Energy Wind Farm (VEWF) was granted outline planning consent to build the 'Viking Wind Farm', comprising 103 wind turbines located across mainland Shetland, Scotland. The Viking Wind Farm includes a number of access points from the local road network, with one of these being Kergord Access Track, which will provide access from the B9075 to the north-west section of the wind farm and new sub-station.

The proposed track is aligned roughly north-south, and rises through the Valley of Kergord, crossing the Burn of Weisdale and its tributaries, including the Burn of Droswall. The development corridor is covered by extensive and highly variable peat deposits.

The proposed development will entail the construction of 2090m of new track, including a new bridge over the Burn of Weisdale. Earthwork embankment side slopes are anticipated to be formed to finished gradients of 1V:2H, while permanent cutting slope gradients are likely to be trimmed to gradients of circa 1V:4H. The provisional track alignment shows the route to predominantly run in shallow cutting and given the heavy plant and materials (up to 15.2 tonne axle loads) expected to use this route and the acceptable maximum longitudinal gradients (up to 11%) required, VEWF has specified a cut and replace method for the full peat thickness.

Four phases of ground investigation have been carried out to inform development of the proposed route alignment. An initial investigation, undertaken in 2009, served to characterise the general distribution of peat deposits within the development area, and established that the greatest peat thicknesses are typically encountered in the southern half of the development area. Further peat probing, undertaken in September 2013, November 2015 and March 2016, proved peat thicknesses of up to 3.9m and further confirmed that peat coverage was thinner on the steeper northern slopes and alongside watercourses.

The total volume of peat excavation anticipated for the whole site is approximately 86,500m³, which is based on specific assumptions and limitations. Of this estimated total volume of excavated peat, there is scope to re-use 9,000m³ of material in the backfilling of temporary excavations. The remaining 77,500m³ of peat would be displaced permanently. Of the total volume of peat to be excavated, approximately 31,400m³ is estimated to comprise catotelmic peat.

Good practice for peat excavation and storage includes activities such as minimising ground disturbance around excavations, handling turves with care and storing peat to a maximum thickness of 1m above ground level. Options for the re-use of excavated peat include use in restoration works and low height reinstatement bunds. It is anticipated, however, that there will be limited scope for the reuse of permanently displaced peat in restoration works associated with the Kergord Access Track development, and further consideration should be given to the re-use of peat across the wider wind farm development.

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1. Introduction

In April 2012, Viking Energy Wind Farm (VEWF) gained consent to build the 'Viking Wind Farm', which comprises 103 wind turbine generators, located across mainland Shetland, Scotland. The Viking Wind Farm will require a number of access points from the local road network. One of these is the Kergord Access Track, off the B9075. The intention is to progress construction of this track separately from the remainder of the wind farm development. A planning application will therefore be submitted to Shetland Islands Council for the Kergord Access Track.

Kergord Access Track will provide access from the B9075 to the north-west section of the wind farm, where a new sub-station is to be located in Upper Kergord. The proposed track will pass through an area of extensive and highly variable peat cover. Enabling works for the track construction will impact on these peat deposits and hence a Peat Management Plan (PMP) is required in support of the planning application. This report should be read in conjunction with the Kergord Access Track, Peat Landslide Hazard and Risk Assessment (PLHRA) ¹.

Jacobs was commissioned in April 2016 to prepare the PMP for the Kergord Access Track. The PMP has been undertaken in accordance with the guidance provided by Scottish Renewables and the Scottish Environmental Protection Agency^{6/8}.

1.1 Report Structure

This report includes the following information:

- a summary of the peat conditions on-site, with reference to the Kergord Access Track PLHRA¹;
- the proposed construction activities and the estimated peat volumes that would arise from excavations; and
- a description of the temporary storage locations and options for the re-use of excavated peat.

1.2 Assumptions and Limitations

The assessment of the volumes of peat that will arise from excavations during construction of the track is based on the following stipulations and assumptions:

- The cutting depths and embankment heights have been modelled based on dimensions derived from a draft drawing named 'ACAD-Kergord 0.5m Intervals with Peat Depths', provided by VEWF⁵. The track alignment depicted on the 'ACAD-Kergord' drawing⁵ extends to an overall length of 2090m.
- The volumes of peat to be excavated have been estimated based on peat probe data collected during intrusive ground investigations undertaken by Mouchel², Raeburn Drilling⁴ and RPS^{3&7} in 2009, 2013, 2015 and 2016 respectively.
- The dimensions and founding levels of proposed cross-carriageway drainage culverts have not been finalised. Accordingly, no provision has been made in this assessment for peat excavation around potential culvert locations.
- Bridge foundation excavation dimensions have not been finalised and therefore have not been included in volumes given in this assessment. However, the bridge excavations are not anticipated to have a significant impact on total peat volumes.
- It is assumed that permanent cuttings within peat will be constructed to slope gradients of 1 vertical : 4 horizontal.
- The realigned track will be constructed with a carriageway width of 6m, with a 1m verge to either side.

Reference should also be made to the specific peat volume assumptions listed in Appendix B.

2. Site Description

The Viking Wind Farm development is located in the central mainland, Shetland Islands. The proposed development covers the provision of an alternative access track through the Valley of Kergord to serve the proposed converter station within Upper Kergord. The track provides access from the B9075, running northwards from a junction immediately east of the existing crossing over the Burn of Weisdale. Construction will entail 2090m of new 8m wide track (6m wide plus two 1m verges) with cuttings and embankments along the scheme¹⁸. The southernmost section of the route runs along the eastern side of the valley, prior to crossing the Burn of Weisdale and the existing Upper Kergord track. The route continues northwards over the Burn of Droswall, and along the western flank of the valley. Extensive and highly variable deposits of peat cover the proposed development corridor. Figure 2-1 shows the general location of the site, on mainland Shetland.

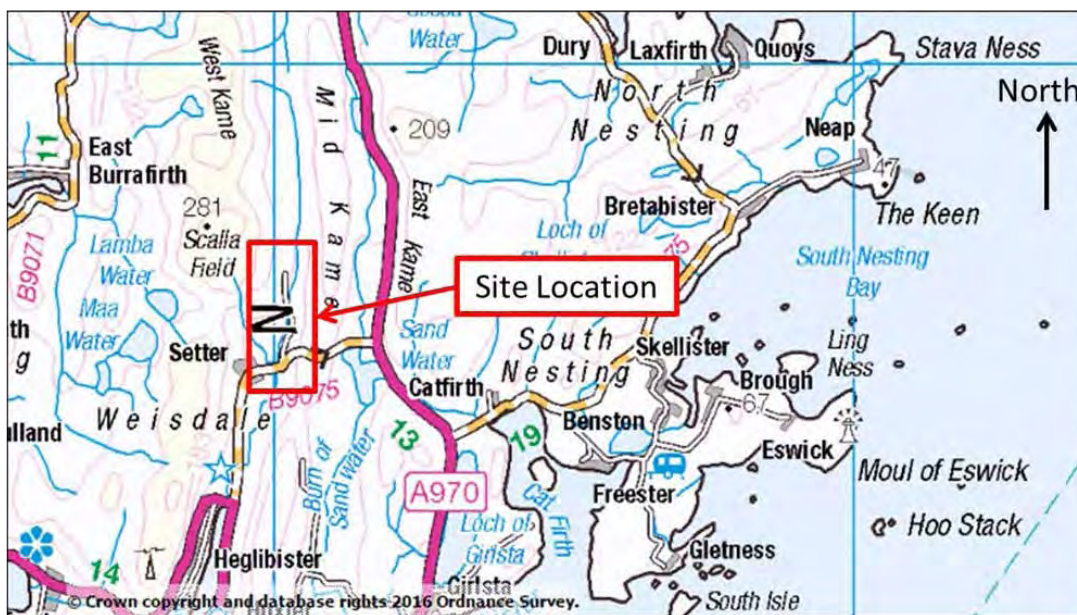


Figure 2-1: Extract from the Ordnance Survey OpenData Viewer of the Shetland Mainland (1:250,000 Scale)¹⁰.

Across the site, the topography generally comprises undulating topography with numerous mounds and depressions in the north and gentle slopes in the south. The elevation of the track ranges from approximately 24m above Ordnance Datum (AOD) near the junction with the B9075 in the south, to a peak elevation of 97m AOD in the north. A site boundary⁹ has been defined by VEFW, although small areas of landowner and environmental constraints could lie within this boundary.

For the purpose of description, the site is considered as four sections of common character, with the extents of each section indicated on the sketch plan shown in Figure 2-2. The peat volume calculations in Section 4 follow the same convention of zones. The general description of each area is as follows:

- A. The alignment of the proposed development passes through open land used for sheep grazing on the gently sloping eastern valley side then crosses over the existing Upper Kergord track and the Burn of Weisdale.
- B. The alignment of the proposed development passes through open land over a low-lying broad ridge and into the narrow, 'v-shaped' valley along the Burn of Droswall.
- C. The alignment of the proposed development passes along the western valley side, which has steep slopes with frequent small streams. This area appears to have been used as crofting land previously.
- D. The alignment of the proposed development passes through crofting/agricultural land with short grassed area.

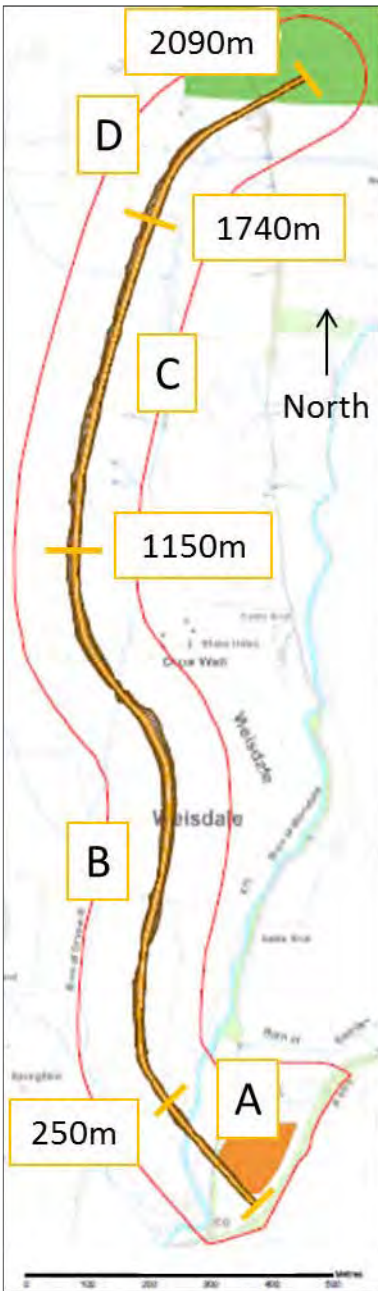


Figure 2-2: Diagrammatic plan above showing the proposed alignment of the Kergord Access Track, divided into four areas based on common character⁹.

3. Site Reconnaissance and Fieldwork

3.1 Site Reconnaissance

An initial site reconnaissance was undertaken by Jacobs in September 2013. The 2013 walkover survey was undertaken in relation to an earlier route alignment, which has since been superseded in part, and was undertaken concurrently with the peat investigation for the adjacent B9075 Sandwater Road project. The proposed development has subsequently been modified, particularly within the southern section of the proposed development and this section of the proposed route was not included within the coverage of the 2013 site reconnaissance. The aim of the site reconnaissance was to zone the site into areas with similar landscape character and geomorphology, and to identify features that may be indicative of ongoing peat instability, e.g. hags, breaks-in-slope, drainage channels, gullies and relict instability features. The site reconnaissance encountered the following key hazards:

- A. Various historic back scars and peat lobes evident along the eastern valley slope.
- B. Relict peat slides, peat pipes and a large peat depression on the intermediate ridge between the Burn of Droswall and Burn of Weisdale.
- C. There are several peat scars, minor compression ridges and occasional peat pipes along the western valley slope. A natural break in slope was identified along the western valley side, with occasional boggy ground associated with stream heads.
- D. Areas of saturated, boggy ground. Low lying crofting land has drainage ditches that cross the site.

3.2 Ground Investigation Fieldwork

Ground investigation fieldwork was undertaken in four phases, under the direction of VEFW, as summarised below.

- ground investigation undertaken by Mouchel under the direction of VEFW in 2009²;
- ground investigation undertaken by Raeburn Drilling and Geotechnical Ltd under the direction of VEP in October 2013⁴;
- ground investigation undertaken by RPS Group Ltd under the direction of VEFW in 2015³; and
- ground investigation undertaken by RPS Group Ltd under the direction of VEFW in 2016⁷.

3.3 Peat Conditions

Peat probes were carried out during the 2013, 2015 and 2016 ground investigations. The peat probes were terminated once a marked change in resistance was observed, which would indicate the presence of dense material underlying the peat. This is likely to be bedrock or Glacial Till. The typical peat thicknesses from data collected during the 2013, 2015 and 2016 ground investigations, which are considered to be relevant to the proposed development, are shown on Figure 3-1. Between proposed track chainages 300m and 1200m, peat deposits were observed to vary in thickness up to circa 4m. Peat deposits were generally noted to be thinner between chainage 0m and 300m and chainages 1200m and 2090m.

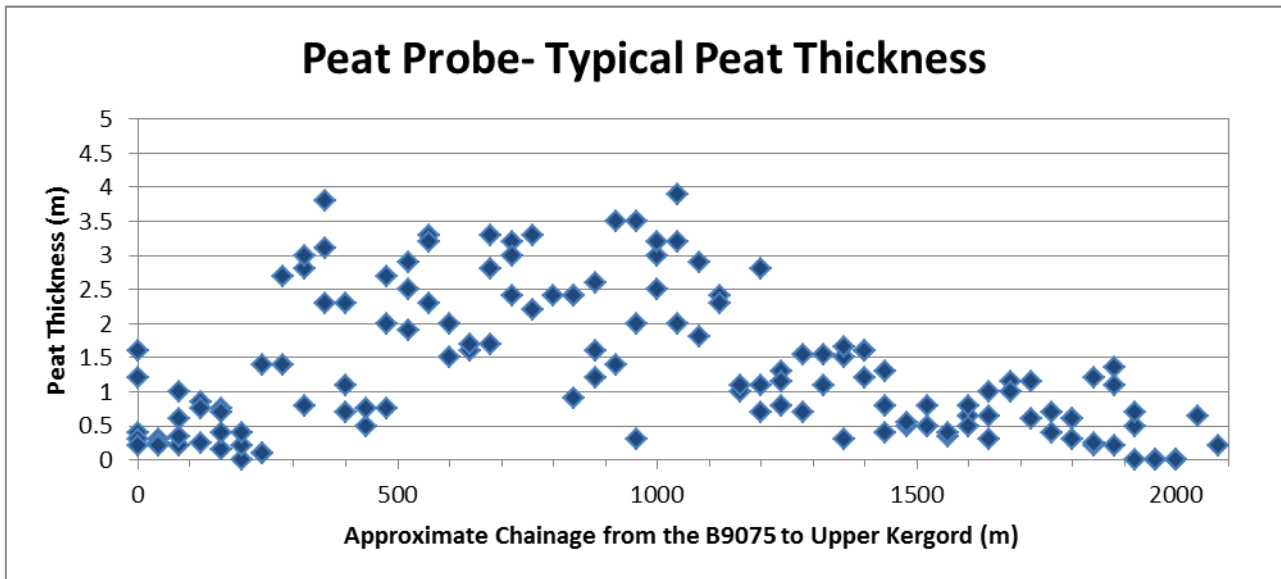


Figure 3-1: Typical peat thicknesses* recorded along the proposed Kergord Access Track.

Note: * These thicknesses have been determined by peat probes in close proximity to the proposed development.

Core samples of peat were obtained during the 2013 ground investigation, to enable the inspection and classification of peat deposits using the von Post method. The other three phases of investigation solely entailed peat probing, which does not permit the visual inspection of soil samples.

The composition of peat bodies typically varies with depth, and two distinct zones may be considered to form in peat bodies – an upper Acrotelm layer and a lower Catotelm layer. The characteristics of the two zones are described below.

- Acrotelm – This layer comprises decomposing peat that lies above the average water table and is of relatively high permeability. It is typically a fibrous peat with low levels of humification. The Acrotelm can be up to 1.0m in thickness, but can be thicker under dry conditions. This layer is typically scored between H1 to H5 on the von Post classification and typically has greater water content (e.g. B4 and B5).
- Catotelm – This layer consists of dense, compact peat that is permanently saturated and lies below the water table. The upper surface of the Catotelm is typically found at depths of 1.0 – 1.5m below ground surface, with its base defining the bottom of the peat mass. This layer comprises pseudo-fibrous to amorphous peat. This layer is typically scored as H6 to H10 on the von Post classification scale.

Figure 3-2 shows the respective thicknesses of the Acrotelm and Catotelm layers at peat core locations along the proposed track, encountered during the 2013 investigation. These findings have been used to estimate the thickness of acrotelmic peat across other areas of the development site.

