Planning and Environmental Consultants

Biodiversity Management and Enhancement Plan

Proposed Sheskin South Wind Farm Application

DOCUMENT DETAILS

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Prepared By:

MKO
Tuam Road
Galway
Ireland
H91 VW84

Planning and Environmental Consultants

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1. INTRODUCTION

1.1 Background

This Biodiversity Management and Enhancement Plan (BMEP) has been prepared in support of the Environmental Impact Assessment Report (EIAR) produced for the proposed Sheskin South Wind Farm, Co. Mayo.

A Biodiversity Management and Enhancement Plan has been prepared as part of the Proposed Development to enhance the ecological condition of the existing peatland habitat in the northwest section of the proposed development site. In addition to peatland enhancement, this plan includes for ecological enhancement through the removal of invasive species (i.e rhododendron) at various locations across the site.

The construction of the proposed windfarm and associated infrastructure will not result in the loss of any peatland habitat. Within the EIAR boundary, this habitat is only found in the very northwest section of the site, outside of any proposed infrastructure. The receiving habitats are fully described in Chapter 6 of the accompanying EIAR.

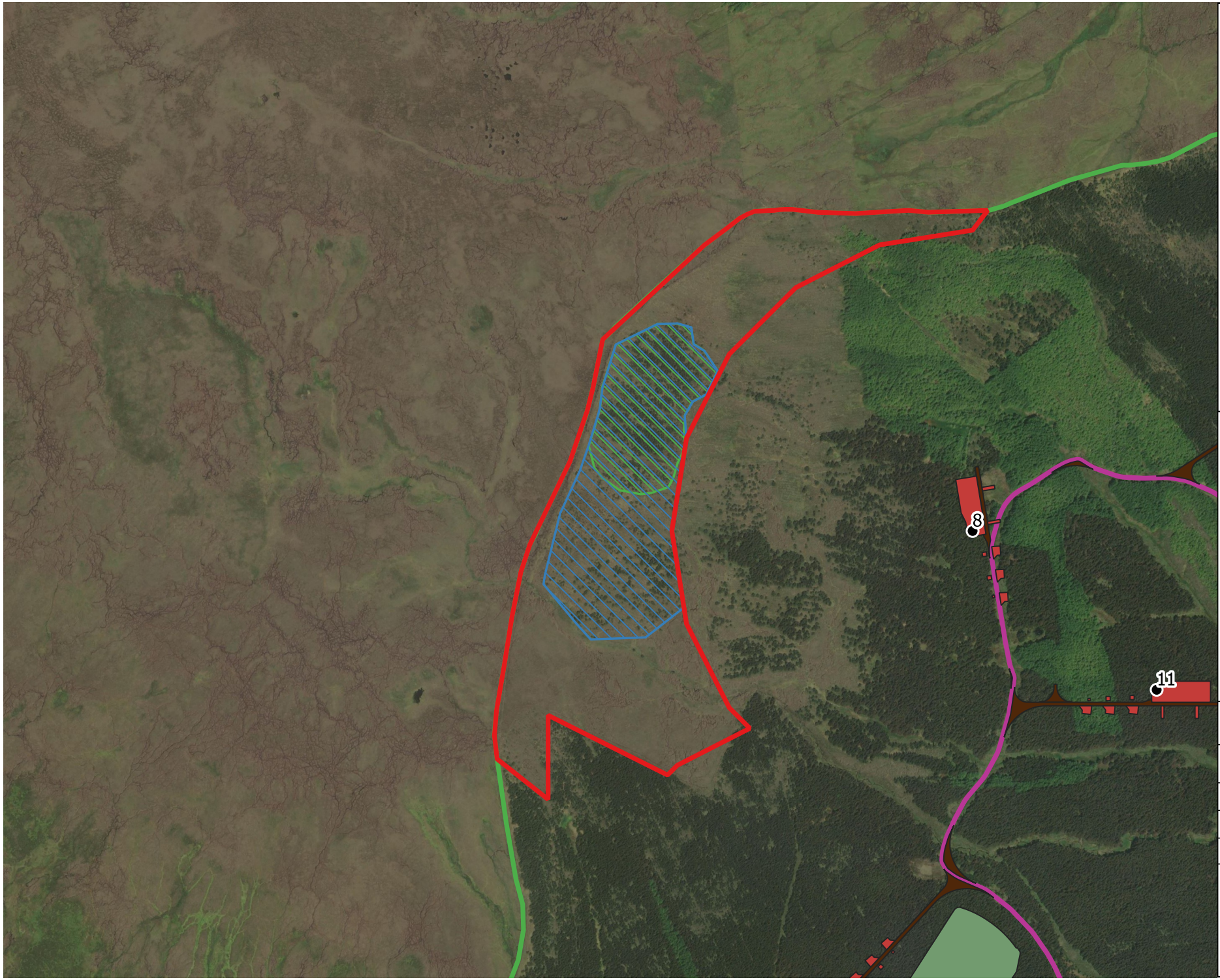
The footprint of the proposed development has been designed to avoid all peatland habitat within the site boundary. Therefore, this BMEP provides the enhancement of peatland habitat to the northwest of the site that has been subject to drainage with sections covered in self-seeded conifer species. The entire proposed enhancement area measures approximately **24.1ha**, located west of Turbine 8. The area covered in self-seeded conifers measures approximately **9.8ha**. It is also proposed to remove Rhododendron from various locations across the proposed development site. The areas identified for enhancement and management are shown in figure 1.1. The proposed enhancement measures are described below.

