

TA9.5: Strathy South Outline Habitat Management Plan



TECHNICAL APPENDIX 9.5

Strathy South Wind Farm Outline Habitat Management Plan Version 2

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REPORT

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1 BACKGROUND

Context and Summary

- 1.1
- The purpose of the Strathly South Wind Farm Habitat Management Plan (HMP) is to set out the measures, informed and agreed with stakeholders (notably Scottish Natural Heritage (SNH) and the Royal Society for the Protection of Birds (RSPB) Scotland) that would protect and enhance habitats and birds at the Strathly South Wind Farm (Proposed Varied Development), including enhancement measures off-site. This HMP also sets out the scope of accompanying bird, vegetation and deer monitoring. The primary purpose of this HMP is to provide a framework which would enable the progress of habitat management and enhancement measures to be gauged, and through this feedback, to ensure techniques and resources are applied to ensure the desired objectives are being achieved.
- 1.2
- On its own, the area covered by the Strathly South HMP encompasses approximately 1,600 hectares (ha) within the main site (Strathly South conifer plantation), and an additional 1,300 ha off-site, with the great majority of this off-site area falling within the Caithness and Sutherland Peatlands SPA/SAC. Land agreements between the landowner and the Applicant are already in place for these areas.
- 1.3
- The Strathly North Wind Farm HMP is already underway, and substantial progress has been made removing the conifer plantation since November 2012, and instigating in its place, habitat restoration, informed by on-going monitoring. The Strathly South Wind Farm HMP will ensure direct habitat benefits will arise over the whole of the main site, other than the 9% used for wind farm infrastructure.
- 1.4
- As well as these on-site direct benefits that would result from the HMP, there are also significant indirect benefits. Notably, evidence shows the presence of the conifer plantation is suppressing breeding populations of dunlin and golden plover (both SPA qualifying species)¹. In addition, where the forest and associated drainage are adjacent to the Caithness and Sutherland Special Area of Conservation (SAC), these are causing on-going damage to peatland hydrology (and potentially on carbon storage based on data used for the carbon calculator), the expected extent over which this impact occurs is 10 m (within a range of 5 – 25 m) (Smith *et al.* 2011)².
- 1.5
- Based on relevant Guidance (SNH, 2016)³, the common approach to production of Habitat Management Plans is to produce an Outline HMP at the application stage, and then to proceed to a Finalised HMP as a pre-commencement condition. Particularly on afforested sites, this allows for the most up-to-date information and restoration techniques to be taken into account. This approach was applied successfully at the Strathly North Wind Farm, for example, where new equipment and tree removal approaches became commercially available between the production of the Outline and Final Detailed HMP.
- 1.6
- Overall therefore, the Applicant has continued to keep under review best practice in habitat restoration, and the optimal approaches would be applied for the Proposed Varied Development to forest removal and habitat restoration, by seeking out and reviewing monitoring results from other sites and continuing to look for further restoration opportunities on-site. As part of this process, there would be dialogue with RSPB Forsinard Reserve staff, and through the ongoing establishment of peatland research links with the Environmental Research Institute at Thurso.
- 1.7
- Given the resources and approaches that would therefore be applied through the lifetime of the Proposed Varied Development, on and off-site, the Strathly South Wind Farm HMP would bring considerable habitat and wider biodiversity benefits, increasing habitat connectivity and supporting the overarching aims of the Caithness and Sutherland Peatland SPA and SAC.

¹ Wilson, J. D., Anderson, R., Bailey, S., Chetcuti, J., Cowie, N.R, Hancock, M. H., Quine, C. P., Russell, N., Stephen, L. and Thompson, D. B. A. (2014). Modelling edge effects of mature forest plantations on peatland waders informs landscape-scale conservation. *Journal of Applied Ecology* 2014, 51. 204-213.

² J.U. Smith, P. Graves, D.R. Nayak, P. Smith, M. Perks, B. Gardiner, D. Miller, A. Nolan, J. Morrice G. Xenakis S. Waldron, S. Drew (2011). Carbon implications of windfarms located on peatlands – update of the Scottish Government Carbon Calculator tool.

³ Scottish Natural Heritage (2016) Planning for development: What to consider and include in Habitat Management Plans.