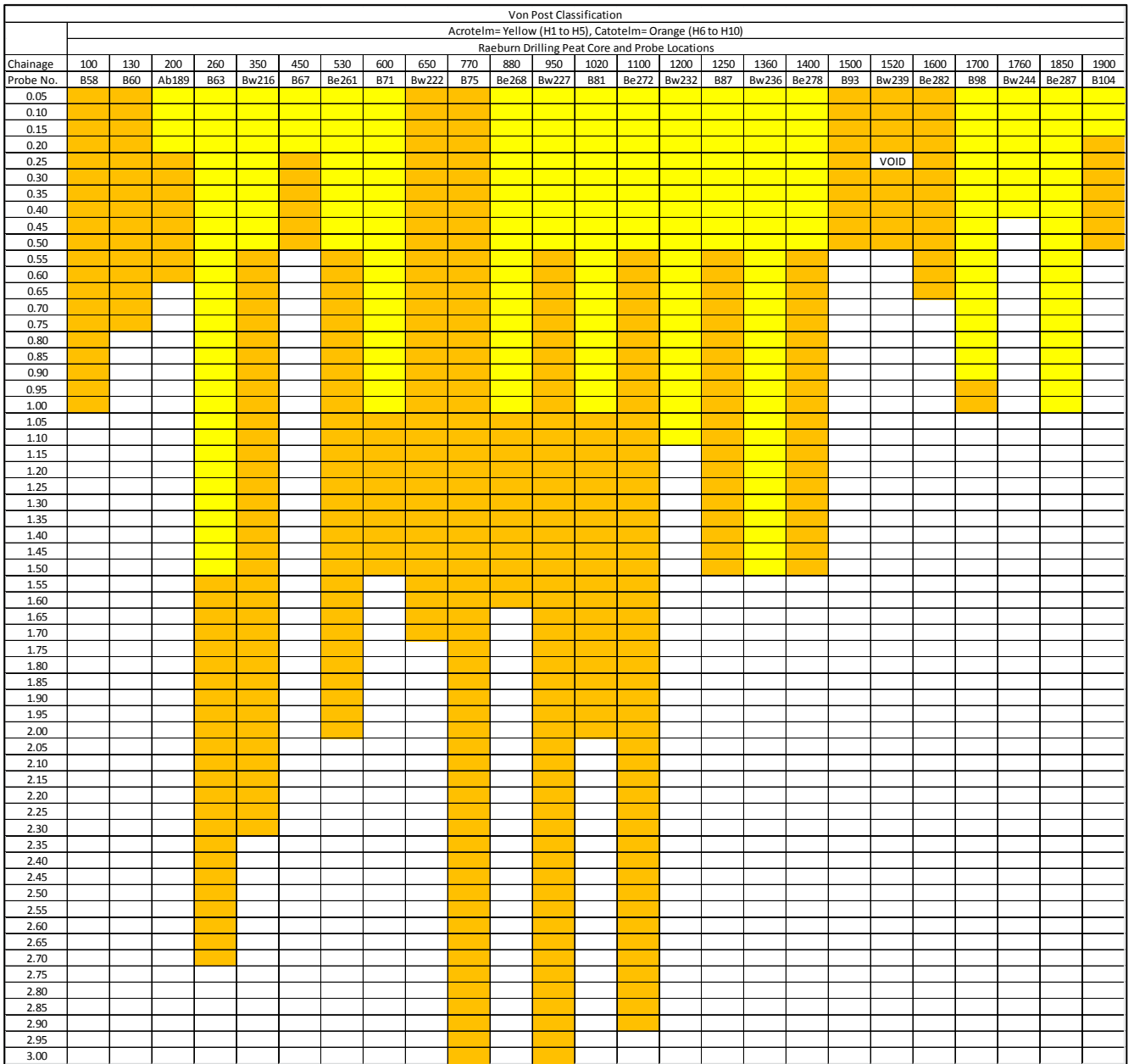


Figure 3-2: Acrotelm (highlighted Yellow) and Catotelm (highlighted Orange) depth ranges at peat core locations (2013 investigation).

4. Proposed Works

Preliminary work provided by VEFW shows the proposed construction along the Kergord Access Track comprising of general earthworks, with a bridge crossing anticipated at the Burn of Weisdale and a large culvert of the Burn of Droswall. The proposed alignment is shown in Appendix A. The junction between the Kergord Access Track and the B9075 is likely to be adopted as a public highway upon completion of the works.

The proposed construction drawing⁵ shows cuttings along the majority of the route, with two short sections of embankment alongside the Burn of Weisdale and Burn of Droswall. Earthwork cuttings and embankments are minor, relative to existing ground level, and given the heavy plant and materials (up to 15.2 tonne axle loads) expected to use this route and the acceptable maximum longitudinal gradients (up to 11%) required, VEFW has specified a cut and replace method for the full peat thickness.

Chainage		Proposed Works**	
From	To	Average Cutting Depth*	Typical Embankment Height
0***	100	1.1	-
100	200	1.7	1.6
200	300	1.5	-
300	400	2.1	-
400	500	1.8	-
500	600	2.8	-
600	700	2.6	-
700	800	3.3	-
800	900	3.2	-
900	1000	1.9	3.2
1000	1100	1.8	-
1100	1200	2.3	-
1200	1300	2.3	-
1300	1400	2.6	-
1400	1500	2.3	-
1500	1600	1.9	-
1600	1700	2.0	-
1700	1800	2.4	-
1800	1900	2.2	-
1900	2000	0.8	-
2000	2090	0.7	-

Table 4-1: VEP Proposed Earthworks.

Explanatory notes are present overleaf.

- Note:
- *The cutting depth excavation is to finished road level only and does not allow for road pavement construction.
 - **The earthworks depths/heights are stated relative to existing ground level. VEWF proposes to remove the full thickness of peat and to support the highway upon the underlying competent stratum. Accordingly, excavation depths cannot be inferred from this information
 - *** The proposed site compound area is to be installed immediately east of the Kergord Access Track as temporary works between chainage 0m and chainage 100m with an maximum peat depth of 0.62m and an average peat depth of 0.45m.

The provisional cutting and embankment heights have been estimated from the proposed construction drawing⁵, and are summarised in Table 4-1 at 100m chainage intervals, starting at the southern end where the track extends from the B9075. Cutting slopes are provisionally shown at 1V:2H gradient⁵, however this is likely to be unfeasible for construction within peat and would need to be trimmed back from the crest of the cutting and the slope slackened to nearer 1V:4H. Embankment slope gradients are anticipated to be 1V:2H (27 degrees)⁵.

The volumes estimated in Section 5 of this report, have been estimated using the maximum peat thickness at 40m chainage intervals based on the peat probe ground investigations. The probes are spaced at 40m chainage intervals between 0m to 2080m.

5. Estimated Volumes of Peat Excavation

Details of the estimated peat volumes associated with the proposed construction works and the temporary works are provided in this section. Peat excavation calculations are presented in Appendix B. Peat excavation volumes have been derived from the proposed earthworks geometry, as depicted on the construction drawing entitled ‘ACAD Kergord’⁵, and the thickness of peat deposits established by intrusive ground investigations. A copy of the proposed highway geometry drawing is presented in Appendix A.

Figure 5-1 to Figure 5-4 show diagrammatic cross sections of the excavation required to enable construction of the cuttings and embankments for the Kergord Access Track, based on the ‘ACAD Kergord’⁵ model. The sketches also indicate the locations of peat to be removed for temporary works.

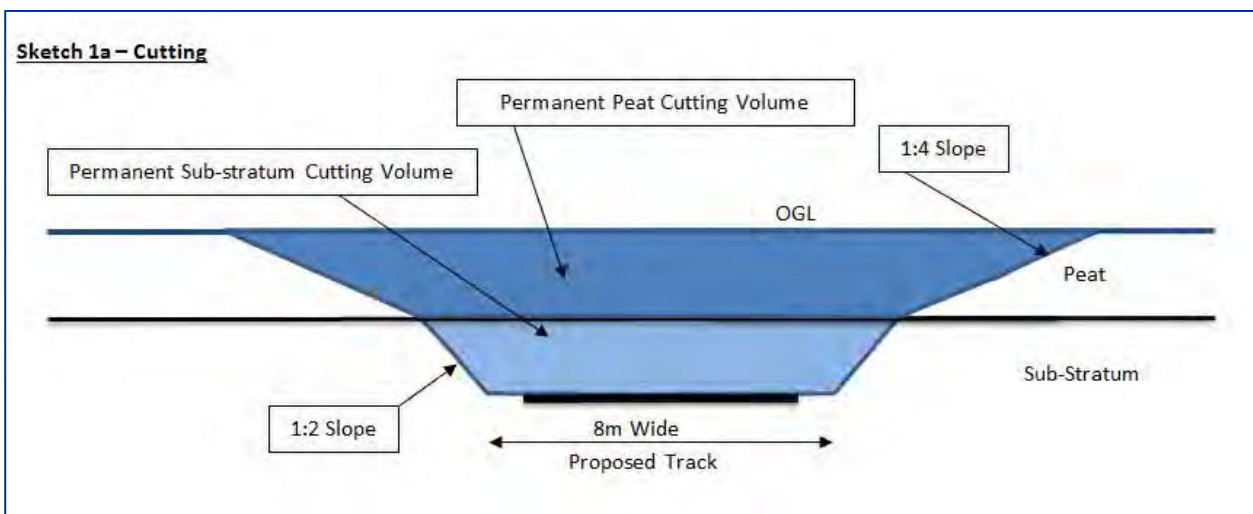


Figure 5-1: Diagrammatic Cross Section of the Proposed Kergord Access Track- Cutting

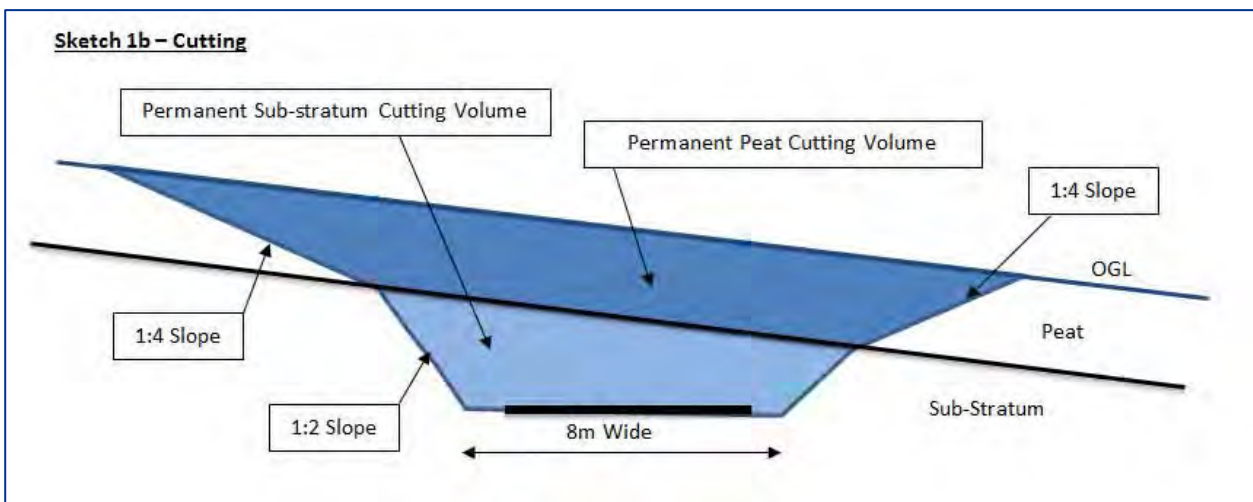


Figure 5-2: Diagrammatic Cross Section of the Proposed Kergord Access Track- Side Long Cutting

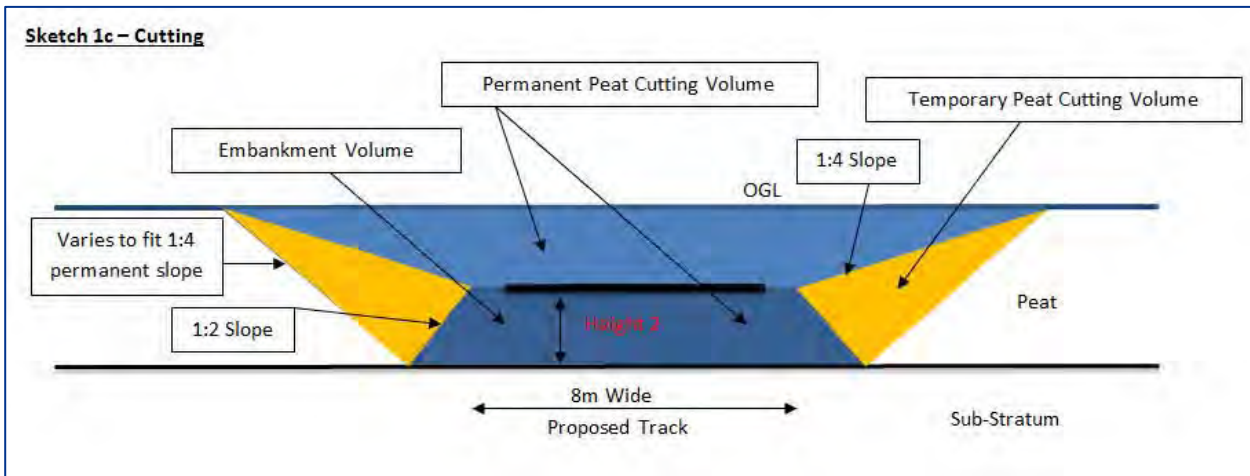


Figure 5-3: Diagrammatic Cross Section of the Proposed Kergord Access Track- Cutting with low rise Embankment

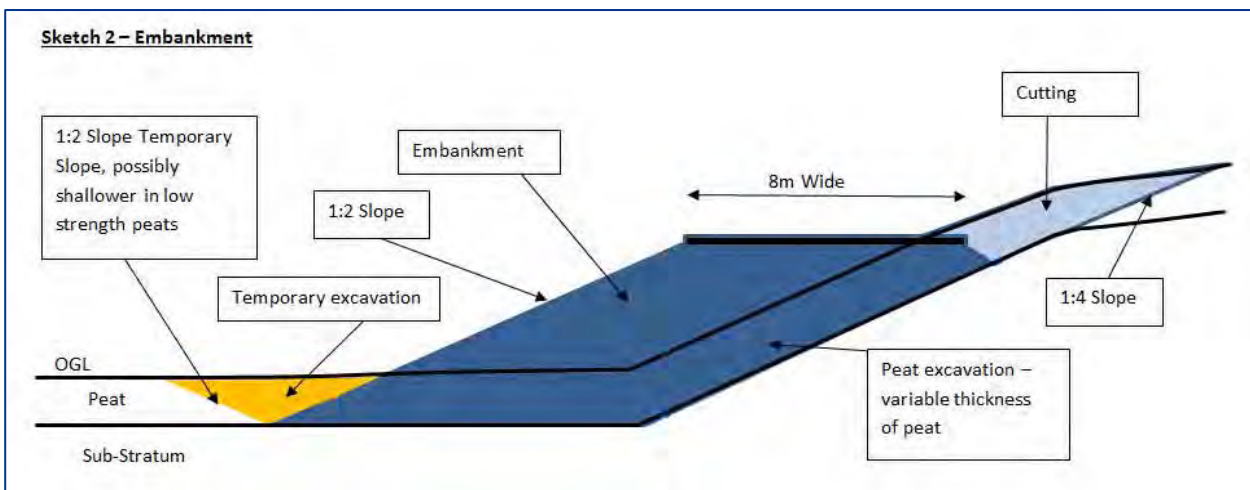


Figure 5-4: Diagrammatic Cross Section of the Proposed Kergord Access Track- Embankment

5.1 Estimated Volumes of Peat Excavation

For the construction of the Kergord Access Track the peat excavation volumes have been calculated for zones A, B, C and D, as defined in Section 2, and are summarised in Table 5-1.

Area	Chainage (m)	Section (m)
A	0m-250m	250m
B	250m-1150m	900m
C	1150m-1740m	590m
D	1740m-2090m	350m

Table 5-1: Summary of areas across the scheme.

Table 5-2 to Table 5-6 detail the volumes of peat to be excavated for each area and overall combined volumes for the site. Excavation volumes are further defined in terms of temporarily displaced material and permanently displaced material. The volume of catotelmic peat that is anticipated to arise from excavations has been

estimated based on the extrapolated findings of the peat coring exercise undertaken in 2013. The relative volumes of Acrotelm/Catotelm are based on an assumed 1m thick Acrotelm in areas where overall peat thickness has been proved to exceed 1.5m.

Area A	Volume (m ³)
Permanent Excavation	3,600
Temporary Excavation	700
Total Excavation (Permanent and Temporary)	4,300
Estimated volume of Catotelmic Peat	260

Table 5-2: Estimated volumes of peat excavation Area A.

Area B	Volume (m ³)
Permanent Excavation	33,600
Temporary Excavation	4,800
Total Excavation (Permanent and Temporary)	38,400
Estimated volume of Catotelmic Peat	17,900

Table 5-3: Estimated volumes of peat excavation Area B.

Area C	Volume (m ³)
Permanent Excavation	32,000
Temporary Excavation	4,700
Total Excavation (Permanent and Temporary)	36,700
Estimated volume of Catotelmic Peat	13,300

Table 5-4: Estimated volumes of peat excavation Area C.

Area D	Volume (m ³)
Permanent Excavation	7,200
Temporary Excavation	0
Total Excavation (Permanent and Temporary)	7,200
Estimated volume of Catotelmic Peat	0

Table 5-5: Estimated volumes of peat excavation Area D.