Following the implementation of the measures outlined in this report, there will be a net gain in peatland habitat on the site. This BMEP provides measures that will be employed to improve the ecological quality of the peatland habitats that are located outside the construction footprint but within the EIAR boundary.

The bog enhancement programme described in this report will be implemented in accordance with the published guidelines and best practice described in detail below including the guidelines arising from the EU–LIFE/Coillte 'Irish Blanket Bog Restoration Project" (2002-2007)', Scottish Natural Heritage (SNH)'s guidance note Planning for development: What to consider and include in Habitat Management Plans (Version 2, January 2014) and the National Parks and Wildlife Service's (NPWS) publication 'Best practice in raised bog restoration in Ireland' (2017, Irish Wildlife Manuals No. 99).

1.1.1 Statement of Authority

This report has been prepared by Colin Murphy (B.Sc., M.Sc.). Colin has over two years professional ecological consultancy experience and is a Qualifying member of the Chartered Institute of Ecology and Environmental Management. This report has been reviewed by Pat Roberts (B.Sc. (Env.)) who has over 16 years' experience in ecological consultancy.



Map Legend

- Area A- Self Seeded Conifer
- Area B- Dense conifer cluster
- Enhancement area
- EIAR Site Boundary
- Turbine Foundation & Crane Hardstands
- Proposed New Roads
- Existing Roads
- Turbine Layout

N

Drawing Title

Biodiversity Enhancement Area

Project Title

Sheskin South Wind Farm

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201119	Figure 1.1
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MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

2. BIODIVERSITY MEASURES

2.1 Conifer Felling and Peatland Enhancement

Self-seeded conifers in an area to the northwest section of the site will be felled and removed within an area to the northwest section of the site. The total coverage of conifers in this area covers approximately **9.8ha** (Shown as **Area A** on Figure 1.1). Located within the **9.8ha,** is a dense cluster of conifers, measuring approximately **3.9ha** (Shown as **Area B** on Figure 1.1). Outside of this central cluster, the self-seeded conifers are sparsely located. The location of enhancement area A and B is shown on Figure 1.1.

All self-seeded conifers located within the proposed enhancement area will be felled. The denser cluster of conifers (measuring **3.9ha**) will be removed from site, in line with the methodology described in (Mackin et al, 2017).

Outside of this area, all conifers that are felled will remain in-situ. Doing this will prevent unnecessary machinery movement across the proposed enhancement area, reducing the risk of habitat disturbance.

This area has also been identified as a Coillte 'Bioclass' Area. This habitat has also been mapped as EU Habitats Directive Article 17 Annex I blanket bog by the NPWS and measures approximately 38ha within the EIAR boundary. The areas surrounding the proposed enhancement area to the north and west comprise peatland and heath habitat. By linking up these habitats, this will increase connectivity between peatland habitats locally, which is beneficial for biodiversity and dispersal of species dependant on the habitat and improves the general hydrology and function of the habitat at a landscape scale.