- 1.8
- Through this level of investment, monitoring and research, it would be possible to make a major contribution to the goals of the Peatland Partnership, removing forest, halting the hydrological impacts trees and associated drainage have been having on the adjacent SAC. The aim would be to re-establish habitat connectivity, and link with adjacent landowners including RSPB, to integrate management, secure cost reductions through economies of scale during implementation of restoration works, and maximising conservation and socio-economic benefits, thereby helping to secure the Flow Country's nomination as a World Heritage Site. Notably, by sustaining investment and expenditure on habitat restoration of formerly afforested sites, over 50 years, this HMP would also help build local capacity and expertise that could be applied to other 'forest to peatland' restoration projects in the Flow Country, broadening its conservation benefits.
- 1.9
- This Technical Appendix is an update of the previous Strathly South Wind Farm HMP. It provides details of the additional land management agreements and would allow, in the event of Proposed Varied Development receiving consent, for a rapid start to habitat mitigation and enhancement works.
- 1.10
- If the Proposed Varied Development is consented, the Applicant would be committed to commissioning the suite of bird, habitat, protected species and deer surveys detailed within the relevant parts of the Proposed Varied Development's 2020 EIAR.

Evolution of the Strathly South Wind Farm Habitat Management Plan

- 1.11
- The origin of the Strathly South Wind Farm HMP was the Landscape/Ecology Mitigation Strategy contained within the 2007 Environmental Statement (ES). The 2013 ES Addendum provided a substantially revised set of proposals for forest removal and subsequent habitat management, following the modification of the scheme to 47 turbines and taking account of stakeholder feedback and the evolution of the HMP at the Strathly North Wind Farm. The Outline HMP proposals for the Consented Scheme were presented in Section 10.6.3 – 10.6.5 of the Chapter A10 Ecology (Volume 2) and in Technical Appendix A11.2: Management At Strathly South: Forest Removal, Habitat Management and an Assessment of the Effect on Birds Connected with the Caithness and Sutherland Peatlands Special Protection Area (Volume 4), of the 2013 ES Addendum (reproduced as Appendix 1 to Technical Appendix 9.6; (EIAR Volume 4), and comprised:
- **A Forest Management Plan (FMP)** setting out the proposed work plan for removing the conifer plantation and detailing steps taken to mitigate the potential environmental impacts associated with these activities, and incorporating a detailed method statement as requested by the Scottish Environment Protection Agency (SEPA) (7th August 2007). The FMP included phasing of forest removal that would give priority, as requested by SNH, to the early removal of forest sub-compartments where growth was sufficiently poor that significant peatland vegetation remained (due to poor tree growth not having shaded out these species). Three phases of tree removal were proposed, with Phase One covering clearance of the sub-compartments that had remnant peatland vegetation, plus the areas where access was required for wind farm infrastructure (tracks, borrow pits, switching station, laydown areas and turbine bases). Phase Two would be the clearance of the remainder of trees for the turbine envelope and Phase Three would involve the removal of all remaining conifer plantation. The subsequent control of any conifer regeneration would be carried out as part of the HMP.
 - **Habitat Management Plan (HMP)** detailing the habitat management measures to be implemented following tree removal. In light of further consultation with SNH, notably in relation to diver rafts, and taking account of responses from SNH of 8th January 2015, and 27th February 2015, in light of the Consented T39 Layout, the HMP progressed to a 2015 iteration, referred to as the Outline HMP Version 1. This version also encompasses additional off-site enhancement on 1,300 ha of Armadale Farm to support conservation management previously funded by SNH under a Peatland Management Agreement but to increase the practical support available for implementation.
 - **Deer Management Plan (DMP)** which was required due to the proposed removal of the conifer plantation, and thus the potential displacement of the deer populations from within the main site to the neighbouring SAC. The DMP was proposed to manage the potential impacts this could have on sensitive qualifying habitats. Surveys were undertaken in 2010 and subsequently in 2019 in order to estimate the size of the deer population within Strathly South

- conifer plantation for the purposes of assessing the potential impacts and the results are provided in Technical Appendix 9.3: Deer Population and Habitat Impact Assessment Report 2019 (EIAR Volume 4).
- 1.12 The DMP outlined the measures to be implemented in estimating, controlling, and monitoring deer populations during and post-construction, ensuring there are no likely significant negative effects to the surrounding SAC, and that deer numbers are appropriately managed on-site to allow the development of peatland habitats.
- 1.13 Original technical details to inform forest removal and subsequent habitat management were considered in the 2013 ES, notably Technical Appendix A11.2 (in part now updated by Technical Appendix 9.6: Strathly South Phased Felling Plan (EIAR Volume 4), in which Section 2 examined the physical characteristics of the main site, Section 3 examined its habitats and the conifer plantation, and Section 4 explained the techniques under consideration for forest removal. Section 5.1, 5.2 to 5.4 provided information relating to post-clearance vegetation succession, and, Section 5.5 presented the Outline HMP.
- 1.14 The Outline HMP Aims in the 2013 ES Addendum were:
1. To encourage, at appropriate locations, active peat-forming vegetation, to contribute to the restoration of blanket bog and wet heath habitats;
 2. To maintain and improve peatland habitats within non-forested land units adjacent to the site;
 3. To reduce collision risk to breeding and foraging raptors (in particular hen harrier and short-eared owl), and waders (greenshank) associated with the Caithness and Sutherland Peatlands SPA; and
 4. To mitigate collision risk for breeding divers by provision of diver rafts at suitable locations off-site, in consultation with SNH.
- 1.15 Subsequent to the 2013 ES Addendum submission and taking account of feedback from SNH and RSPB and other consultees, the 2014 Further Information Report (FIR) was produced, although at the time the Outline HMP was not updated as further consultations with SNH were ongoing.