Area A to D	Volume (m ³)
Permanent Displaced Peat	76,200
Temporary Displaced Peat	10,300
Total Excavation (Permanent and Temporary)	86,500
Estimated volume of Catotelmic Peat	31,400

Table 5-6: Estimated combined volumes of peat excavation in Areas A-D.

6. Peat Excavation and Storage

This section outlines good practice for excavation, storage and transportation of peat material. These should be considered within the design and construction planning stages for the proposed Kergord Access Track.

6.1 Good Practice for Peat Excavation

During peat excavation the following general excavation principles and good practices should be observed during the construction works to the Kergord Access Track.

- All reasonable measures will be taken to avoid or minimise excavations, such as limiting the extents of temporary compound areas for only essential plant/material storage. Therefore minimising disturbance to peat and peatland habitats.
- Areas of ground disturbance around excavations will be kept to a minimum and will be clearly defined on-site. During construction, access to working areas will be restricted to specified routes, comprising specially constructed tracks.
- Appropriate plant such as low pressure models will be used to avoid unnecessary disturbance to the ground surface.
- Turves should be stripped and handled with care and kept with the vegetation side up so that damage to living vegetation is prevented or minimised as far as possible.
- The turves should be as large as possible to minimise desiccation during storage. Irrigation of the turves can also prevent desiccation.
- The timing of excavation activities should be considered to avoid very wet weather to minimise the likelihood of excavated peat remoulding into peat slurry.

6.2 Good Practice for Peat Storage and Transport

Excavated peat should be stored and transported adhering to the following good practice⁶.

- Peat turves should be stored in wet conditions. e.g. within waterlogged former excavations.
- Peat should be stockpiled in large volumes to minimise exposure to wind and sun which can lead to desiccation. However, there should be consideration for slope stability.
- Excavated peat should be stored on geotextile matting to a maximum of 1m thickness and 1V:3H slope or shallower.
- The material must be classified into acrotelm and catotelm and it must be ensured that the two peat layers are stored separately, to avoid cross contamination.
- Peat storage areas should be monitored during periods of very wet weather, or during snowmelt, to identify early signs of peat instability.
- Peat storage areas should be at least 50m from noted burns and watercourses within the site area.
- Peat loads should be applied slowly over time to avoid rapid changes in stress within the underlying soil.
- Survey probes/pegs will be utilised on finished stockpiles, which can be visually inspected and surveyed (i.e. deviation from the horizontal could be due to movement of the spoil).
- Movement of the excavated turves should be kept to a minimum.
- Contamination of excavated peat with substrate materials should be avoided. If vehicles that are used for transporting non-peat material are also to be used for peat materials, measures should be taken to minimise cross-contamination of peat soils with the other materials.

6.3 Temporary Storage Options

The immediate reuse of the peat material would be preferred to temporary storage, however if this is not possible, storage, haulage and reuse of the excavated material would be planned prior to peat excavation in order to minimise the movement of the material around the site.

Suitable locations for temporary storage are those with a peat thickness of less than 1m, with a shallow slope gradient away from potential receptors. This is providing the peat stored is contained within a bunded/lined area to prevent draining and drying out the peat.

Figure A3 in Appendix A shows the average peat thickness across the site. There are two potential areas at the start and end of the proposed Kergord Access Track where the surface slope angle is relatively shallow and the peat thickness is less than 1m. However, the first area located between chainage 0m-300m, is located within 50m from the B9075, the existing Upper Kergord Track and the Burn of Weisdale. The second area, located between chainage 1900m-2090m, crosses a tributary burn and passes immediately north of the properties at the north of the existing track to Upper Kergord. Therefore the proximity of receptors are likely to prevent these areas from being used as temporary storage areas, and may need further assessment during detailed design. There may also be ecological or other engineering issues that may preclude these potential storage areas from further consideration.

Further to this the site compound, which is an area approximating 10,000m², is to be constructed as temporary works immediately east of the Kergord Access Track. The peat beneath the site compound has a maximum thickness of 0.62m and an average thickness of 0.44m from the peat probe survey data. The peat will be excavated and placed within a bunded/lined area surrounding the compound area to prevent draining and drying out of the peat. The estimated peat volume for the site compound is approximately 4400m³. Following completion of the works the compound area will be decommissioned, the working platform removed and peat replaced.

7. Reuse Options

The proposed construction works are estimated to give rise to the permanent displacement of some 86,500m³ of peat. Options have been explored in accordance with the waste hierarchy guidance⁸, which are as follows:

- Prevention.
- Preparing for Reuse.
- Recycling.
- Other Recovery.
- Disposal.

7.1 Prevention

The scheme should seek to avoid or minimise the volume of peat excavation and only then consider reuse of peat. However, given the heavy plant and materials (up to 15.2 tonne axle loads) expected to use this section of realigned track and the acceptable maximum longitudinal gradients (up to 11%) required to connect with the B9075, the VEFW have specified a cut and replace method. Adjusting the alignment east or west within the site corridor is unlikely to minimise the overall peat excavation, due to the relatively consistent peat thickness between the land constraints.

7.2 Preparing for Reuse

Estimated volumes of peat reuse are provided in Table 7-1. Opportunity exists for a proportion of the displaced peat to be used for restoration and landscaping purposes alongside the proposed development as follows:

- **Softening of Embankment Profile using non-engineered fill materials.** There is potential for reuse of peat in embankment landscaping alongside the structural fill, which will regrade the finished slope from 1V:2H to 1V:4H, or shallower.
- **Low-height bund parallel to highway.** Where the proposed development is at-grade, there is likely to be a verge reinstatement (2.5m wide and 0.5m thick), which will provide a visual screen. However, this use for peat would surcharge the crest of the cutting and the feasibility of this option would need to be verified by slope stability analyses.
- **Restoration of peat landscape in areas of redundant highway.** Another option for peat reuse is to remove redundant road pavement construction, within sections of highway to be abandoned, and to replace the thickness of road construction with peat arisings, so as to restore the peat landscape. This would apply to sections of the existing road located away from the SSSI. The intention would be to crush the road pavement and use the material for wind farm track and hardstanding areas.
- **Raise water table.** Peat may be used to block drainage ditches as part of restoration proposals for raising water tables to restore blanket or raised bog. Fibrous peat is most suitable for this with peat turves also used to bind the surface.

When backfilling peat, the natural structure of the ground should be emulated, including placement of the catotelm layer beneath the acrotelm. The acrotelm peat layer is generally acceptable for reuse above the existing ground level without the need for treatment. However, the reuse applications of the catotelm layer alone are limited due to the amorphous structure of the material. Catotelm peat is considered likely to degrade to the consistency of slurry under the processes of excavation, handling and transportation and so would only be suitable for use in filling hollows and not for placement above ground level in its condition of arising.

The total volume of permanent and temporary peat excavation is anticipated as 86,500m³ from the proposed construction works. Proposed construction works are estimated to give rise to the permanent displacement of 77,500m³ of peat.

Reuse Options	Peat Volumes (m ³)*	Assumed Dimensions of Reuse (m)
Backfill to temporary excavations	9,000	Varies with peat thickness, and has a temporary slope gradient of 1:2
Low height landscaping bunds parallel and adjacent the track**	4,900	0.5m thick, 2.5m wide, 1940m long (either both sides of the track or one side)
Restoration of damaged peatland, (e.g. blocking minor watercourses) for surrounding areas and the wider wind farm development.	TBC	Varies according to restoration area, typically 1m deep
Restoration of borrow pits for excavation of materials for the wider wind farm development.	TBC	Up to 2m thick

Table 7-1: Reuse Options and Estimated Peat Volumes.

Note*: Catotelm peat volume is subject to further assessment and classification to ensure it behaves in a plastic manner. Catotelm peat may need to be processed to be rendered suitable for reuse.

Note**: This excludes areas of highly dependent habitats and watercourses.

It is recognised that the thickness of peat deposits and therefore peat excavation volumes and nature of the peat excavated may vary. The volume of peat excavated may be lower as a result of micro-siting to areas with shallower peat depths prior to construction. However, this method may not be applicable to sections of the proposed development that may be adopted as public highway, which would be subject to formal planning processes. In addition, peat probes can sometimes penetrate soft mineral soils underlying the peat meaning that sometimes peat depths will be overestimated. The calculations for reuse will also vary in practice based on the nature and the characteristics of the excavated peat, which may lead to volumes of reuse being overestimated.

7.3 Recycling

Peat may be used as fertilizer. The peat would require drying/dewatering post excavation and prior to the peat being milled. Fertilizer would be a by-product of the excavation exercise, from which surplus peat would be classified as waste, unless covered by an exemption.

7.4 Other Recovery

Peat maybe used commercially or domestically as fuel. However, this is limited to the peat turves only and would be a by-product of the excavation exercise, from which surplus peat would be classified as waste, unless covered by an exemption.

7.5 Disposal

Further consideration of the peat balance would be undertaken during the design and construction planning stages to fully understand the volume and the nature of the peat to be excavated and methods for its reuse to ensure that disposal of peat is not required. The details of this would be confirmed following detailed design and included in a pre-construction PMP, to be agreed between VEFW, SEPA and Shetlands Island Council, which would detail the volumes that can be reused at each location.

8. Conclusion

Excluding the temporary excavation for the site compound, the total volume of peat excavation anticipated for the whole site is approximately 86,500m³, which is based on specific assumptions and limitations. Of this estimated total volume of excavated peat, there is scope to re-use 9,000m³ of material in the backfilling of temporary excavations. The remaining 77,500m³ of peat would be displaced permanently. Of the total volume of peat to be excavated, approximately 31,400m³ is estimated to comprise catotelmic peat.

Reuse options for the permanently displaced peat have been explored in accordance with the waste hierarchy guidance¹⁵, with possibilities including use of low-height bunds parallel to and adjacent the highway, to provide a visual screen (c. 4,900m³). Other restoration includes using peat to block drainage ditches for raising water tables in order to restore blanket or raised bog. The permanently displaced catotelm peat volume is subject to further assessment and classification to ensure it behaves in a plastic manner.

Further to this the site compound to be constructed as temporary works immediately east of the Kergord Access Track. Approximately 4400m³ of peat will be excavated and placed within a bunded/lined area surrounding the compound area to prevent draining and drying out of the peat. Following completion of the works the compound area will be decommissioned, the working platform removed and peat replaced.

Further consideration of the peat balance would be undertaken during the design and construction planning stages to fully understand the volume and the nature of the peat to be excavated and methods for its reuse to ensure that disposal of peat is not required. The details of this would be confirmed following detailed design and included in a pre-construction PMP, to be agreed between the VEWf, SEPA and Shetlands Island Council, which would detail the volumes that can be reused at each location.

9. References

1. Kergord Access Track, Peat Landslide Hazard Risk and Assessment, B1486007/KAT/PLHRA, Jacobs 2016.
2. Viking Wind Farm, Peat Stability Assessment Report, Technical Appendix 14.1, Viking Energy Partnership, Mouchel Ltd, March 2009;
3. Kergord Peat Probing, Ground Investigation, RPS Group Ltd, Viking Wind Farm, Shetland, October 2015;
4. Peat Probing Ground Investigation, Raeburn Drilling Ltd, (Contract 23186), September 2013;
5. CAD drawing 'ACAD-Kergord 0.5m Intervals with Peat Depths', showing the track alignment, cutting and embankment slopes and track chainage received 8th April 2016;
6. Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste, Scottish Renewables and the Scottish Environmental Protection Agency, January 2012;
7. Kergord Peat Probing, Ground Investigation, RPS Group Ltd, Viking Wind Farm, Shetland, Peat Probe Investigation Phase 2, Data Spreadsheet. Received 14/03/16;
8. Development on Peatland Guidance, SEPA, Natural Waste Policy Unit, August 2010;
9. Kergord Grid Road, Viking Energy, 1:7000 scale at A3, May 2016; and
10. Ordnance Survey OpenData Viewer, 1:250,000 Scale Colour Raster. Available from: <https://www.ordnancesurvey.co.uk/opendata/viewer/>.

Appendix A. Figures

- Figure A1- Aerial Photography, Jacobs, 2016;
- Figure A2- Site Plan, Jacobs, 2016;
- Figure A3- Indicative Peat Thickness, Jacobs, 2016

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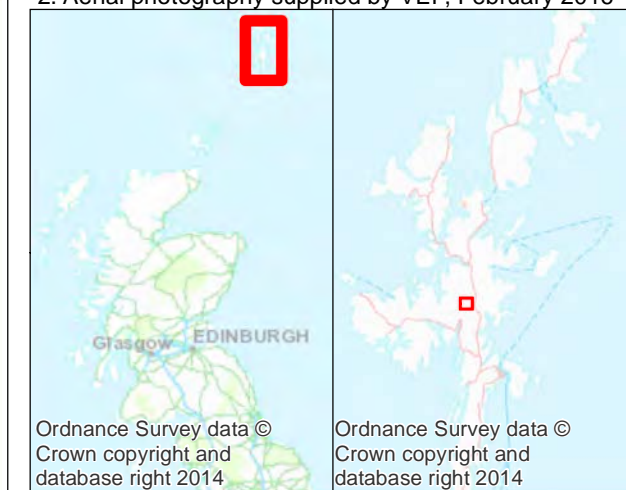


FIGURE A1

Legend

- Site Boundary
- Proposed Construction Compound
- Proposed Development
- Chainage along the Proposed Development
- 100m Buffer Zone
- 50m Buffer Zone

- NOTES:**
1. Refer to Kergord Access Track, Peat Management Plan B1486007/KAT/PMP
 2. Aerial photography supplied by VEP, February 2016



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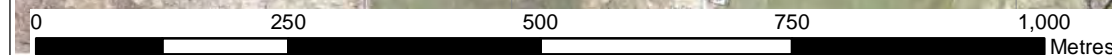
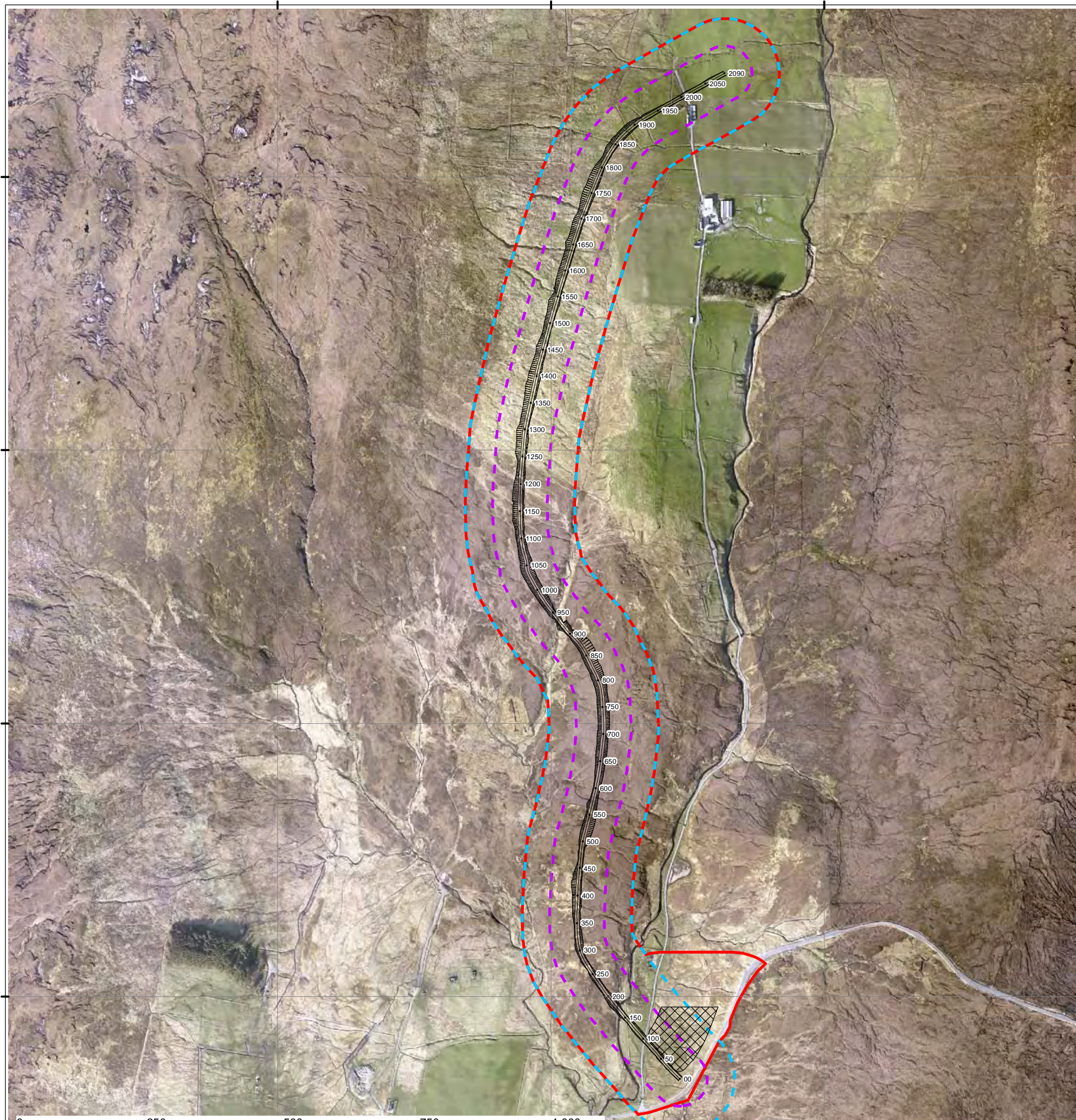
Project
KERGORD ACCESS TRACK