This area will be felled as part of the construction phase of the wind farm. However, the enhancement area may require further maintenance to achieve successful reinstatement back to peatland habitat. It is therefore proposed to fell and remove conifers in a manner that will cause minimal damage to the bog surface.

As described in the Irish Wildlife Manual (IWM) No. 99 (Mackin et al, 2017[1]):

> *'Removal of forestry is a proven restoration measure, and has been used effectively by organisations such as Coillte at a number of raised bogs in Ireland, both on the high bog and cutover. In recent years, this measure has been applied at many raised bog sites as part of EU LIFE-funded restoration projects, including Crosswood Bog SAC, Lough Ree SAC, Killyconny Bog (Cloghbally) SAC, Girley Bog NHA, Scohaboy Bog NHA and Wooddown Bog NHA'.*

The IWM also states that:

> *'In general, clear-felling using a harvesting machine should only be carried out if a crop is commercially viable, surface conditions are dry and there is a low risk of damage to raised bog habitats. A number of alternatives to clear-felling are available, depending on the particular circumstances of a bog. These include halo-thinning, ring barking, fell to waste using a specialist track machine or chainsaw, or complete tree removal with cables and winches.'*
>
> *'In order to select the most appropriate solution, consideration should be made of the following: the potential for peat-forming habitats to develop, the risk of damage to the bog surface, and the*

[1] *Mackin, F., Barr, A., Rath, P., Eakin, M., Ryan, J., Jeffrey, R. & Fernandez Valverde, F. (2017) Best practice in raised bog restoration in Ireland.* Irish Wildlife Manuals*, No. 99. National Parks and Wildlife Service, Department of Culture, Heritage and the Gaeltacht, Ireland.*

commercial viability (area and yield class) of the crop. Where working conditions on the raised bog surface are unsuitable for machinery, or only a small crop of conifers are present, use of a chainsaw may be the most appropriate solution.'

The approach to be taken to conifer removal will adhere to the guidance provided within Appendix A of the Macklin *et al.* 2017. Where clear-felling using a specialist harvesting machine is undertaken, the waste material, including branches and waste lengths of timber will be used to create a brash mat beneath the machine as it works to reduce damage to the bog surface.

A 500m metre buffer will be maintained between the enhancement area and the nearest turbine. The purpose of this is to ensure suitable habitat for protected species is not created within the 500m buffer zone from the turbine. The northern and southern sections of the enhancement area consist of open peatland, while the central section has largely become self-seeded with conifers.

In order to facilitate the re-establishment of peatland vegetation within these areas, and maintain an effective hydrological regime, the following measures will be fully implemented in these areas:

- The conifers located within the dense cluster (Shown as area A on figure 1.1) will be felled and removed by the Keyhole felling method, which is fully described in section 4.9.1 of the main EIAR, and in accordance with the guidance in Macklin et al. 2017.
- This area will be accessed from the east, adjacent to Turbine 8, using brash tracks.
- Brash tracks will be created from the waste material, such as branches and uncommercial lengths of timber, and placed beneath the machine to create a track.
- Brash tracks will be put in place to support vehicles on soft ground, reducing peat and mineral soils erosion and avoiding the formation of rutted areas, in which surface water ponding can occur.
- Brash tracks renewal will take place when they become heavily used and worn. Provision will be made for brash mats along all off-road routes, to protect the soil from compaction and rutting. Brash tracks will be removed once the works are complete.
- Outside of the central cluster, trees are more sparsely occurring and will be felled by hand.
- All trees felled outside of the denser cluster area will be left on site where they were individually felled. The purpose of this is to reduce unnecessary machine movement throughout the enhancement area.
- All works will be completed outside the bird nesting season, which runs from March to August (inclusive).

2.2 Drain Blocking

Drain blocking will be subject to approval and carried out under the supervision of the project geotechnical engineer, project hydrologist and project hydrologist, following confirmatory assessments carried out prior to the commencement of the enhancement works.

