FEHILY TIMONEY

CONSULTANTS IN ENGINEERING,
ENVIRONMENTAL SCIENCE
& PLANNING

APPENDIX 6.1

Input Data for Carbon Calculator

Carbon Calculator Inputs Category	Value	Comments
No. of Turbines	8	
Duration of consent	35	35 year lifespan.
Power rating of 1 turbine (MW)	3.9MW - 4.8MW	Calculator ran twice for upper and lower range extents
Capacity factor	35	
Backup - Fraction of output to back up %	5	Carbon calculator note advises that '*If 20% of national electricity is generated by wind energy, the extra capacity required for backup is 5% of the rated capacity of the wind plant (Dale et al 2004)*'. 5% of capacity (105.6) = 1.65%
Additional emissions due to reduced thermal efficiency of the reserve generation (%)	10	Carbon calculator note advises that: '*Extra emissions due to reduced thermal efficiency of the reserve power generation ≈ 10% (Dale et al 2004)*'.
average annual air temp (°C)	11	Taken from Table 6-6 from Chapter 5 Air and Climate Chapter, Volume 2 of the EIAR.
Type of peatland	Fen	
average depth of peat at site (m)	0	
Content of dried peat (% by weight)	49	Carbon calculator note advises that: '*An estimate of the range of %C in peat of between 49% and 62% is provided by Birnie et al. (1991)*'. Based on the thinness of peat on site, limited frequency and area and management (farming and forestry), peat is not intact and is therfore likely to have a lower level of carbon content.
Average extent of drainage around drainage features at site (m)	1	Unable to calculate. Land already drained and not intact peatland. An estimation is given.
average water table depth (m)	0.5	The carbon calculator only allows a figure of -0.1-1m, as the this is likely to be less due to land management a depth of 0.5m is provided.
Drainage around drainage	0.5	Worst case
Dry soil bulk density of peat gcm^{-3}	0.2	Carbon calculator note advises that: '*A value for bulk density for peat as derived from the National Soil Inventory of Scotland (Lilly et al., 2010), is 0.2 g cm-3.. Dryburgh (1978) report a range of typical bulk density of sod peat slightly higher, as being between 0.25 and 0.45 g/cm-3*'.
Time required for regeneration of bog plants after restoration (years)	2	While no restoration/regeneration is envisaged, the lowest figure the carbon calculator accepts is 2 years.
Carbon accumulation due to C fixation by bog plants in undrained peats (tC ha-1 yr-1)	0.1	While no restoration/regeneration is envisaged, the lowest figure the carbon calculator accepts is 0.1 tC ha-1 yr-1.
area of forestry to be felled (ha)	14.2	
Average rate of carbon sequestration in timber (tC ha-1 yr-1)	3.6	This is dependent on the yield class of the forestry. Carbon sequestered for yield class 16 m3 ha-1 y-1 = 3.6 tC ha-1 yr-1
Counterfactual emission factors: Fossil fuel mix emission factor (t CO2 MWh-1)	0.45	Fixed value
no. of borrow pits	0	
average length of borrow pits (m)	0	
average width of borrow pits (m)	0	
average depth of peat removed from pit (m)	0	
Method used to calculate CO2 loss from foundations and hard-standing	Rectangular with verticle walls	
average length of turbine foundation (m)	25	
average width of turbine foundation (m)	25	
average depth of peat removed from turbine foundation	0	No peat shall be removed from site
average length of hard standing (m)	70	
average width of hard standing (m)	35	
average depth of peat removed from hard-standing (m)	0	No peat shall be removed from site
Volume of concrete (m3) used in construction of wind fa	8000	

Existing access track	1400	We are constructing approx 7.1km of new access track and upgrading approx. 1.4km of existing forest tracks.
length of access track that is floating road (m)	0	0m expected.
Floating road width (m)	5	n/a
floating road depth (m)	0	n/a
Length of floating road that is drained (m)	0	n/a
Average depth of drains associated with floating roads (	0	n/a
Length of access track that is excavated road (m)	2200	2.2km cut road length
Excavated road width (m)	5	Whilst 4.5m is the width of the new and upgraded access track. The model takes ≥5m.
Average depth of peat excavated for road (m)	0	No peat shall be removed from site
Length of access track that is rock filled road (m)	8500	We are constructing approx 7.1km of new access track and upgrading approx. 1.4km of exisitng forest tracks.
Rock filled road width (m)	5	Whilst 4.5m is the width of the new and upgraded access track. The model takes ≥5m.
Rock filled road depth (m)	1	
Length of rock filled road that is drained (m)	8500	We are constructing approx 7.1km of new access track and upgrading approx. 1.4km of existing forest tracks.
Average depth of drains associated with rock filled roads	0.75	Includes the total for interceptor drains and swales.
Total length of access track (m) (existing+to be upgrade	8500	We are constructing approx 7.1km of new access track and upgrading approx. 1.4km of existing forest tracks.
Length of any cable trench on peat that does not follow access tracks and is lined awith a permeable medium eg. sand (m)	0	None outside access track/hardstandings.
Volume of additional peat excavated (m3)	0	
Area of additional peat excavated (m2)	0	
Peat landslide hazard	0	
Improvement of degraded bog - Time required for hydrology and habitat of bog to return to its previous state on improvement (years)	2	While no restoration/regeneration is envisaged, the lowest figure the carbon calculator accepts is 2 years.
Period of time when effectiveness of the improvement in degraded bog can be guaranteed (years)	2	While no restoration/regeneration is envisaged, the lowest figure the carbon calculator accepts is 2 years.
Improvement of felled plantation land - Time required for hydrology and habitat of felled plantation to return to its previous state on improvement (years)	2	While no restoration/regeneration is envisaged, the lowest figure the carbon calculator accepts is 2 years.
Improvement of felled plantation land - Period of time when effectiveness of the improvement in felled plantation can be guaranteed (years)	2	While no restoration/regeneration is envisaged, the lowest figure the carbon calculator accepts is 2 years.
Restoration of peat removed from borrow pits - Time required for hydrology and habitat of borrow pit to return to its previous state on restoration (years)	1	No peat. The lowest figure the carbon calculator accepts is 1 years.
Restoration of peat removed from borrow pits - Period of time when effectiveness of the restoration of peat removed from borrow pits can be guaranteed (years)	2	No peat. The lowest figure the carbon calculator accepts is 2 years.
Early removal of drainage from foundations and hardstanding - Time to completion of backfilling, removal of any surface drains, and full restoration of the hydrology (years)	0.1	No envisaged. The lowest value the carbon calculator accepts is 0.1 years.
Restoration of site after decomissioning	N/A	Not applicable

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