Drawing Title
**KERGORD ACCESS TRACK
AERIAL PHOTOGRAPHY**

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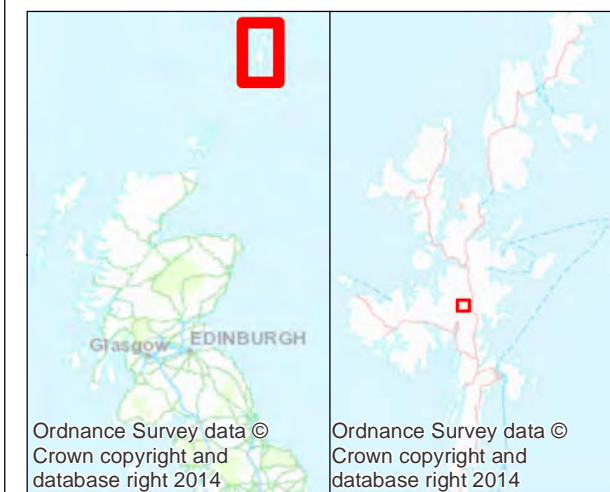


FIGURE A2

Legend

- Site Boundary
- Proposed Development
- Proposed Construction Compound
- Chainage along the Proposed Development
- 100m Buffer Zone
- 50m Buffer Zone

NOTES:
 1. Refer to Kergord Access Track, Peat Management Plan B1486007/KAT/PMP



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Project
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Drawing Title
 KERGORDE ACCESS TRACK SITE PLAN

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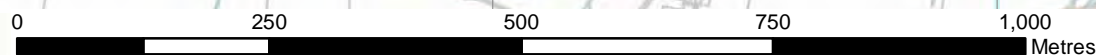
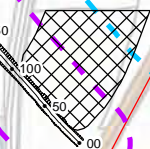
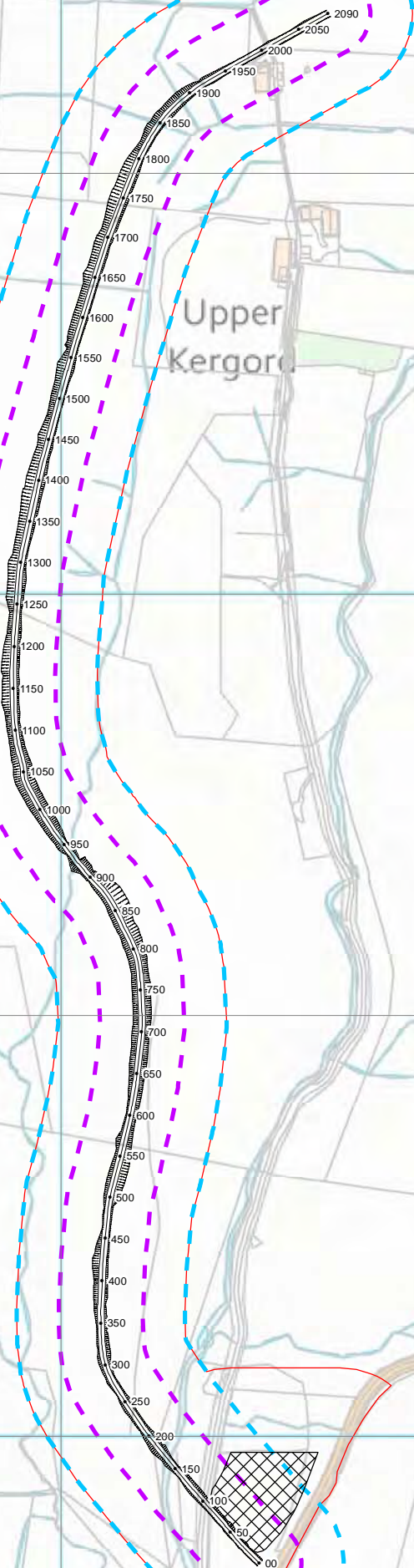
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Burn of Scallafield

Upper Kergord

Whaa Field

B9075



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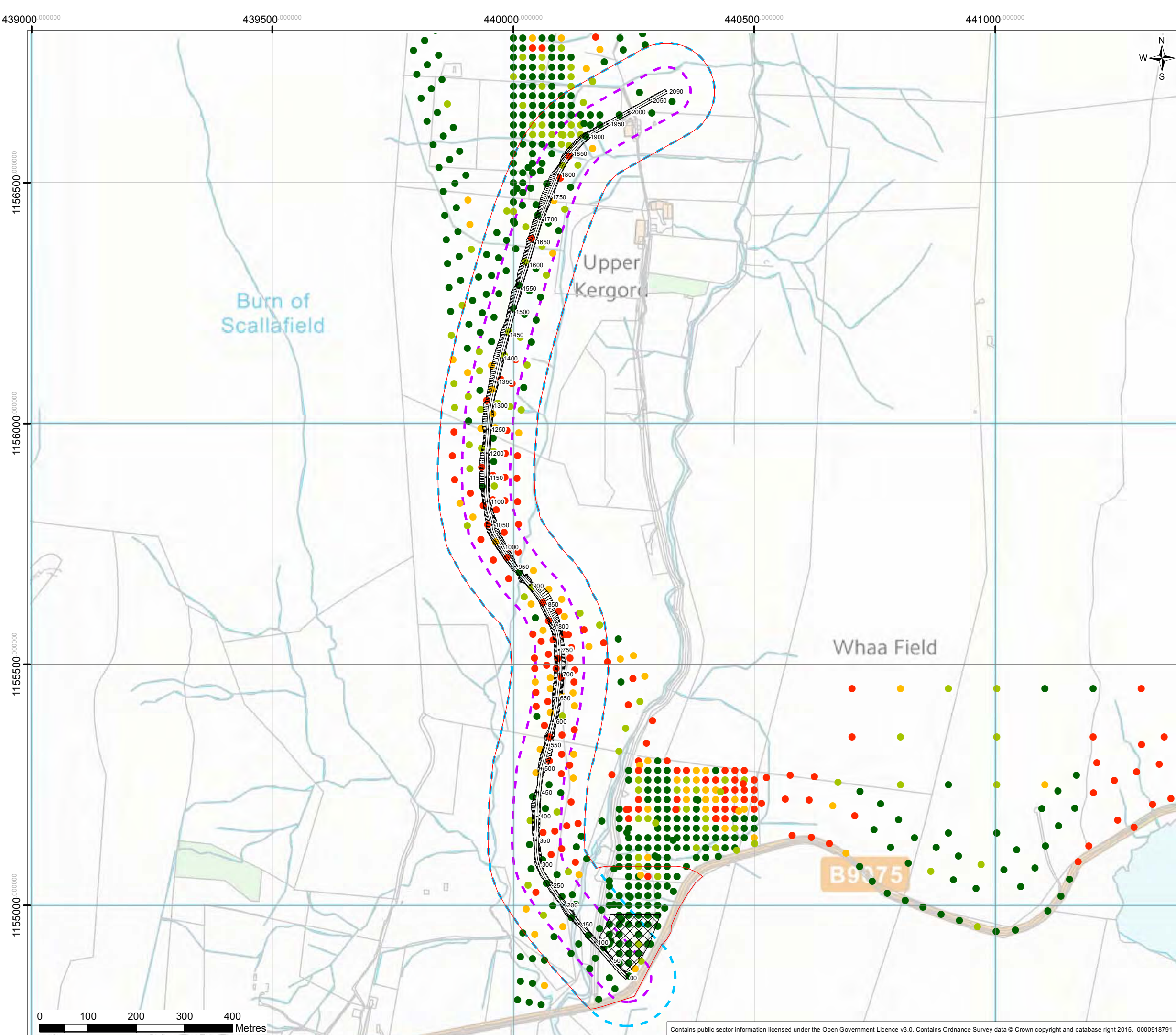
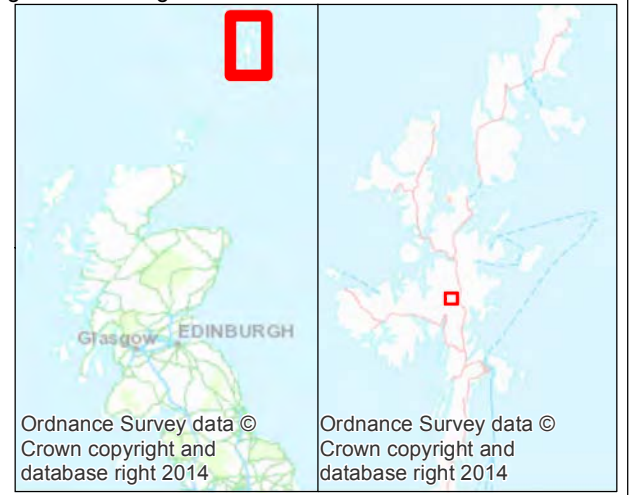


FIGURE A3

- Legend**
- Site Boundary
 - Proposed Development
 - Proposed Construction Compound
 - Chainage along the Proposed Development
 - 100m Buffer Zone
 - 50m Buffer Zone
- Indicative Peat Thickness Range**
- Peat < 1.0m
 - 1.0m ≤ Peat < 1.5m
 - 1.5m ≤ Peat < 2.0m
 - Peat ≥ 2.0m

NOTES:

1. Refer to Kergord Access Track, Peat Management Plan B1486007/KAT/PMP
2. The peat thickness data is derived from the Raeburn Drilling Limited, September 2013 ground investigation and the RPS Group November 2015 and April 2016 ground investigations.



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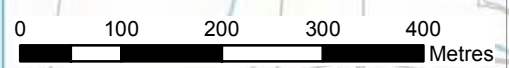
Client: **VIKING ENERGY WIND FARM**

Project: **KERGORD ACCESS TRACK**

Drawing Title: **INDICATIVE PEAT THICKNESS**

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Appendix B. Peat Volume Calculations

The following documents are available on request:

- Estimated Peat Excavation and Peat Reuse Volumes

Appendix C. Drawings

The following documents are available on request:

- Peat Probe Location Plan, SSE Renewables Developments (UK) Ltd, 1:8,000 scale, 5th September 2013;
- CAD drawing 'ACAD-Kergord 0.5m Intervals with Peat Depths', showing the track alignment, cutting and embankment slopes and track chainage received 8th April 2016;

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Appendix L. Outline Construction Environmental Management Plan

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Construction Environmental Management Plan (CEMP)

Kergord Access Track Appendix L

CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

Kergord Access Track

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	Name	Position	Signature
Prepared by :			
Checked by :			
Reviewed by :			
Comments:	<i>Version 1.0 submitted as an outline CEMP as part of the Environmental Statement.</i>		

DOCUMENT REVISIONS			
Revision No:	Description:		Date:
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PART 1 – CONSTRUCTION ENVIRONMENTAL MANAGEMENT

1 INTRODUCTION

1.1 Construction Environmental Management: Aims & Objectives

- 1.1.1 This document provides information on proposed Environmental Management measures and outline details on Construction Methods (Part 2 of this CEMP) for the Kergord Access Track, hereby referred to as the proposed development. This document has been prepared for the Planning Authority and statutory consultees and outlines the proposed management methodology to be employed during the construction of the proposed development.
- 1.1.2 The principal objective of this document is to provide information on the proposed infrastructure and information on how SSER (the *Employer*) intend to avoid (where possible), minimise and control adverse environmental impacts associated with the development. Furthermore, this document aims to define good practice as well as specific actions to be implemented following receipt of a planning consent.
- 1.1.3 The information contained within the CEMP will form part of the Civils Works Contract. The methods and principles contained herein, as well as within referenced legislative instruments and published guidance documents, are adhered to by the *Contractor* in developing the detailed design, construction method statements and other plans relating to environmental management as required by the Contract.
- 1.1.4 The *Contractor* submits all relevant information as detailed in this document to the *Employer* for acceptance in accordance with the contract provisions. No works commence prior to the *Employer's* acceptance.
- 1.1.5 The *Employer* provides an updated CEMP to the Planning Authority post-consent / pre-works (CEMP v2.0). The *Employer* provides the *Contractor* with an electronic copy of the CEMPv2.0 which the *Contractor* develops and maintains for the duration of the works.
- 1.1.6 This document is read and implemented on site in conjunction with industry best practice, published guidance documents, and other documents referred to within the CEMP (see Section 17).

1.2 Roles, Responsibilities and Structure of the CEMP

- 1.2.1 The *Contractor* appoints an appropriately competent person or persons (*Contractor's* Site Environmental Representative) to undertake relevant environmental tasks as detailed in this document prior to, during and upon completion of the construction works. It shall be assumed that the role will be a full-time role and the relevant person will be based on site unless otherwise agreed by the *Employer* prior to commencement of construction.
- 1.2.2 The *Contractor* demonstrates the competence of the Site Environmental Representative to the *Employer* via submission of relevant information (e.g. CV, training records, membership records) for acceptance prior to commencement of construction works.

- 1.2.3 The *Contractor* is responsible for obtaining all necessary consents, licences and permissions¹ for his activities as required by current legislation governing the protection of the environment.
- 1.2.4 A copy of this document and related files and documents will be kept in the site offices for the duration of the site works and will be made available for review at any time. Upon completion of the construction works, the *Contractor* submits a complete CD copy of the final set of information to the *Employer* for their records.
- 1.2.5 Where the *Contractor* has standard documents within his own company / corporate Environmental Management Plan which might cover a particular requirement of this CEMP, these will either be inserted or cross referenced within the relevant Section of the detailed CEMP (v2.0).

A **Checklist** has been included in Section 18, providing the *Contractor* with a summary of the minimum information to be provided to the *Employer* pre- during and post-construction. The information / documents listed in the Checklist represent the minimum information to be provided to the Employer / Planning Authority at the stages indicated in the Checklist.

¹ For example, discharge consents, abstraction licenses, Waste Management License (WML) Exemption, Permission, notification or consent for road closure, opening or diversion.

2 PROJECT ENVIRONMENTAL CONSTRAINTS

2.1 Schedule of Mitigation, Commitments Register and Planning Conditions

2.1.1 Mitigation measures are described in the relevant chapters of the Environmental Statement (ES). If not already provided in the ES, a Schedule of Mitigation will be prepared post-consent and will be provided as part of a revised and updated CEMP (v2.0) in Table 1 below. Table 1 will be updated following receipt of planning consent to include any additional commitments made following submission of the planning application (e.g. in an ES Addendum)

TABLE 1.0 SCHEDULE OF MITIGATION	
ES Section	Mitigation Specified within the ES
	<i>To be provided post-consent (CEMP version V2.0)</i>

2.1.2 Following receipt of planning consent, the Mitigation Schedule will be updated and incorporated into a Commitments Register which will detail all mitigation measures referred to in the ES, any ES Addendum and additional documentation provided to, and approved by the Planning Authority.

2.2 Planning Conditions

2.2.1 Table 2.0 below will be updated to include details of relevant planning conditions attached to any consent to be received, and will detail which section(s) of the updated CEMP documentation covers specific planning conditions.

TABLE 2.0 RELEVANT PLANNING CONDITIONS AND RELATED DOCUMENTATION	
Planning Condition	Related CEMP Section / other document

TABLE 2.0 RELEVANT PLANNING CONDITIONS AND RELATED DOCUMENTATION		
Planning Condition	Related CEMP Section / other document	

- 2.2.2 The Schedule of Mitigation and Planning Conditions will be included in a revised and updated CEMP (v2.0) document for review by the Planning Authority prior to commencement of any construction works.
- 2.2.3 Figure 1 illustrates the general parties and their responsibilities for obtaining, reviewing, issuing and accepting documentation in regard to environmental management post-consent.

**FIGURE 1:
GENERAL DOCUMENTATION AND INFORMATION FLOW POST-CONSENT**

SSE Renewables	Specialist Consultants	Principal Contractor	Planning Authority / SEPA
-----------------------	-------------------------------	-----------------------------	----------------------------------

POST – CONSENT / PRE – CONSTRUCTION

<p>Compile a Commitments Register (Planning Conditions and ES Requirements)</p> <p>Appoint Ecologist to undertake further studies/surveys in line with Commitments</p> <p>Provide to PA:</p> <ul style="list-style-type: none"> - information to discharge pre-construction Consent Conditions and to address construction phase Consent Conditions - Revised and updated CEMP documentation (V1.1), including e.g. water monitoring plan and design details <p>Include CEMP requirements in PC Contract documentation</p> <p>Appoint PC</p> <p>Review information provided by PC (pre-construction information, designs etc) and issue further information as required to PA</p>	<p>Undertake baseline monitoring and further surveys as required.</p> <p>Input / Preparation of documents to discharge pre-construction and to address construction phase consent conditions.</p> <p>Review / comment on relevant detailed information where required</p>	<p>Provide all relevant environmental plans, designs and information as required under the Contract (including CEMP requirements)</p>	<p>Review and approve additional information provided in support of discharge of Planning Conditions.</p>
--	---	---	---

CONSTRUCTION

<p>Monitoring of compliance with Contract (including CEMP requirements)</p> <p>SSER can suspend works (or part thereof) at any time where a potential pollution risk is deemed to be inadequately mitigated or where the agreed methods and/or mitigation measures are not adhered to.</p> <p>Provide information relevant to comply with planning conditions and ES</p>	<p>Ecological/Environmental Clerk of Works (ECoW) monitors compliance with CEMP documentation (including planning conditions)</p> <p>Advises SSER and PC of immediate concerns within 30 minutes.</p> <p>Actively communicates and cooperates with project team including the Contractor in preventing and resolving issues</p>	<p>Conducts works in accordance with Contract (including CEMP requirements, maintain CEMP V2.0)</p> <p>Actively communicates and cooperate with the Ecologist/ECoW at all times</p>	<p>Planning Monitoring Officer (PMO) inspects works on behalf of the planning authority.</p>
---	--	--	---

3 CORRESPONDENCE & GENERAL COMMUNICATION

3.1 Roles & Responsibilities

3.1.1 The Contractor provides a **Communication Plan** illustrating roles, responsibilities and communication routes for environmental management during the works. This plan will make reference to or incorporate communication during an environmental emergency or incident (Section 17).