- Prior to drain blocking works taking place, the proposed enhancement area will be surveyed by a suitably qualified ecologist and hydrologist to identify drains to be blocked.
- Drain blocking will be undertaken on a local scale, within the proposed enhancement area. This will be achieved by installing peat dams within the existing ditches (predominantly remnant semi-functioning forest drains). This will maintain, enhance and restore the favourable baseline hydrological and ecological conditions within each of the restoration locations. This measure is effective in raising water levels in the peat and encouraging peat-forming habitats on cutover bog (Mackin *et al*, 2017) An example of peat dams proposed is shown in Plate 2.3. The methodology for peat dam construction, as per (Mackin et al, 2017) is provided in Plates 2-5 and 2-6, with the plastic dam methodology provided in Plate 2-7. Peat removed from the drain initially to create a key for the dam will be used to backfill the borrow pit (see Plate 2.5).
- No additional drainage will be installed in proximity to these habitat areas during the lifetime of the development.

- The use of off-road vehicles on the site will be restricted to the proposed new site access track unless where specifically required to access the areas to be felled
- These works will also be preceded by a toolbox talk to the felling team by the project ecologist to ensure all measures are implemented in full.
- No application of chemical and organic fertilisers or will be undertaken within the peat enhancement area.
- Peat extraction within the proposed peatland reinstatement area will not be permitted.
- Burning and dumping will not be permitted.
- The rehabilitation area will be monitored (as described below) to assess the success of the rehabilitation plan.

Plate 2-1. Example of proposed area for forestry felling with typical peatland vegetation remaining beneath the conifers. Such low-quality forestry offers high potential for restoration to peatland.

Plate 2-2. Example of peat dams to be used for on-site forestry drain blocking. This will re-establish and maintain a hydrological regime for the required peatland rehabilitation.

Plate 2-3. Example of plastic dams to be used for on-site drain blocking where peat dams are not suitable.