3.2 Correspondence, Records & Reports

3.2.1 The *Contractor* provides a complete record of all relevant communication and reports associated with all aspects of environmental management. As a minimum the *Contractor* maintains environmental monitoring records where applicable to the project. These may include:

- A) Minutes and attendance record of start-up meeting (on-site meeting prior to commencement of construction works).
- B) **Environmental risk register** (as part of the SHE risk register required under the SSE SHE Specification)
- C) Minutes of weekly meetings covering environmental (ecology, archaeology, hydrology) issues (meetings may be combined with e.g. progress meetings)
- D) **Communication Plan** (Section 3.1)
- E) *Employer* and *Contractor* **Audit Reports** (Section 3.3)
- F) **Records of toolbox talks** (Section 4)
- G) **Dust / noise monitoring records** (Section 5)
- H) **Waste Management Plan** and records (Section 6)
- I) **Drainage Maintenance Register** (Section 7)
- J) **Water Quality Monitoring Records** (Sections 8)
- K) **Excavation Register** (Section 14)
- L) **Geotechnical Risk Register** (Section 14.3)
- M) **Licensing and Consents**: copies of all permissions, consents, licenses and permits and related correspondence.

3.2.2 General Correspondence: All other relevant internal and external communication records relating to environmental management.

3.2.3 Table 3.0 illustrates the main environmental tasks and responsibilities generally applicable to a project of this kind.

3.3 Environmental Audits

3.3.1 The *Contractor* undertakes a programme of environmental audits, including audits of his sub-contractors, on a quarterly basis (as a minimum) and provides an audit report to the Employer

within 2 weeks of the audit being undertaken.

- 3.3.2 Audits may be completed at any time by the *Employer*, but at least one per quarter. The *Contractor* maintains a record of all completed audit forms and records of corrective action and close outs.

3.4 Risk Assessments and Method Statements

- 3.4.1 The *Contractor* provides risk assessments and method statements (RAMS) for all works and tasks prior to these being undertaken. These documents take into account and address all of the environmental aspects of the planned works and will include proposed mitigation measures.

3.5 Notice Boards

- 3.5.1 The *Contractor* provides and maintains project environmental notice board(s) which are positioned to ensure that all operatives have the opportunity to review a notice board on a daily basis. As a minimum this will include one notice board to be placed in each compound.
- 3.5.2 The environmental notice boards are maintained by the *Contractor's* Environmental Representative and shall be updated at least monthly. As a minimum, the notice boards contain:
- Description of the key environmental risks and intended risk mitigation measures;
 - Accompanying Environmental Constraints / Eco Map illustrating the location of the key risks and required exclusion zones / buffer zones and location of emergency response equipment, as required by the CEMP; and
- 3.5.3 Key contact numbers and responsible personnel identified within the Environmental Incident and Emergency Response Plan (EIERP).

**Table 3.0
CONSTRUCTION PHASE - MAIN TASKS AND RESPONSIBILITIES (ENVIRONMENTAL)**

Task	Principal Contractor					Contractors / Sub-Contractors	Employer					Independent Water Quality Consultant	Visitors	SEPA / EA / PMO
	Project Manager	Site Agent	Site Foreman	Geo-technical Consultant/ Engineer/ GCoW	Environmental Manager / Site Engineer		Project Manager	Site Manager	Env. Manager	Env.Site Engineer	Ecologist / ECoW			
Provide information (in accordance with contractual timelines)	☑													
Start Up Meeting	✓	x	x	x	x	(x)	✓	✓		x	x			(x)
Site Inductions	☑	x	x	x	✓	x	x	x	x	x	✓		x	x
Obtaining all relevant permissions, consents, licenses and permits	☑													
Weekly progress meetings including Contractor, Employer, GCoW, Environmental Specialist/Manager/Engineer) updates/issues	☑	x	(x)	(x)	✓	(x)	(x)	x		(x)	✓			(x)
Monthly Environmental Report					☑						☑			
Liaison with regulator / statutory consultees	☑							✓			✓			
Environmental Checks and monitoring (e.g. dust, oils and chemicals storage, drainage mitigation, waste management, plant etc)	✓	✓	☑	✓	☑	✓				☑	x			
Environmental monitoring (Water Quality)					✓					✓		☑		
Record keeping (e.g. waste documentation, licences, training, incidents, mitigation designs, material, waste and risk registers etc)	☑			✓	☑		☑	✓		✓	✓			
Environmental audits / inspections	✓				☑				☑	✓				☑

KEY:

- ☑ Lead / Responsible (may apply to several roles)
- ✓ Provide support (may apply to several roles)
- x Attend / take action (may apply to several roles)
- (x) Optional / as required

Note: This table only shows the main tasks/responsibilities. Following agreement between the Employer, the Contractor, tasks / responsibilities may be re-assigned.

4 SITE INDUCTION AND TRAINING

- 4.1.1 The *Contractor* ensures that all contractor employees, sub-contractors, suppliers, and other visitors to the site are made aware of the specific environmental issues relating to their work. Accordingly, environmental specific induction training will be prepared and presented to all categories of personnel working and visiting the site
- 4.1.2 As a minimum, the *Contractor* provides inductees with the following information:
- Identification of specific environmental risks associated with the work to be undertaken on site by the inductee (e.g. exclusion zones, fuel handling, spill kit locations, sensitive habitats, drainage control / mitigation, spill control, silt pollution control, waste minimisation and recycling, reporting of environmental observations).
 - Environmental Incident and Emergency Response Procedures (including specific Environmental Communication Plan requirements – refer to Section 17 for further information).
- 4.1.3 The *Contractor* provides a convenient sized copy of an **Eco Map** to all inductees showing sensitive areas, exclusion zones, wash out areas, watercourses, refuelling exclusion areas, location of skips, etc. The map shall be updated and re-issued as required. Any update will trigger a tool box talk –see below- to comment and stress on necessary change.
- 4.1.4 The *Contractor* submits a **tool box talk schedule** at least 1 week prior to commencement of works. The proposed schedule –to be considered as a live document- shall be consistent with the programme of works. Additional tool box talks shall be added as required based on circumstances such as unforeseen risks, repeated observation of bad practices, perceived lack of awareness, pollution event, etc.
- 4.1.5 The *Contractor* provides as a minimum one environmental related tool box talk or other environmental related training session per month on the above topics, along with any other environmental issues which arise on site. Additional tool box talks shall be added as required based on circumstances such as unforeseen risks, repeated observation of bad practices, perceived lack of awareness, pollution event, etc.
- 4.1.6 Where necessary, the *Contractor* requests the assistance of specialist personnel on site (e.g. ECoW, GCoW, ACoW, *Contractor's* Site Environmental Representative, etc.) to undertake specific toolbox talks or parts thereof as required.
- 4.1.7 The *Contractor* provides, as a minimum, training on the use of spill kits (on ground and in surface waters), to be provided on a regular basis (to account for staff / subcontractor changes etc).
- 4.1.8 The *Contractor* maintains a record of all toolbox talks or other environmental related training sessions delivered, their content and the attendees.

5 POLLUTION PREVENTION & MITIGATION

5.1 Responsibility

- 5.1.1 The *Contractor* is responsible for pollution prevention for the duration of the contract and until such time as permanent measures, such as permanent drainage and silt mitigation controls, are deemed to be adequate and appropriately constructed.
- 5.1.2 This responsibility will include the actions of any third party who is sub-contracted by the *Contractor* or otherwise involved in the project.
- 5.1.3 It is the responsibility of the *Contractor* to contact SEPA, other statutory and non-statutory bodies in the vicinity of and downstream of the proposed project so that the requirements and interests of these parties are adhered to and protected throughout the duration of the Contract.
- 5.1.4 The *Contractor* is familiar with and executes works in accordance with the guidance provided in the SEPA Pollution Prevention Guidelines and other guideline documents as detailed in Section 17.
- 5.1.5 The *Contractor* ensures that all staff and subcontractors working on site will be familiar with pollution prevention and mitigation measures as detailed in this document; this includes subcontractors, *Employer's* direct contractors and other *Employer's* representatives working on the site.

5.2 General Pollution Prevention Measures

- 5.2.1 The following points (not exhaustive) indicate general pollution prevention measures in accordance with those highlighted within the guidelines referenced in this document and the ES. Pollution Prevention measures relating to specific tasks are also detailed in the respective sections of this document.
- i. Any material or substance which could cause pollution, including fuels / oils, wet cement, raw concrete or silty water will be prevented from entering groundwater, surface water drains or watercourses by the appropriate use of and appropriate placement of (temporary) silt fences, cut-off drains, silt traps and drainage to vegetated areas where appropriate. Any sign of failing water treatment measures or sight of silted or contaminated water entering any watercourse on site will be reported immediately.
 - ii. Any silty water generated on site will ideally be settled out as much as possible through drainage mitigation measures (silt traps, etc.) and channelled into vegetated (not blanket bog or similarly protected) areas at least 50 metres from watercourses.
 - iii. External fuel delivery lorries will only be allowed as far as the site compound where there will be a covered refuelling area equipped with an impermeable base.
 - iv. Fuel transfer / refuelling will be undertaken by specifically trained and competent staff or undertaken under competent supervision.
 - v. Areas of waste oil / fuel / chemical storage and permanent refuelling will be located 50m away from watercourses or drainage paths. Where this is not possible, advice will be sought from the ECoW and a minimum distance will be agreed with the *Employer*. Such storage areas will be sited on an impervious base to prevent the downward percolation of

contaminants to natural soils and groundwater.

- vi. All refuelling will be carried out at least 50 metres from watercourses. Where this buffer distance cannot be achieved a minimum distance will be agreed with the ECoW. Fuel pipes on plant, outlets at fuel tanks etc will be regularly checked and maintained to ensure that no drips or leaks to ground occur.
- vii. Spill kits will be available within each plant on site and also located close to identified pollution sources or sensitive receptors (fuel storage areas, water course crossings, etc).
- viii. Irrespective of the buffer distance and location of refuelling, interceptor drip trays (or similar, e.g. plant nappies, – open metal drip trays are not acceptable) will be available. Interceptor drip trays will be positioned under any stationary mobile plant to prevent oil contamination of the ground surface or water.
- ix. All stockpiled materials will be stored in designated areas and isolated from any surface drains and a minimum of 50 metres away from watercourses. Aggregate or fine materials storage will be enclosed and screened/sheeted.
- x. Washing-out of concrete wagons on site shall only be permitted when the *Contractor* has provided a designated, suitably prepared wash-out area with signage identifying the area as suitable for concrete wagon wash-out.
- xi. The concrete 'washout' in the designated area shall not be emptied into any watercourse and shall be disposed of in accordance with the Site Waste Management Plan.
- xii. Tools, equipment or materials will not be washed in watercourses. Mortar mixing and material storage areas must be away from watercourses.

5.3 COSHH

- 5.3.1 The *Contractor* is responsible for ensuring that all materials ordered or brought to site listed as hazardous under the Control of Substances Hazardous to Health (COSHH) Regulations are accompanied with a hazardous information sheet. The *Contractor* complies with the COSHH Regulations.

5.4 Pollution Monitoring & Controls

- 5.4.1 The *Contractor* carries out regular inspections of oil/fuel storage areas and plant. The frequency and responsibility for undertaking these inspections will be recorded by the *Contractor* and communicated to the *Employer* prior to commencement of the works.
- 5.4.2 To ensure compliance of the works with this document and pollution prevention requirements, the *Employer* regularly monitors the *Contractor's* works. **Should the *Employer* identify any failure to comply with the requirements of this document or the *Contractor's* own method statements the *Employer* may stop the associated works until such time as the failure is rectified.** Any associated cost or time delay incurred will be borne by the *Contractor*.

6 WASTE MANAGEMENT

6.1 Site Waste Management Plan (SWMP) Implementation and Records

- 6.1.1 In accordance with best practice the *Employer* requires a Site Waste Management Plan (SWMP) for all their construction sites². The *Contractor* utilises one of the available WMP templates e.g. Smart Waste or WRAP waste management plans³, or similar.
- 6.1.1 The SWMP provides details on how waste reduction is to be implemented at the site and also how this is to be monitored throughout the construction phase. The *Contractor* nominates a site representative who takes responsibility for implementation and monitoring of the SWMP.
- 6.1.2 The *Contractor* provides details of their proposed waste contractors (carriers, transfer station, waste recipient etc) to the *Employer* as part of the SWMP, according to the provisions of the contract.
- 6.1.3 The requirements of the SWMP are communicated to all site operatives during their induction. Furthermore, all operatives on site attend waste reduction toolbox talks on a monthly basis to increase awareness of recycling/waste reduction.
- 6.1.4 The Contractor provides adequate numbers of separate bins (e.g. for paper, cans/plastic, kitchen waste etc) and skips / waste containers (e.g. for wood, metal, hazardous waste, general waste) to facilitate waste segregation and recycling.
- 6.1.5 The Contractor provides a site plan showing all waste disposal and recycling locations.

6.2 SWMP Monitoring and Auditing

- 6.2.1 The *Contractor's* Environmental Site Representative checks the contents of the site waste and recycling skips on a weekly basis. Non-compliance will be highlighted at the weekly progress meeting and appropriate actions taken e.g. a toolbox talk to all site operatives.

6.3 Anticipated Construction Waste Streams

- 6.3.1 A number of different waste streams are likely to arise during construction of the proposed development. The *Contractor* identifies all waste streams⁴ and provides an estimate of expected waste volumes for each waste type generated within the waste stream.
- 6.3.2 The *Contractor* ensures all relevant information is taken into account in preparing his SWMP (for example intrusive ground investigation data, supply chain assessments, options appraisals etc).

² SWMP are already a legal requirement for certain projects in England and Wales. For projects in E&W where a SWMP is legally required, the Employer provides a draft SWMP prior to works commencing.

³ Information on WRAP and SMART SWMPs can be found on <http://www.wrap.org.uk/content/site-waste-management-plans-1> and <http://www.smartwaste.co.uk/page.jsp?id=97>

⁴ For example food waste, paper, plastics, glass and other typically domestic refuse and sewage, concrete, waste chemicals, fuel and oils, packaging, e.g. paper, plastics and wood, waste metals, polluted water from plant, vehicle and wheel washes.

7 TEMPORARY DRAINAGE

7.1 Scope and Minimum Requirements

- 7.1.1 The *Contractor* submits all temporary drainage designs and drawings at least 4 weeks prior to the start of the works. Where approval of these designs is required by Local Planning Authority and their Consultees, the *Contractor* allows 4 weeks for these approvals.
- 7.1.1 The *Contractor* undertakes maintenance of all temporary and permanent drainage solutions as and when required at a frequency at least weekly whilst Principal Contractor. Where necessary the *Contractor* maintains a **Drainage Maintenance Register** and issues this to the *Project Manager* on a weekly basis.
- 7.1.1 The *Contractor* designs all new drainage to accommodate a 1:200 year + climate change storm event, as a minimum.
- 7.1.1 The *Contractor* designs and constructs a drainage system including all silt mitigation measures necessary to prevent the pollution of existing drainage systems and watercourses for construction and post construction activities.
- 7.1.2 As a minimum all temporary drainage is installed as the proposed development is constructed, where possible the permanent drainage is installed as the *works* progress. In the event that temporary drainage is installed at the time of construction the permanent drainage is installed within 3 months of that section of proposed development being completed.
- 7.1.3 All drainage associated with the *works*, with the exception of that carrying purely Greenfield run-off, is not permitted to discharge directly into any existing drainage or watercourse without at least 2 treatment volumes.
- 7.1.4 Except where necessary to facilitate the crossing of a watercourse, no works will be undertaken within 50m of any watercourse identified on the 1:50,000 OS map, or 25m of any other watercourse (except where an element of infrastructure may be downslope of a watercourse).
- 7.1.5 The *Contractor* does not discharge water on either a temporary or permanent basis unless he has acceptance from the relevant landowners and the ECoW, and complied with the requirements of the relevant Authorities, Utilities and Service Providers.
- 7.1.6 The *Contractor* does not discharge any drainage within 50m of a watercourse unless accepted otherwise by the Project Manager and the ECoW.
- 7.1.7 Access for livestock to each watercourse is maintained or replaced where required as a result of the design and execution of the works.

7.2 Clean Water Diversion

- 7.2.1 Where possible, green field run-off will be kept separate from silty water or other potentially contaminated water. Where appropriate, interceptor ditches and other drainage diversion measures will be installed – in advance of any excavation works – in order to collect and divert green field run-off away from construction disturbed areas.