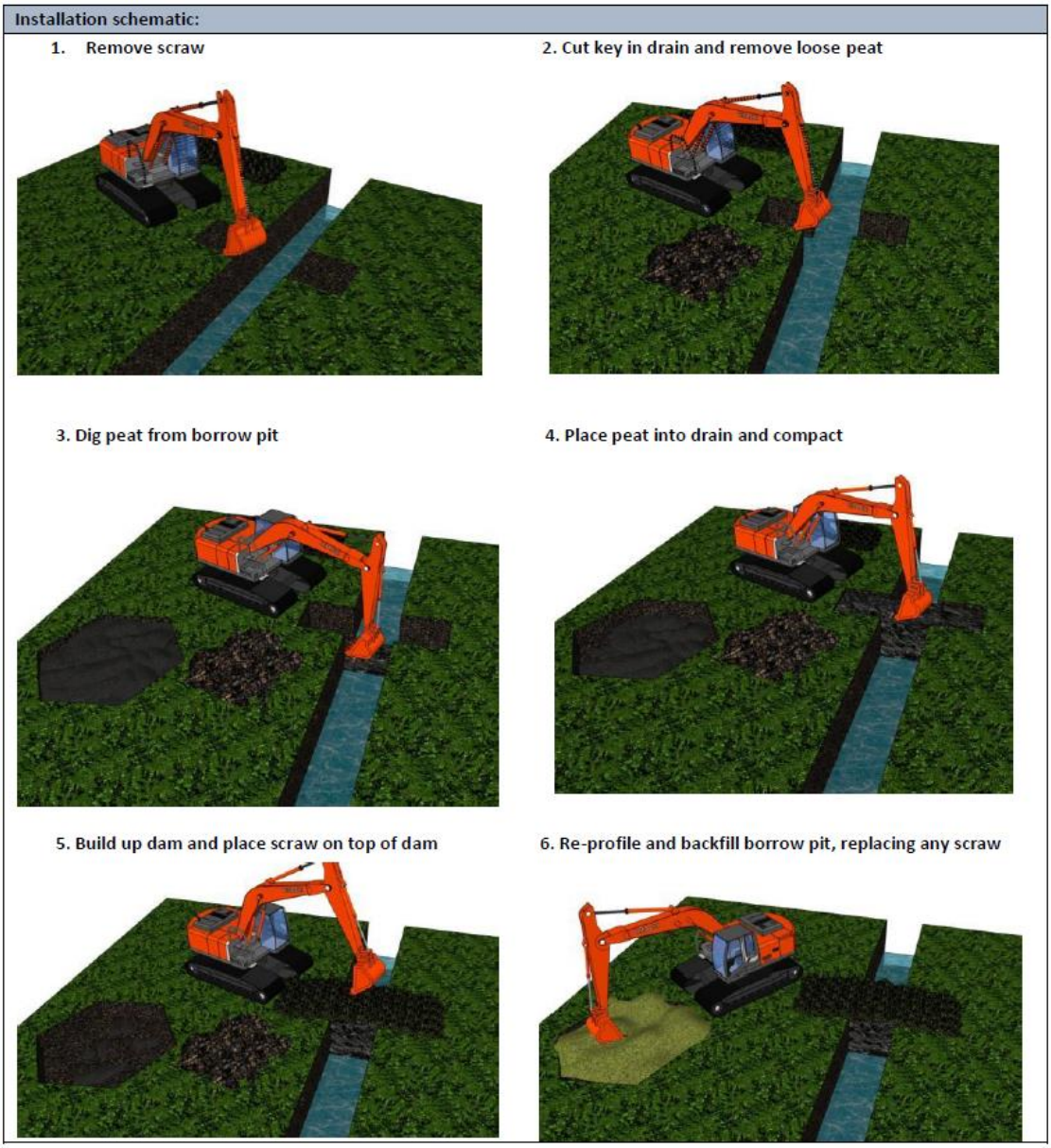


Plate 2-4. Methodology for peat dam construction (Source: Mackin et al, (2017))

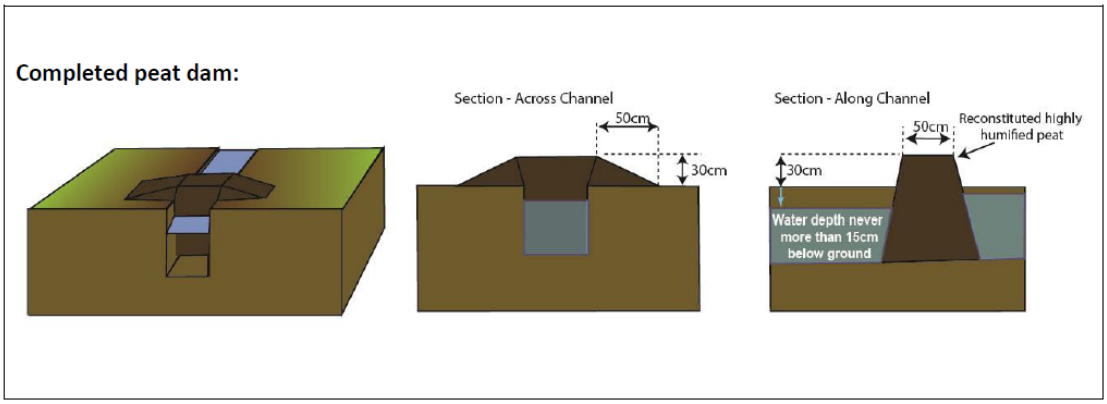


Plate 2-5. Drain Blocking by machine (McDonagh, 1996)

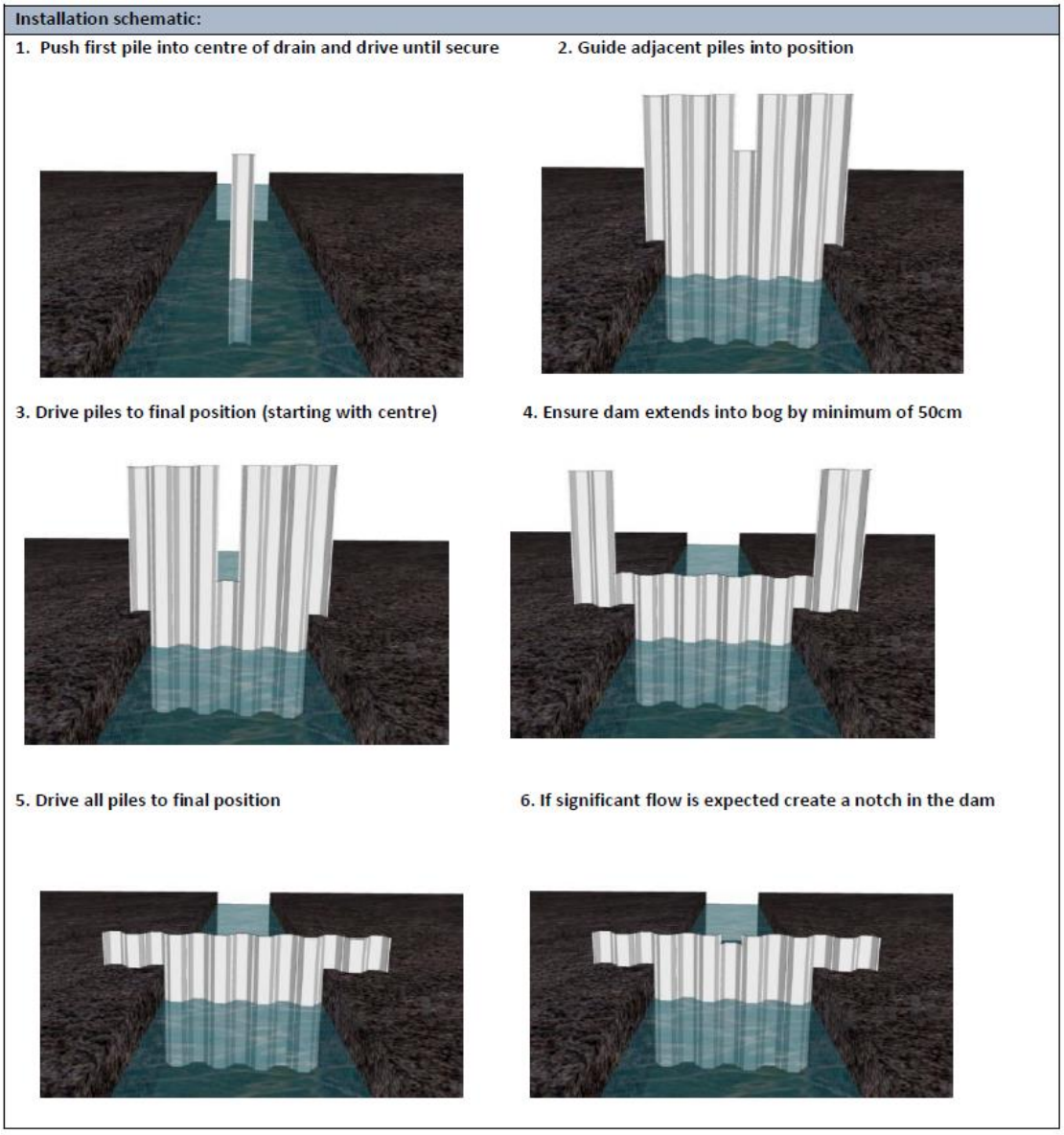


Plate 2-6. Plastic dam installation methodology (Source: Mackin et al, (2017)).

2.3 Removal of Rhododendron

Rhododendron ponticum was recorded from various areas within the site particularly along the access road and along the road and adjacent watercourse leading to Turbine 21, as shown in Figure 2.1. The following treatment procedures will be adhered to facilitate the removal of Rhododendron on site.

- Previously identified infested areas will be resurveyed prior to the commencement of the treatment procedures. The purpose of this is to identify if the Rhododendron has spread outside of previously mapped areas.
- Prior to the commencement of treatment, all areas identified for treatment will be marked with barrier tape.
- All staff will be fully trained and competent in the use of herbicides
- Rhododendron will be cut to a height of between 2 and 4cm above the ground and immediately sprayed with a 20% solution of glyphosate mixed with a dye.

- The application of herbicide will adhere to legislation and best practice protocols on all aspects including: the storage and application of herbicides, PPE, record keeping.
- All herbicide mixtures will be prepared off-site or in a designated area on the forest road network.
- Alternatively eco- plugs may be used. https://www.forestresearch.gov.uk/research/the-use-of-ecoplugs-for-woody-weed-control/
- Treated area will be monitored annually for three years, following the initial treatment. Further cutting and herbicide treatment will be carried out if required.

2.4 Timing of Works

Hedgerow clearance works will be conducted in line with the provisions of Section 40 of the Wildlife Acts 1976 (as amended, 2000) which sets out the bird nesting season as between the 1st March and the 31st of August in a given year.