- 7.2.2 The *Contractor* channels separately silty and clean water drainage to vegetated areas at least 50 metres from watercourses to allow the settlement of solids. Where settlement over vegetation is not ecologically sound (e.g. involving intact blanket bog, requiring only rain-fed nutrients), or is not practical or adequate to deal with the volume of silt generated, the *Contractor* provides and maintains silt traps or settlement lagoons.

7.3 Silt Mitigation and Settlement Ponds

- 7.3.1 The *Contractor* erects and maintains silt fences to protect all watercourses, which may be affected by the works. The *Contractor* maintains these weekly to the satisfaction of the *Project Manager* and the ECoW.
- 7.3.2 All drainage associated with the works, with the exception of that carrying purely greenfield run-off, is not permitted to discharge without receiving the equivalent of at least 2 treatment volumes as a minimum.
- 7.3.3 The *Contractor* undertakes maintenance of all temporary and permanent drainage solutions as and when required and at a frequency of at least weekly whilst Principal Contractor.
- 7.3.4 Silt laden run off should be expected from any areas of recently exposed soil or rock. This silt laden run-off will be captured and directed via berms or ditches towards specially constructed sediment control structures.
- 7.3.5 Siting of settlement ponds will take into consideration access requirements for reinstatement and maintenance (for example: periodic silt removal, expansion of ponds or incorporation of additional silt mitigation measures, etc.).
- 7.3.6 The *Contractor* discusses and agrees the location of lagoons and other drainage mitigation measures with the ECoW prior to associated works taking place.
- 7.3.7 Additional filtration measures may include flow attenuation measures such as weirs, rock bars and / or anchored and embedded straw bales within settling ponds or between series of ponds.

7.4 Drainage

- 7.4.1 The *Contractor* designs all new drainage to be installed alongside the proposed development, where appropriate. The dimensions of the ditches will be sized to accommodate the development run-off from site infrastructure and green field run-off from adjacent ground resulting from a 1:200 year + climate change storm event.
- 7.4.2 The *Contractor* designs the frequency of relief drains crossing the proposed development to ensure the longitudinal road drainage ditches do not surcharge during the 1:200 year + climate change storm event.
- 7.4.3 The *Contractor* installs all permanent drainage concurrently with all adjacent infrastructure, in particular the *Contractor* installs the permanent drainage in tandem with the construction such that no section of road is trafficked until the associated drainage is complete.
- 7.4.4 If the *Contractor* constructs any parts of the *works* without its designated drainage system in place, or a sufficient temporary alternative, the *Project Manager* may instruct the *Contractor* to exclude all non essential traffic from that area until the drainage system is in place.

- 7.4.5 The *Contractor* provides pipe culverts for cross drainage. Pipe culverts extend beyond the edge of road construction materials by at least 1m. Check dams are installed immediately above a cross drain inlet.
- 7.4.6 The *Contractor* provides silt traps / catch pits at the inlet of all cross drains to prevent the pipes becoming blocked and prevent erosion at the inlet points. Silt traps / catch pits are designed to allow access by gully suckers to remove silt when the proposed development is operational, and are designed to present no risk to livestock and animals, whilst permitting unrestricted water flow into the catch pit.
- 7.4.7 The *Contractor* provides erosion protection at all inlets and outlets to protect against the erosive force of flow during high rainfall events. The type of erosion protection may vary and will be influenced principally by the flow capacity of the culvert / relief drain, velocity and turbulence of flow and sensitivity of the outfall environment.
- 7.4.8 The *Contractor* erects and maintains silt fences to protect all watercourses, which may be affected, within 50m of any element of the *works* or drainage outfall. The *Contractor* maintains these.
- 7.4.9 All drainage channels are sufficiently wide as is practicable to allow wildlife to safely enter / exit the channel. Slope angles are a minimum of 1(v):3(h), except where the *Contractor* can demonstrate a more efficient design.
- 7.4.10 The *Contractor* provides scour / erosion protection to slow the flow of water.
- 7.4.11 The *Contractor* provides permanent check dams / water bars (flow barriers or dams constructed across the drainage channel) at regular intervals within drainage ditches. Check dams are required in order to reduce the velocity of water and therefore allow settlement of coarser sediment particles, as well as silt at low flow conditions. Reduction in velocity will also prevent scouring of the drainage channel itself.
- 7.4.12 Check dams are constructed of clean aggregate graded 50mm – 300mm and are embedded into the side walls and invert of the excavation by at least 100mm. The number and location of check dams will be dependent on the slope gradient, flow and volume of water though the minimum frequency of check dams 1 per 75m length of ditch.
- 7.4.13 Green field run-off and development run-off will be kept separate where possible and will be channelled separately to suitably vegetated areas at least 50 metres from watercourses to allow the settlement of solids on site.

7.5 Peat and Soil Storage Drainage

- 7.5.1 The *Contractor* considers the location of any temporary peat or soil storage areas such that erosion and run-off is limited, leachate from the stored material is controlled and stability of the existing ground, particularly in peatland areas, is not affected. The *Contractor* also gives consideration to the impacts of poor drainage control in any areas where peat is used in reinstatement (see sections 14 and 15).
- 7.5.2 Interceptor ditches, down slope drainage collection systems, containment berms (embedded where appropriate), and appropriate drainage mitigation measures will be required as with other infrastructure described above.
- 7.5.3 The *Contractor* carefully selects the locations and design the peat and other spoil storage requirements including methods for reinstatement works and incorporated drainage elements.

Such design will be prepared in consultation with the ECoW and *Employer* prior to works commencing.

8 WATER QUALITY MONITORING

8.1 General Requirements

- 8.1.1 In line with best practice, the *Employer* undertakes surface water quality monitoring where an impact on surface water bodies cannot be ruled out. The *Employer* considers it best practice to obtain baseline surface water quality data prior to commencement of the works, and to monitor water quality during the works, in order to identify any significant changes of water quality which may be attributed to the construction works.
- 8.1.2 The surface water monitoring programme is implemented and maintained by the *Employer* and either undertaken by the *Employer's* environmental staff or by an environmental consultant appointed by the *Employer*.
- 8.1.3 Where a decrease in water quality resulting from construction works is observed the *Contractor* will undertake remedial measures and will bear the costs of all associated sampling and investigation. The *Contractor* may wish to undertake confirmatory sampling and analysis at any point during the works at his own cost.
- 8.1.4 A surface water monitoring plan will be prepared following receipt of planning consent. The plan will detail proposed monitoring locations, monitoring frequency and analytical parameters based on the findings of the ES and any subsequently submitted documents / information (e.g. Addendum ES). The Water Quality Monitoring Plan will be submitted to the Planning Authority post-consent / pre-commencement of works as part of CEMP v2.0.

8.2 Surface Water Quality Monitoring Locations

- 8.2.1 Monitoring of water quality will be carried out on selected watercourses; specific monitoring locations will be identified post-consent during the detailed design phase (pre-commencement of works).

8.3 Monitoring Frequency and Analytical Parameters

- 8.3.1 Surface water quality monitoring will usually be undertaken at the following intervals:

Pre-construction (baseline) monitoring:	Monthly, commencing 6 - 12 months prior to any construction works taking place.
During construction:	Monthly, commencing within 2 weeks of start of works, and ad-hoc if deemed necessary, e.g. following a pollution incident
Post construction:	Monthly, for (minimum of) three months following completion of construction works.

- 8.3.2 Monitoring of specific locations may cease within 3 months of works ceasing in this area, following consultation with SEPA where necessary.
- 8.3.3 The surface water quality monitoring will include the monitoring of field parameters at each location prior to the collection of water samples at each location for analysis at a UKAS accredited laboratory.
- 8.3.4 The field parameters monitored during each monitoring round and obtained via use of a hand-

held monitoring device, are pH, electrical conductivity, temperature, and dissolved oxygen. Monitoring results will be recorded in the field.

- 8.3.5 Water samples at each location will be obtained and submitted to a UKAS accredited laboratory. As a guide, analysis for the following parameters may be undertaken:

Table 4.0 PROPOSED LABORATORY ANALYTICAL PARAMETERS	
Analytical test	Rationale
Electrical conductivity	Useful indicator of the overall salinity of surface or spring water
pH	Overall water quality parameter which could indicate effects on water acidity due to changes in land use and disturbance of peatlands.
Temperature	General physical indicator
Dissolved oxygen	Likely to be high in all streams but needs determining as an important indicator of water quality.
Turbidity	Measurable on site, and the most noticeable indicator of impact to a water course
Total suspended solids (TSS)	TSS: measure of water quality for construction developments and hence a TSS limit is generally specified for discharges from construction sites.
Biochemical oxygen demand (BOD)	A measure of the biologically degradable substances in water and a standard surface water quality parameter.
Chemical Oxygen Demand (COD)	Measure of possible releases from disturbed peat turf and peat.
Dissolved organic carbon (DOC)	Key component of carbon cycle and known to be sensitive to development on peatland. Organic carbon can help to reduce metal toxicities. May correlate closely with colour.
Soluble iron	Solubility can be affected by pH. High iron concentrations may precipitate out if physical conditions change.
Ammoniacal Nitrogen	Nutrient, known to occur as pulse after ecosystem disruption.
Total reactive phosphorus (orthophosphate)	Standard nutrient parameter, known to occur as pulse after ecosystem disruption and may lead to eutrophication (algal blooms).
Nitrate	End product of nitrogen pollution. Principal nutrient and standard nutrient parameter. Indicator of background pollution and needed for assessing any impact of ground disturbance during construction.
Chloride as Cl	Indicator of rainfall inputs and site weathering, often related to geology of catchments, partly controls electrical conductivity readings.
Total Petroleum Hydrocarbons (TPH) (CWG by GC-FID)	Monitor impact from potential hydrocarbon releases on site during construction works.

8.4 Surface Water Quality Monitoring Reports

- 8.4.1 A monthly monitoring report on the findings of the monitoring exercises will be prepared and provided to the *Employer* and the *Contractor* within 1 week of receipt of analytical results.

8.4.2 The pre-construction monitoring results will inform baseline values (average and maximum baseline levels), and the monthly monitoring reports for the period covering the construction and post-construction works will highlight any results exceeding the baseline conditions.

8.5 **Contractor's Visual and Field Water Quality Monitoring**

8.5.1 The *Contractor* ensures that all personnel and visitors on site are encouraged (at site inductions) to report visual indications of changes in water quality (e.g. discolouration or other evidence of contamination) in any watercourses on site.

8.5.2 **The *Contractor* undertakes visual inspections of the watercourses on site**, including the monitoring locations referred to in section 8.2 above, at least once a week. The *Contractor's* monitoring records will include the following minimum information:

- Antecedent and current weather conditions;
- Current construction activities within the vicinity and in particular up stream or up gradient of the observation point;
- Visual assessment of water colour, turbidity and flow rate;
- Evidence of chemical contamination;
- Visual evidence of silt or sediment pollution within the water column or on the bed of the watercourse / standing water body.
- Details on any communication, corrective action and / or mitigation undertaken as a result of any water quality issues observed during the monitoring visit.

8.5.3 Where evidence of pollution is observed to the water environment, emergency response procedures will be implemented and the incident will be reported to the *Employer* within 30minutes (section 16). Remedial measures will be implemented immediately and details of action taken will be recorded.

8.6 **Private Water Supplies (PWS)**

8.6.1 As detailed in Chapter 10 (Geology, Hydrogeology and Hydrology) no Private Water Supplies (PWS) have been identified within 1km of the proposed development. The nearest PWS to the proposed development is located in close proximity to Hellister (grid reference HU393496) approximately 5 km south of the proposed development. Therefore no mitigation measures are required to safeguard PWSs..

9 WATERCOURSE CROSSINGS

9.1 General

- 9.1.1 The Controlled Activities (Scotland) Regulations 2011 regulate activities in or in the vicinity of rivers, lochs and wetlands, including engineering activities like river crossings and culverting. Works may require (depending on the nature of the works) Registration with, or a Licence from, SEPA.
- 9.1.2 The *Contractor* produces a detailed Water Course Crossing Plan prior to commencement of the works, i.e. detailed plans for each of upgrades or new built structures. The *Contractor* submits these plans to the *Employer* and SEPA (via the Planning Authority) for acceptance.
- 9.1.3 The *Contractor* obtains all necessary permissions prior to the execution of any works affecting a watercourse.
- 9.1.4 The ECoW is consulted with regard to all Watercourse Crossing works. The ECoW carries out surveys immediately prior to construction or upgrading to identify areas of mammal activity in watercourses.

9.2 Design Philosophy

- 9.2.1 The *Contractor* adheres to general good practice in Watercourse Crossing design in line with relevant guidance, in particular CIRIA and Scottish Government publications (section 16), taking into account various requirements summarised below:
- i) All watercourses over which the access roads cross will be routed through culverts or under bridges appropriately sized and designed not to impede the flow of water and allowing safe passage for wildlife;
 - ii) Culvert design will be over-engineered so that it can be sunk into the bed of the watercourse allowing riverine substrate to stabilise on the floor of the culvert (i.e. leaves the watercourse in as natural condition as possible);
 - iii) Low maintenance; and
 - iv) Visually in keeping with the surroundings.
- 9.2.2 All river crossings will be designed to convey a minimum 1:200 year + climate change storm event, and individually sized and designed to suit the specific requirements and constraints of its location.

Culverts

- 9.2.1 The design of all culverts is in accordance with CIRIA Report 689. Inlet and outlet will be as 'Headwall' design type as stated in the Report for all watercourse crossings. Multiple pipe culverts are not permitted.
- 9.2.2 The natural bed and banks of any existing watercourse will remain unaffected by any new structure.

Bridges

- 9.2.1 The *Contractor* consults and complies with the requirements of the relevant Statutory Authorities, Utilities and Service Providers, including the onsite ECoW and the *Employer* for the construction of any culverts or bridges.
- 9.2.2 The *Contractor* provides watercourse crossing structures (i.e. bridges) with sufficient clear span as to ensure no *works* are required within the one metre of the watercourse, unless accepted in writing by the *Project Manager*.
- 9.2.3 The *Contractor* designs all new and upgrades any existing structures spanning watercourses to accommodate the flow resulting from the **1:200 year + climate change storm event**. The *Contractor* designs these structures to ensure they do not to affect any existing floodplain or the downstream flow characteristics of the watercourse.
- 9.2.4 Where the *Contractor* demonstrates the passing of the unrestricted flow from the 1:200 year + climate change storm event negatively affects the downstream catchment the *Contractor* designs the proposed development and associate drainage to ensure any surcharging during the 1:200 year + climate change storm event does not jeopardise the structural integrity of any assets while protecting the downstream catchment.

Erosion Protection

- 9.2.5 Erosion protection is generally required at the outlet of the culvert (and to a lesser extent at the inlet). However by appropriately sizing and designing the structure erosion can be minimised reducing the need for any engineered protection.
- 9.2.6 Where possible the design will avoid using artificial bank reinforcement, and the watercourse kept as natural as possible. Bank protection measures will have to be justified to SEPA regardless of the required level of authorisation (under the Controlled Activities Regulations) required.

10 ECOLOGICAL PROTECTION

10.1 Scope and Objectives of the Habitat and Species Protection Plan

- 10.1.1 Implementation and monitoring of a Habitat and Species Protection Plan will be the responsibility of the Ecological Clerk of Works (ECoW). The ECoW will be a qualified ecologist and a Member of the Institute of Ecology and Environmental Management (IEEM).
- 10.1.2 The ECoW is appointed and employed by the *Employer*, the appointment being subject to approval by the Planning Authority after submission of details of qualifications and experience. The role and duties of the ECoW are further detailed in Section 10.5 below.
- 10.1.3 The Habitat and Species Protection Plan applies to the immediate pre-construction and the construction period of the development.

10.2 Definitions, coverage and scope

- 10.2.1 Species protection may be defined as the set of measures used to minimise the risk of disturbance, injury or death to species of nature conservation interest. Particular attention is paid to species protected under EC and / or UK legislation.
- 10.2.2 Habitat protection may be defined as the set of measures used to minimise the risk of damage or destruction to the terrestrial and aquatic habitats of the site, including groundwater dependent terrestrial ecosystems (GWDTE), and downstream ecosystems.
- 10.2.3 The generally applicable and best practice protection and mitigation measures to be applied at the site are summarised below. **Following receipt of Planning Consent the habitat and species protection plans will be revised and updated to incorporate site specific requirements as detailed in the ES and stipulated in relevant planning conditions, together with any mitigation requirements identified during post-consent (pre-works) species surveys.**

10.3 Habitats Protection Plan

Aquatic Habitats:

- 10.3.1 The purpose of the aquatic habitat protection plan is to maintain a high water quality to support aquatic habitats used by any existing aquatic species like otters, water voles and fish and associated eco systems, both within the development site and downstream of the site, including salmon spawning grounds.

Terrestrial Habitats:

- 10.3.2 Protection of terrestrial habitats (through avoidance and minimisation of damage and loss) such as active blanket bogs and groundwater dependent terrestrial ecosystems (GWDTE) is required as these habitats are recognised as important under the EC Directives.
- 10.3.3 All site working practices need to consider their possible effects on sensitive habitats and soils and mitigate significant negative effects as far as is reasonably possible.

Habitat Protection Measures:

- 10.3.4 Proposed measures for both aquatic and terrestrial habitat protection are generally as follows:

- A **50m buffer** will be maintained between working areas, machinery and watercourses in all areas except at watercourse crossing points (any buffer zones less than 50m have to be authorised by the ECoW, the minimum buffer zone is 20m). Buffer zones will be demarcated, where necessary, by the ECoW. The *Contractor* will discuss and agree the requirement for demarcation with the ECoW and the *Employer* prior to commencement of any works;
- Details on watercourse crossings design and work, taking into account habitat and species protection are provided in Section 9 of this CEMP;
- A Water Quality monitoring programme, to be implemented prior to commencement of the construction works and undertaken in the pre, during and post construction phase of the development is detailed in Section 8 of this CEMP;
- Construction activities around watercourses will adhere to general good practice measures and Pollution Prevention Guidance produced by SEPA. Relevant guidance documents are referenced in Section 17 of this CEMP;
- Pollution prevention measures will be installed and maintained as appropriate, Sections 5 and 7 provide details on pollution control and drainage mitigation measures;
- Any forestry felling works, if applicable, in the vicinity of watercourses will adhere to general good practice measures as outlined in Section 13 of this CEMP;

10.3.5 The **Contractor** ensures the protection of habitats as detailed in this CEMP. The *Contractor*

- Includes information on habitat and species protection and legal requirements in the daily inductions and toolbox talks, in consultation with the ECoW (see Section 10.5).
- Ensures that all staff, contractors subcontractors and visitors are aware of the emergency response procedures to be followed in the event of a pollution incident.
- Microsites development infrastructure to reduce the damage to sensitive habitats, in consultation with the ECoW and the GCoW and ACoW, as necessary.
- Makes best use of excavated turf and peat as part of reinstatement procedures (see Sections 14 and 15 (Excavated Materials and Reinstatement)).
- Adheres to buffer distances relating to watercourses / lochs / springs and species as detailed in this CEMP and revisions thereof.
- Prevents discharge or run-off of silty or polluted water to ground / habitat / watercourses.
- Consults the ECoW ahead of any clean water discharge to ground / habitat / watercourses.

10.4 Species Protection Plan

Birds

10.4.1 All bird species are protected by law⁵. All breeding birds encountered within the development

⁵ Under the Wildlife and Countryside Act 1981 (Appendix 1) it is an offence to kill them or damage their nests and eggs. Species listed in Schedule 1 of the Act are specially protected, so that it is an offence merely to disturb them while nesting. Other specially protected species are listed on Annex 1 of the EC Birds Directive, which also prohibits

area access site or at pinch points are protected.

10.4.2 If construction commences before the end of the breeding season the Contractor provides bird deterrence measures prior to the start of the breeding season and undertakes breeding bird checks ahead of construction works.

Mammals

Otters - Pre-Construction measures

10.4.3 Within 3 months prior to commencement of the development on site (or during the suitable survey period prior to commencement of works), a pre-construction otter survey will be carried out by the *Employer*. This is the only specially protected and important ecology species potentially likely to be affected by the proposed development works. This will be conducted by a suitably qualified and experienced ecologist. Surveys will not be undertaken during, or after heavy rain or periods of flood.

10.4.4 If required, the ECoW will make relevant licence applications (e.g. licence to disturb) to SNH on behalf of the Employer and will oversee and/or undertake related mitigation measures in accordance with any licence obtained.

10.4.5 Prior to works commencing, the ECoW marks buffers around all known otter shelters using a marking method and distance approved by the planning authority in consultation with SNH.

Otters - Measures during construction

10.4.6 The *Contractor* informs the ECoW at least one week ahead of works commencing in or near watercourses, and consults the ECoW on any mitigation measures required as part of the works.

10.4.7 The *Contractor* ensures that

- all open excavations are ramped to enable easy exit by otter and other species;
- culvert pipes stored on site are capped, or if caps are not available, pipes are stored vertically, to prevent otter entrapment;
- design of any permanent or temporary lighting is such that it is directed away from watercourses and that an unlit corridor of 30m either side of watercourses is maintained.

10.4.8 During the construction period, the ECoW carries out further checks, including checks ahead of the construction front.

10.4.9 The ECoW maintains a mapped record of checked areas and a log of otter and water vole surveys and informs the *Contractor* and *Employer* as soon as possible of any potential restrictions and limitations to the planned works as a result of the checks/survey findings.

willful disturbance at the nest. However, if disturbance to the nest of any other bird species without special protection were sufficient to prevent parent birds from incubating their eggs or feeding their nestlings, so that the brood died, this could be regarded as an offence under the 1981 Act.

10.4.10 The ECoW notes key areas of otter activity and any potential shelters outwith a licensable distance from construction and monitors activity at these areas and shelters regularly during construction.

10.4.11 All site personnel report any sightings of otters and water voles and any potential otter shelters / water vole burrows encountered on site to the ECoW as soon as possible.

10.5 The Ecological / Environmental Clerk of Works (ECoW)

Background and Term of Appointment

10.5.1 The *Employer* considers it best practice to provide an ECoW for the duration of the construction works, irrespective of whether or not this role is required as part of a Planning Consent.

10.5.2 The ECoW will generally be appointed 3-4 months prior to work commencing on site. The role will be full-time for the duration of the main construction period. and may be reduced to a part time role (2-4 days/week) thereafter (landscaping, road marking etc.) subject to Contractor performance and general consensus between ECoW, *Employer* and the Planning Authority (where required).

10.5.3 The ECoW will be a member of the Institute of Ecology and Environmental Management (IEEM) with suitable experience.

ECoW tasks

Overview

10.5.4 The ECoW advises and assists the *Contractor* in avoiding, minimising and mitigating adverse effects. The *Contractor* consults with the ECoW prior to undertaking specific works as detailed below, and considers the ECoWs advice at all times.

10.5.5 Where the ECoW disagrees with works being undertaken by the *Contractor*, resulting in a breach of planning conditions or measures detailed in the ES and the CEMP, the ECoW informs the *Employer* immediately. On advice of the ECoW the *Project Manager / Employer* may halt *the works* or parts thereof.

10.5.6 The following are anticipated to represent the main tasks which translate these aspects of the role into action. This list is not intended to be exhaustive, and will require modification during the construction period as and when circumstances dictate.

Micrositing

10.5.7 The ECoW (in consultation with the Archaeological Clerk of Works and the Geotechnical Clerk of Works, if applicable and required) advises on micro-siting, where required. The *Contractor* consults the ECoW prior to micro-siting being undertaken.

Drainage Management and Watercourses

10.5.8 The ECoW conducts weekly inspection of site pollution prevention measures (silt fences, settlement ponds, check dams etc) and visually assesses their effectiveness. This includes inspection of water management measures installed by contractors such as excavation pumping and diversion channels.

10.5.9 The ECoW:

- Assesses, in advance of works, habitats and species on ground that may be affected by drainage management.
- Reviews drainage management proposals associated with temporary peat storage and reinstatement works in advance of such works commencing.
- Surveys in advance of any works near or crossing a ditch or watercourse, the condition of the watercourse and for protected terrestrial and aquatic species, using an established specialist if necessary.

Excavated materials and reinstatement

- Reviews working areas and route corridors, in consultation with the Archaeological Clerk of works (ACoW) as necessary.
- Agrees proposals for side casting and temporary storage areas as development proceeds.
- Monitors the condition of stored turf.
- Agrees any required hydroseeding specification, including seed mix and fertiliser quantities, if required, in liaison with SNH.

Ecological Protection Tasks

- Erects and maintains markers and notices for limits around watercourses, exclusion zones and other areas with protected species or habitats.
- Considers requests and granting of permission to enter within habitat and protected species exclusion zones.
- Conducts weekly checks for protected species and sensitive habitat (peatland, watercourses) within and adjacent to construction areas, and maintains a register of all habitat inspections carried out.
- Implements species protection plans, if ground checks suggest this is necessary for the protected species detailed in Section 10.4 above.
- Implements the Terrestrial Habitat Protection Plan and Aquatic Habitat Protection Plan, including surveys and checks specific to those plans.
- Executes the terms of any Licence to Disturb, aquatic species and birds, or disturb/destroy their places of shelter, which might be required as a result of future surveys and searches.

On-site communication and liaison with Consultees

10.5.10 The EcoW will always inform the *Employer's* Project Manager and *Contractor* of areas of particular concern, who will then make a decision as to the subsequent action.

10.5.11 The ECoW is involved in the delivery of biodiversity-related Toolbox Talks as part of the site induction process. All staff will know of the circumstances when the ECoW should be contacted, and the relevant phone numbers.

10.5.12 The ECoW liaises with the statutory consultees as required and agreed with the *Employer* in line with any Planning Authority requirements (if applicable).

Meetings and Recording

10.5.13 The ECoW attends a weekly (or fortnightly, if agreed) meeting which will include representatives from the *Employer*, *Contractor*, sub-contractors. The purpose of these meetings is to:

- review the effectiveness of the ecological and environmental mitigation;
- review the construction progress on site in the context of ecological and environmental mitigation;
- discuss construction programme for the following week, and fortnight look-ahead; and
- agree actions on these matters.

10.5.14 The ECoW keeps a record of the following:

- animal sightings and signs (including birds, in addition to other site ornithological monitoring), particularly those noted in searches one or two days in advance of construction;
- the habitats of ground to be developed via survey at least a week in advance of construction work;
- record of tasks carried out and written record of all verbal advice given.

10.5.15 The ECoW maintains a **GIS database** of key recordings made during the construction period. Field records will use, if necessary, differential GPS technology captured into a field GIS system.

10.5.16 The ECoW assists the *Employer* with the supply of relevant information for compliance assessment.

10.5.17 The ECoW provides monthly reports (template will be provided by the *Employer*).

10.5.18 The ECoW produces a final report to the *Employer* documenting the environmental and ecological effects of the construction period. The evidence for effects will be based on findings included in the minutes of weekly/fortnightly meetings, together with other recording information maintained by the ECoW. The report will relate results to residual effects predicted in the site's ES documents. The report will be made available to the *Contractor* and the Planning Authority.

11 ARCHAEOLOGICAL PROTECTION

- 11.1.1 Any construction works involving ground disturbance will pay due attention to the potential presence of unknown and recorded archaeological subsurface features or structures. To ensure this, the following measures will be put in place:
- 11.1.2 Archaeological support will be provided by an Archaeological Consultant appointed by the *Employer*. The consultant will prepare a methodology for the identification, preservation and recording of archaeological remains at the site (Written Scheme of Investigation'). The contents of the WSI will generally be agreed with the Planning Authority's archaeologist.
- 11.1.3 The services provided by the consultant will include a walkover survey of the precise locations of the proposed development's ground impacts prior to commencement of construction works. Any archaeological features identified will be fenced off / demarcated prior to commencement of construction works. Information on such areas will be included in the site induction / toolbox talks.
- 11.1.4 A 'Contractors Guidelines' document will be prepared by the consultant, which provides brief and clear guidelines for all construction contractors undertaking any ground works. The guidelines contain details of arrangements for calling upon professional archaeological support (the Archaeological Consultant) in the event that buried remains of potential archaeological interest are discovered during the absence of a watching brief.
- 11.1.5 As part of the WSI / Contractors' Guidelines' a call-out procedure will be put in place which should ensure the presence of an archaeologist on site, generally within 24 hours of a call-out.
- 11.1.6 The *Contractor* familiarises themselves with the contents of the above documents and ensures that their contents is communicated to relevant staff, subcontractors and plant operators via the induction and toolbox talks prior to commencement of any ground works.

12 LANDUSE

12.1 Agricultural Land

12.1.1 The *Contractor* liaises with relevant landowners prior to commencement of works. The *Contractor* undertakes a site walk-over of relevant areas with the landowner (and *Employer* as appropriate).

12.1.2 The *Contractor* will provide a risk assessment for all works on agricultural land, identifying potential hazards / sensitive areas and proposed mitigation measures, as identified in liaison with the landowner.

12.1.3 The risk assessment, method statements and mitigation measures will address the following potential issues (this is not an exhaustive list and the *Contractor* will amend as applicable)

- General access restrictions (gates, fences, unstable ground);
- Stock movement (type of stock, numbers, location of stock and requirements/timetable for movement, access restrictions, specific risks e.g. cattle / bulls etc);
- Season-dependending risks / restrictions (lambing season, crop harvesting etc);
- Cattle grids and gates (proper use, repair and installation of cattle grids, gates etc);
- Fencing (requirement for removal / replacement / repair of fencing, location of electrical fencing etc); and
- Surface water (drainage, surface water bodies, livestock drinking water supplies and routes).

13 EXCAVATED MATERIALS

13.1 Contractor Requirements

- 13.1.1 In advance of each main phase of works, the *Contractor* (in consultation with ECoW, and other specialists where required), provides a method statement detailing expected volumes, material classification, storage and reuse procedures for the excavated materials anticipated from that particular work area.
- 13.1.2 The *Contractor* liaises with SEPA on all aspects of waste management, if required, to ensure compliance with all appropriate regulatory controls prior to and during construction works.
- 13.1.3 The ES contains information on expected soil types and volumes requiring excavation and reuse as part of the construction works. The *Contractor* utilises this information and any additional investigation findings post-consent when planning the works.
- 13.1.4 Any material that is not suitable for a predetermined use without the requirement for treatment (e.g. dewatering) is classed as waste and requires to be dealt with in accordance with the *Contractor's* developed Site Waste Management Plan.

13.2 Excavations

- 13.2.1 The *Contractor* creates, and maintains, an **Excavation Register**, which is updated weekly and details the location and extent of all open excavations and the current and original location of all stockpiled material. The *Contractor* makes this available to the *Project Manager* upon request.
- 13.2.2 The *Contractor's* attention is drawn in particular to the risk of slope instability and peat slides, and the *Contractor* ensures that under all conditions, the ground surface stability is fully maintained both during investigation and construction of the proposed development.
- 13.2.3 The *Contractor* undertakes sufficient additional studies and intrusive Site Investigations, where required, to establish the prevailing ground conditions at the Site and the likely ground conditions following completion of the construction and installation works. This includes geotechnical and geo-environmental investigations, hydro-geological and hydrological investigations or other investigations to ensure that the ground conditions are fully understood. Particular attention should be paid to peat or similar organic deposits, even on shallow slopes.
- 13.2.4 The *Contractor* undertakes turf and soil stripping and excavation works in line with best practice as described in relevant guidance documents in Section 17, in particular:
- *Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste* (2012); and
 - *Good Practice During Wind farm Construction* (2010).
- 13.2.5 The *Contractor* employs a construction management team and plant operators of proven experience of working in a peat environment for all peat drainage, excavation, road construction and reinstatement & restoration works.

13.3 Handling and Temporary Storage of Excavated Material

- 13.3.1 Where material is not required for immediate reinstatement, temporary storage may be required. To minimise handling and haulage distances, where possible excavated material will be stored local to the site of excavation and / or local to the end-use site where it is required for re-profiling, landscaping or structural purposes. The *Contractor* agrees storage location(s) with the ECoW prior to commencement of excavations.
- 13.3.2 Where the *Contractor* excavates topsoil, peat vegetation, or other organic soil the turfs are stored separately, with vegetation facing upward. The *Contractor* waters the turfs to maintain them as suitable for reinstatement and restoration. The *Contractor* stores turfs for a maximum period of 6 months.
- 13.3.3 Where the *Contractor* excavates peat soils these are segregated by material type and stored separately in stockpiles. Peat soils are stockpiled no higher than 1m.
- 13.3.4 Where practical the *Contractor* reuses topsoil / peat immediately, however, where this is not possible it is stockpiled for a maximum period of 6 months.
- 13.3.5 Where the *Contractor* makes stockpiles these are located in non trafficked areas. The *Contractor* only handles topsoil or peat twice: once from the excavated area to a stockpile and secondly from the stockpile to its final position unless agreed, in advance, with the *Project Manager* and the ECoW.
- 13.3.6 Stockpiles will be isolated from any surface drains and a minimum of 50 m away from watercourses, unless otherwise agreed with the ECoW. Stockpiles will include appropriate bunding to minimise any pollution risks where required.
- 13.3.7 The *Contractor* maintains the **Geotechnical Risk Register**. The *Contractor* makes this available to the *Project Manager* on a monthly basis for the duration of the *works*.