3. MONITORING OF ENHANCEMENT AREA

3.1.1 Vegetation Monitoring

To confirm that habitat enhancement has been successful, all areas of peatland restoration will be monitored post-enhancement. The criteria for success will be defined as per the guidance in the National Survey of Upland Habitats (Perrin et al., 2014). Monitoring results will be reported by a suitably experienced ecologist (person with relevant academic qualifications and peatland surveying experience) and within an Annual Environmental Report for the first 5 years post construction, and every 5 years thereafter for the operational life of the wind farm, with any criteria failures identified, and adaptive mitigation actions implemented if required.

Prior to the commencement of all habitat enhancement measures described in this Plan, permanent vegetation monitoring plots will be established within the management areas. The monitoring plot locations will be selected using stratified random sampling. This will allow the monitoring plots to be representative of microtopography and vegetation cover, sampling areas from the wettest, intermediate and driest parts of the management areas. Monitoring plots will be surveyed and classified using the relevé method as per the (Perrin et al., 2014) with plot sizes being 2m x 2m. Biotic and abiotic parameters that form baseline indicators of ecological and hydrological condition of the bog will be recorded. Monitoring plots will be marked out permanently using fencing posts and their location recorded using GPS. The number of monitoring plots will be determined by the level of plant community heterogeneity identified following felling. However, it is proposed that a minimum of ten 2m x 2m monitoring plots will be established across the enhanced areas.

Monitoring plots will be surveyed on the first, third and fifth year post implementation and every five years thereafter. Monitoring will be carried out for the lifespan of the windfarm (35 years) by a suitably qualified ecologist experienced ecologist (person with relevant academic qualifications and peatland surveying experience). Results will be analysed and a report of the findings for the year will be produced. The enhancement plan will be regularly updated and amended where necessary to improve the efficacy of the enhancement work.

Habitat data gathered during the monitoring surveys will be classified and analysed according to the methodology provided within the following documents:

- Vegetation Description and Data Analysis: A Practical Approach, 2nd Edition (Kent, 2011)
- Detailed habitat and ecotype classification based on The National Survey of Upland Habitats (Perrin et al., 2014)