14 REINSTATEMENT

- 14.1.1 The *Contractor* undertakes reinstatement. Reinstatement works are those undertaken during construction and aim to address any damage inflicted on the landscape as part of the construction *works*. Reinstatement is undertaken in parallel with, or as soon as possible following, the construction *works* in each area, such as the re-dressing of road verges and other areas that may be disturbed as a result of the construction process. Where redressing proves unsuccessful re-seeding and hydro-seeding may be part of reinstatement measures. Reinstatement is primarily undertaken using in-situ and Site-sourced materials (turfs and topsoils).
- 14.1.2 The *Contractor* provides proposed methods for reinstatement of materials in landscaping and re-profiling of verges, other disturbed areas and redundant construction features (such as drainage ditches, settlement ponds or other sediment control measures, concrete wash out pits and other features which may not be required as part of the permanent works). Reinstatement proposals will provide details on methods proposed for replacement of turves and re-seeding where appropriate. If reseeded is required, this will be undertaken, where possible, using native species of local provenance.
- 14.1.3 Excavated peat from cut and fill sections of proposed development will be used for dressing the side slopes of the road. No mineral soil will be used for dressing the side slopes of the road to prevent silt run off.
- 14.1.4 Where practicable, reinstatement and re-profiling of, and around, the proposed development will be carried out as the work front progresses, or as soon as is practical after the substantial completion of the works themselves in a particular area. Early reinstatement and re-profiling is required to minimise visual impact and temporary storage / stockpiling of soils and to promote vegetation and habitat reinstatement as early as possible.
- 14.1.1 Where feasible, to prevent scour and run off and facilitate vegetation re-establishment, any down-slope embankments will be graded such that the slope angles are not too steep and there is a gradual transition with the surrounding / existing ground profile.
- 14.1.2 Reinstatement of vegetation will be focused on natural regeneration utilising peat or other vegetated turves or soils stripped and stored with their intrinsic seed bank. To encourage stabilisation and early establishment of vegetation cover, where available, peat turves or other topsoil and vegetation turves in keeping with the surrounding vegetation type will be used to provide a dressing for the final surface.
- 14.1.3 The *Contractor* undertakes all works in such a way as to allow reinstatement of disturbed areas to proceed as early as possible and in a progressive and sustainable manner.
- 14.1.4 Any accidental damage or other impacts caused during the works are repaired and reinstated or restored by the *Contractor* to the *Employer's* satisfaction and in accordance with the Planning Consent and any agreements with the landowners, all prior to taking over by the *Employer*.

15 ENVIRONMENTAL INCIDENT & EMERGENCY RESPONSE

15.1 General Requirements

15.1.1 The *Contractor* prepares a detailed Environmental Incident and Emergency Response Plan (EIERP) in line with PPG21, in particular sections 2.1.-2.4. and PPG22.

15.2 SEARS and Environmental Auditing

15.2.1 A SSE Safety and Environmental Awareness Report (SEAR) is required to be completed for any potential or actual environmental incident or emergency which occurs or is noted on site. Blank SEAR forms will be provided by SSE Renewables.

15.3 Summary Sheet for Machinery / Plant Operators

15.3.1 The *Contractor* provides a 1 page Summary Sheet containing the key information for incidents response to be used as a quick reference for any on-site personnel witnessing an incident. A laminate copy of this Summary Sheet will be located with all plant / machinery / on-site vehicles. A Communication Plan (to be followed in the event of a spillage) will be provided by the *Contractor*, in liaison with relevant stakeholders and will be provide to the *Employer*, according to the Contract provisions, prior to commencement of the site works.

Key Information to be provided to the ***Project Manager and / or the ECoW within 30 minutes*** of an incident (irrespective of the scale / severity of the incident):

- E.g. What substance was spilled;
- Approximate volume and time of spillage;
- Accurate Location of spill (GPS or grid reference if possible, or bridge ID/number referenced on map etc);
- All measures taken;
- Help required i.e. manpower, machinery, expert advice, disposal, etc; and,
- Whether the spill has reached a watercourse.

16 REFERENCE DOCUMENTATION

- **SEPA/EA Pollution Prevention Guidelines (PPGs):**
 - PPG01 (2001) General guide to the prevention of pollution
 - PPG02 (2011) Above ground oil storage tanks
 - PPG03 (2006) Use and design of oil separators in surface water drainage systems
 - PPG04 (2006) Treatment and disposal of sewage where no foul sewer is available
 - PPG05 (2007) Works and maintenance in or near water
 - PPG06 (2012) Working at construction and demolition sites
 - PPG07 (2011) Refuelling facilities
 - PPG08 (2004) Safe storage and disposal of used oils
 - PPG13 (2007) Vehicle washing and cleaning
 - PPG21(2009) Pollution incident response planning
 - PPG22 (2012) Dealing with Spills
 - PPG26 (2011) Storage and handling of drums and intermediate bulk containers
- *Developments on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste*, a joint publication by Scottish Renewables and the Scottish Environment Protection Agency, Version 1 January 2012.
- *Good Practice During Wind Farm Construction*, A joint publication by Scottish Renewables, Scottish Natural Heritage, Scottish Environment Protection Agency, Forestry Commission Scotland, Version 1, October 2010;
- SEPA Regulatory Position Statement, Developments on Peat, National Waste Policy Unit, 9 February 2010.
- Engineering in the Water Environment, Good Practice Guide, Construction of River Crossings, First edition, SEPA, April 2008.
- *Prevention of Pollution from Civil Engineering Contracts: Special Requirements* publication (SEPA, 2006)
- The Waste Hierarchy, National Waste Strategy: Scotland. **SEPA**, September 2006. (http://www.sepa.org.uk/waste/moving_towards_zero_waste/waste_hierarchy.aspx).
- **Scottish Natural Heritage (SNH):**
 -
 - Constructed tracks in the Scottish Uplands, March 2005.
- **British Standards Institute (BSI):**
 - Code of Practice for Earth Works, BS6031:2009
 - Code of practice for noise and vibration control on construction and open sites. Noise, BS5228-1: 2009.
- **Forestry Commission:**
 - Forests and Water UK Forestry Standard Guidelines, 5th Edition 2011
- **CIRIA Publications:**

- Control of Water Pollution from Construction Sites – Guide to Good Practice (SP156)
- Control of Water Pollution from Construction Sites – Guidance for Consultants and Contractors (C532)
- Control of Water Pollution from Linear Construction Projects – Technical Guidance (C648)
- Control of Water Pollution from Linear Construction Projects – Site Guide (C649)
- Culvert Design Guide, C689, CIRIA, 2010;
- Environmental Good Practice – Site Guide (C650)
- The SUDS Manual (C697)
- Site Handbook for the Construction of SUDS (C698)
- **Institute of Environmental Management and Assessment (IEMA):**
 - Practitioner Series No.11: Waste Management: A Guide for Business in the UK, September 2008.
- **Scottish Government:**
 - River Crossings and Migratory Fish: Design Guidance, Scottish Government, April 2000.

Regulations

- 1 The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (“CARs”).
- 2 The Water Environment (Controlled Activities) (Scotland) Regulations 2011, A Practical Guide, SEPA, Version 7, July 2017.

17 CHECKLIST – Required *Contractor's* Information

The information listed in the table below will be provided by the *Contractor* to the *Employer* according to the provisions of the contract, as indicated.

Pre-commencement of works:	Yes/No
Name and CV of nominated and appropriately qualified person for site based single point of contact for all environmental matters (Section 1)	
Communication Plan (Section 3)	
Risk Assessment & Method Statements (Section 3)	
Schedule of toolbox talks (Section 4)	
Eco Map (Section 4 and 10)	
A Site Waste Management Plan (SWMP, Section 6)	
Details of proposed waste contractors and site plan showing waste collection / storage points (Section 6)	
Watercourse crossing plans and CAR licences/authorisations(Section 9)	
Excavation / Reinstatement plans (Section 14 and 15)	
Environmental Incident and Emergency Response Plan (Section 16)	
During and post-completion of works:	Yes/No
Records of relevant communication, meetings and reports (Section 3)	
Records of site inductions and tool box talks (Section 3)	
Records of communication with SEPA, SNH, PMO (Section 3 and 5)	
Eco Map (Section 4 and 10)	
Records of all environmental checks/inspections (Section 5)	
COSHH documentation (Section 5.3)	
Site Waste Management Plan and related information (Section 6)	
Drainage Maintenance Register (Section 7)	
Records of water quality monitoring (Section 8)	
Excavation Register (Section 14)	

Note: The above list only relates to requirements of this CEMP. As part of the Contract, other information provisions will be required from the *Contractor*.

PART 2 – CONSTRUCTION METHODS

18 INTRODUCTION

18.1 General

18.1.1 The following sections describe the general methods of construction which are stipulated in the Employer's Civil Technical Requirements generally included in the Civils Work Contract forming the basis for the Contractor's detailed design.

18.2 Working Hours and Noise

18.2.1 Construction activities will generally be stipulated as part of a planning consent, normally limited between 07.00 and 19.0 hours Mondays to Fridays, and 07.00 to 13.00 hours on Saturdays, with no working activities on Sundays. In the event of work being required outwith these hours, e.g. abnormal load deliveries, commissioning works or emergency mitigation works, the Planning Authority will be notified prior to these works taking place, wherever possible.

18.3 Plant and Equipment

18.3.1 The works shall be undertaken in strict accordance with the Provision and Use of Work Equipment Regulations "PUWER" (as amended) covering all types of plant and equipment found on construction sites.

18.3.2 All site operatives will be appropriately trained and experienced and hold certification of training achievement issued by CITB or other construction industry approved schemes.

18.3.3 All site plant and equipment shall be fitted with effective silencers / insulation. Regular noise monitoring will be undertaken by the *Contractor* at specific areas around the site to monitor noise effecting nearby properties.

18.3.4 A non-exhaustive list of plant that may be utilised during the construction activities detailed in this Construction Method Statement is as follows; 360° tracked excavators, tipper trucks, dumper trucks, tractor dozers, vibratory rollers, ground ripping plant, mobile crushers and screeners.

19 SITE ACCESS CONSTRUCTION

19.1 Signage

19.1.1 Sufficient signage will be employed on site, for both site personnel and the public, to clearly define the boundary of the works where they coincide with areas accessible to the public.

19.1.2 Ecological awareness signs (e.g. potential otter crossing) are also required at speed limit signs in certain areas of the site.

20 ONSITE PREPARATORY CONSTRUCTION

20.1 Introduction

20.1.1 Preparatory construction concerns the formation of the Temporary Construction Compound

(TCC), laydown areas and associated works which are required to establish the site offices, welfare facilities and storage arrangements for materials, plant and equipment in connection with the construction phase.

20.1.2 While the TCC will be located off-site, the *Contractor* and any subcontractors will be familiar with, and take account of, the planning conditions relevant to the construction works and the requirements of the CEMP prior to construction work commencing.

20.1.3 The TCC is a temporary work for the duration of the construction phase of the project. Following commissioning, the TCC shall be dismantled and all plant, welfare facilities and equipment removed from the site. Reinstatement of this area shall be in line with the requirements stated within the main CEMP document.

20.1.4 The main TCC will comprise of site offices for the Principle Contractor, any other sub-contractors, project support staff (i.e. the ECoW and ACoW) and *Employer*, together with all the necessary welfare facilities for the workforce.

20.1.5 Imported crushed rock will be used to construct the temporary construction compound..

20.2 Temporary Construction Compound Preparation

20.2.1 The *Contractor* designs and constructs an area of hardstanding, as specified in the Civil Works Information, of sufficient load bearing capacity, as the construction compound. Where appropriate a geo-textile layer is used to maximise the effectiveness of stone removal when the compound is removed.

20.2.2 The compound includes all Site accommodation and welfare facilities, bunded fuel tanks and other liquid storage areas with segregation, bunded refuelling areas, general and protected storage areas, vehicle parking, security, lighting and services, communications and laboratory/testing or holding facilities, signage, pedestrian and vehicular circulation routes, and safety barriers. The *Contractor* provides recycling facilities at the Site compound and professional collection thereof.

20.2.3 The compound(s) are free draining with oil interceptors and contain a bunded area for maintaining vehicles and plant, or other pollution control measures, as appropriate / required to protect existing water courses and private water supplies.

20.2.4 The typical construction activities associated with the TCC are detailed below:

- Stripping of any topsoil / peat and careful stockpiling of this material as per CEMP requirements.
- Excavating the remaining superficial soil materials and stockpiling of this material on the surrounding undisturbed area in accordance with CEMP requirements.
- Installation / construction of temporary surface water drainage in accordance with CEMP requirements.
- Laying and compacting crushed rock in layers to form a hardstanding. Crushed rock material will be site won from local excavations and have a low fines content to reduce the risk of sediment contamination.
- Delivery of offices, mess area, toilets and associated infrastructure on flat bed lorries.
- Erection of offices, mess area, toilets, and installation of all bunded areas to contain

generator and fuel stores.

- Erection of fencing around the perimeter of the main TCC.
- Following the completion of all construction activities, the TCC shall be reinstated according to the methods set out in the CEMP.

20.2.5 Welfare facilities will be provided for site operatives under the Construction and Design Management Regulations 2007 including sanitary conveniences, washing facilities, drinking water, changing rooms and accommodation for clothing not worn during working hours and rest facilities.

20.2.6 Toilets during the construction phase will be chemical toilets or soakway, depending on ground suitability and discussion with SEPA. The waste will be emptied on a regular basis by a registered waste disposal contractor. Toilets will be located within the TCC areas.

20.2.7 Potable water will be supplied via a borehole or surface water extraction subject to licences/authorisations obtained from SEPA under CAR. The water will be used for messing purposes during the construction phase.

20.2.8 If additional water is required to be impounded and / or abstracted from site water bodies for site based activities (i.e. dust suppression, etc), the CAR Regulations apply and advice will be sought from SEPA prior to any abstraction.

20.2.9 The duration of the works may extend into winter months. If required, external lighting will be required to be provided at the TCCs. Lighting columns will be erected in proximity to security gates and any site offices / welfare facilities and stores. Compound lighting shall face inwards to reduce light pollution and environmental impact effects.

20.2.10 All areas of the site including accommodation areas shall be kept clean and tidy with a regime of good housekeeping established to facilitate mobility of personnel and plant/equipment around the site and eliminate potential hazards and environmental pollution.

21 ROAD CONSTRUCTION

21.1 Introduction

21.1.1 The overall site design has been developed in accordance with recommendations adopted from the Environmental Statement(s) and to reflect the requirements and specifications for transporting converter station and wind turbine components to the consented Viking Wind Farm turbine and converter station locations.

21.1.2 The extent of construction disturbance will be limited to around the perimeter of, and adjacent to, road alignment, including associated earthworks, and shall be monitored by the ECoW and ACoW as required.

21.1.3 Proposed alignments of the proposed development will be inspected by the *Contractor*, ECoW and ACoW prior to the on-set of construction in that area. The regularity of inspections (hourly, daily, weekly, as appropriate) during the construction period shall be determined in advance for each particular stretch, based on anticipated ground conditions, known ecological or archaeological sensitive receptors, prevailing weather conditions, and anticipated rate of progress.

21.1.4 In general, as part of the design mitigation wherever practicable all proposed site infrastructure has been sited at least 50m from any watercourse.

21.2 General Construction Criteria

- 21.2.1 It is anticipated that all access tracks will be constructed from aggregate won from local excavations and constructed to the best practices for wind farm access tracks. If site won material does not conform to required engineering specification for the final running surface then imported crushed rock material may be required.
- 21.2.2 Access tracks shall be constructed to a minimum running width of 6m, plus shoulders of approximately 1m on either side, to accommodate the maximum transport requirements. No passing places are being provided due to short sections of access tracks, limited number of turbines and the short length of transportation along the public highway.
- 21.2.3 Access tracks will be formed from a sub-base of general fill won from local excavations, and finished off with a cap-stone / wearing course of graded crushed rock, to provide suitable delivery of the WTG components. Wearing course stone shall be of a suitable material that is not susceptible to breaking down / weathering to a high fines content material.
- 21.2.4 Maintenance of the running surface will be carried out on a regular basis, as required, to prevent undue deterioration. Loose track material generated during the use of access tracks will be prevented from reaching watercourses by maintaining an adequate cross fall on the tracks. Periodic maintenance of tracks by way of brushing or scraping will be carried out to minimise the generation of wheel ruts. In dry weather, dust suppression methods may be required for track and hardstanding areas. The site access tracks, hardstandings and trackside drains will be inspected on a daily basis by the *Contractor*. Records of such inspections will be held on site for review by the ECoW / Planning Authority (PMO) / *Employer*.
- 21.2.5 Access tracks will be formed on suitable underlying material (soil or rock with sufficient bearing capacity) in the following manner:
- Stripping of surface vegetation (turves) and careful stockpiling of this material as per CEMP requirements.
 - Excavating the remaining superficial soil materials (overburden) and stockpiling this material as per CEMP requirements.
 - Where different overburden materials are present these will be stored according to type. This material will be monitored and watered (as appropriate) to be retained for reinstatement purposes.
 - The exposed suitable road formation shall have rock fill material tipped from dumper trucks directly onto the proposed road alignment; and
 - This material will then be either spread by a dozer or placed by a hydraulic excavator and compacted in layers, typically using vibratory rollers.
- 21.2.6 Turning areas will be formed to facilitate the turning of dumper trucks. These turning areas can serve as passing places during the construction period before being reinstated at the end of the works using subsoil/topsoil.

21.3 Unstable Ground

- 21.3.1 Unstable ground is herein considered to be any ground conditions encountered along the proposed alignment, or within the immediate vicinity and influence, of the proposed development that has insufficient strength in its existing state to support the proposed load conditions or to remain in-situ for the duration of the construction works, or that has

experienced natural failure (i.e. not as a consequence of the wind farm construction works) prior to, but along the alignment of, or within the immediate vicinity and influence of, the proposed development alignment such as to require re-alignment of the works, or major civil engineering solution to maintain the proposed alignment.

21.3.2 If any unstable ground is encountered during access track construction, the following procedure shall be adopted:

- Access track construction in the immediate area of the unstable ground shall cease with immediate effect;
- The *Contractor* immediately consults a suitably qualified and experienced geotechnical engineer; and
- If relocation within approved micro-siting allowances of the alignment of the proposed development is possible and acceptable to the ECoW/ACoW (as appropriate), without potential for further ground instability to occur, then construction may recommence along the newly agreed alignment, and any stabilisation / mitigation measures that may be required of the unstable ground shall occur in parallel.