3.1.2 Hydrological Monitoring

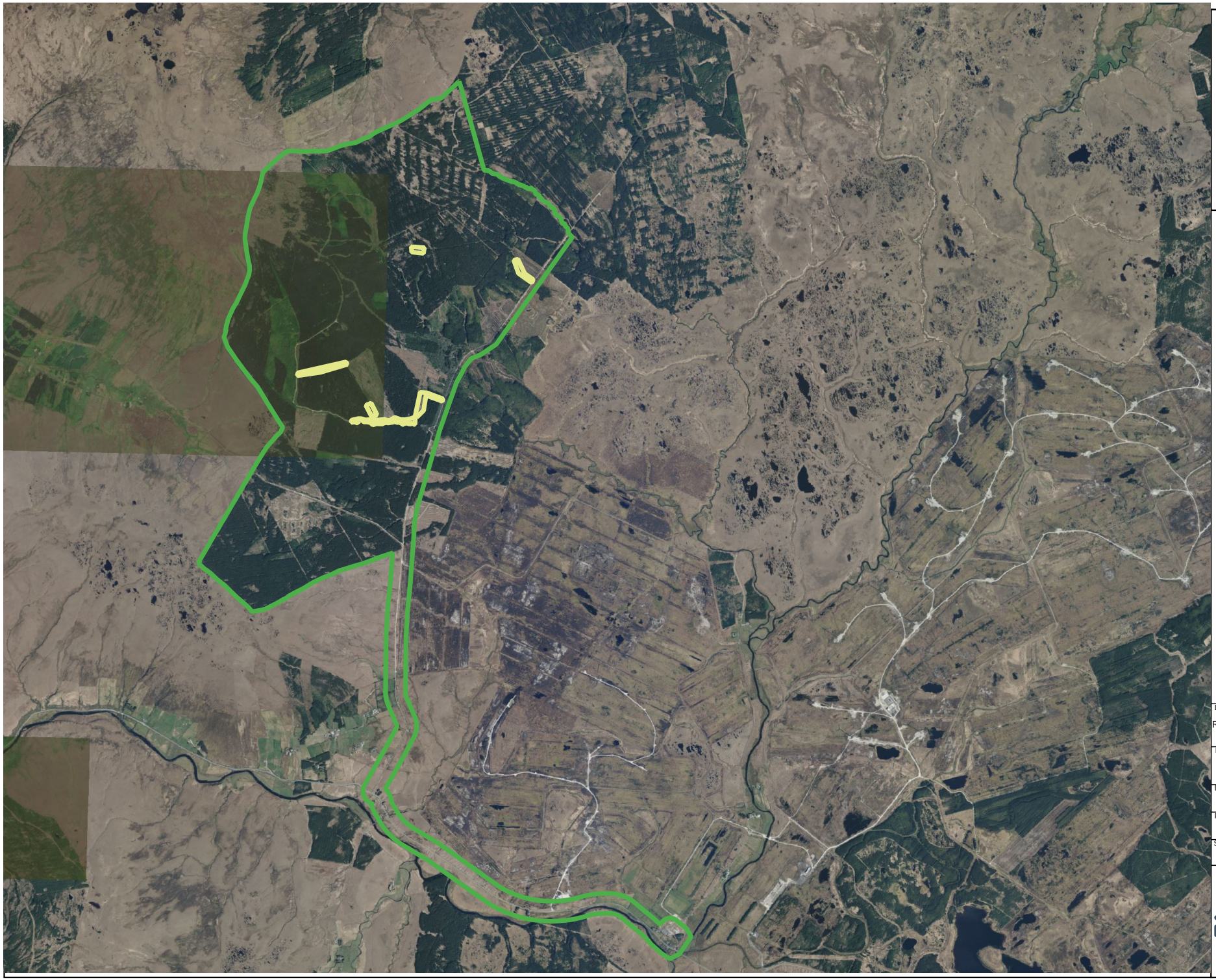
Water levels within areas where drains are blocked will be recorded bi-annually during the first five years of the windfarm and at 5 year intervals for the lifespan of the windfarm (30 years). A number of dipwells or piezometers will be inserted on the peatland to monitor the height of the water table. These will be constructed from 52mm internal diameter PVC. To stop peat filling the tube from the base, the pipe will be covered with gauze affixed with tape. This will be done prior to restoration to allow monitoring of water levels within both the restoration and enhancement areas. In this way, any positive impacts on the local hydrology can be verified and quantified.

3.2 Reporting

Reports detailing the monitoring works carried out, the results obtained and a review of their success, along with any suggestions for amendments to the plan will be prepared in years 1, 3, 5, 10, 15, 20, 25, 30 and 35 following commencement of the plan's implementation.

Table 3-1. Monitoring requirements for proposed enhancement activities

Proposed activity	Years Monitoring
Conifer felling and removed	1
Restoration vegetation monitoring	1,3,5,10,15,20,25,30,35
Rhododendron Monitoring	1,2,3
Hydrological monitoring	1,2,3,4,5,10,15,20,25,30,35



Map Legend

- EIAR Site Boundary
- Rhododendron ponticum distribution

N

Drawing Title
Rhododendron distribution throughout EIAR Site

Project Title
Sheskin South Wind Farm

Drawn By	Checked By
CM	CM
Project No.	Drawing No.
201119	Figure 2-1
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MKO
Planning and Environmental Consultants
Tuam Road, Galway
Ireland, H91 VW84
+353 (0) 91 735611
email:info@mkoireland.ie
Website: ww.mkoireland.ie

4. CONCLUSION

As described in this report and in Chapter 6, the construction of the proposed windfarm and associated infrastructure will not result in the loss of any peatland habitat. Within the EIAR boundary, this habitat is only found in the very northwest section of the site, outside of any proposed infrastructure.

This Biodiversity Management and Enhancement Plan sets out measures for the enhancement and restoration of peatlands within the northwest section of the EIAR boundary. This will be achieved through the felling and removal of self-seeded conifers and drain blocking. The plan also includes for the removal and ongoing treatment of rhododendron in several locations across the proposed development site (see Figure 2.1).

The success of these measures will be evaluated through a detailed monitoring and reporting programme, as described in section 3. Following the implementation of the measures outlined in this report, there will be an enhancement of approximately 24.1ha of peatland habitat through the felling and removal of conifers and increased connectivity to the surrounding mapped Habitats Directive Article 17 Annex I blanket bog.

5. BIBLIOGRAPHY

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