Version 1 Outline Habitat Management Plan (2015)

- 1.16 Following consultation with SNH post-2014 FIR submission, and as a result of ongoing reviews of post-construction bird monitoring, peatland restoration work around the UK, and having compiled a number of further reports (RPS, 2015a-h)^{4,5,6,7,8,9,10,11}, the 2013 Outline HMP was up-dated to Version 1¹². The most notable changes related to:
- The extent of the HMP area;
 - The conclusion that featuring the option for sward management to manage nesting suitability for hen harrier or greenshank is no longer necessary as an outright Aim, in light of SNH's position on hen harrier, and the evidence from operational sites for both species; and

⁴ RPS (2015a) A Review of the Combined Findings of Achany and Rosehall Wind Farms Bird Monitoring 2003 - 2014. Unpublished Report.

⁵ RPS (2015b) An Assessment of Flight Activity of Greenshank in Relation to Collision Risk Modelling at Strathly South Wind Farm. Unpublished Report.

⁶ RPS (2015c) Cumulative Impacts of Wind Farms in Relation to Red-throated Diver, Greenshank, Wood Sandpiper and Hen Harrier at Strathly South. Unpublished Report.

⁷ RPS (2015d) Habitat Suitability and Greenshank Distribution Relating to Strathly South Wind Farm. Unpublished Report.

⁸ RPS (2015e) Hen Harriers Interactions With Operational Wind Farms and Response to RSPB Objection Unpublished Report.

⁹ RPS (2015f) Red-throated Diver Interactions With Operational Wind Farms. Unpublished Report.

¹⁰ RPS (2015g) Wood Sandpipers and Strathly South Wind Farm. Unpublished Report.

¹¹ RPS (2015h) An Assessment of Survey Effort at Strathly South Wind Farm: Concluding 'Beyond Reasonable Doubt' Compared to Other Developments. Unpublished Report.

¹² RPS (2015i) Strathly South Outline Habitat Management Plan Version 1.

- That predicted red-throated diver residual effects are not significant, in light of the evidence presented in RPS (2015f)⁹ and feedback from SNH, the proposal for diver rafts is no longer highlighted (although the option remains through landowner agreement).
- 1.17 Specifically, the resulting Outline HMP Version 1¹² incorporated:
- i. *In terms of habitat extent:* Although not previously highlighted in the 2014 FIR or used to offset habitat loss from the Consented T39 layout, a further area (currently comprising the existing forest track at the north-west part of the site), would be removed and restored to suitable habitats. This is reflective of the fact that there were no longer any turbines proposed in this area. Also by rationalising the wind farm track layout, in light of construction experience at Strathly North, two proposed track sections for the Consented T39 layout would be dropped between 18 and 24, and between either 10 and 13 or 19 and 13. These refinements resulted in a further reduction in wind farm infrastructure of approximately 0.6ha. Both of these modifications were discussed with the Strathly North construction manager, who was able to confirm their technical deliverability, using his practical experience from constructing the wind farm development on this adjacent site. Finally, in terms of HMP extent, there has been completion of a land management agreement with the owner of Armadale Farm, for 1,300 ha of additional off-site habitat enhancement, as SNH is no longer able to fund the Peatland Management Agreement over this part of the SAC/SPA.
 - ii. *In terms of sward management:* As a result of SNH withdrawing concerns over collision risk to hen harriers, combined with evidence of successful greenshank breeding from operational wind farms, Aim 3 of the 2013 Outline HMP (targeted sward management to reduce attractiveness for particular breeding birds) was no longer considered necessary as an explicit Aim of the HMP. However, it remained an option, if ever required, as in accordance with best practice.
 - iii. *In terms of diver rafts:* SNH staff advised that provision of diver rafts was not considered to be of sufficiently proven benefit for red-throated divers, given the absence of peer-reviewed research. Consequently, it has been removed as an explicit HMP Aim. This also takes into account evidence provided in RPS (2015)⁹ which shows the risk of collision is so low. As a result, the diver rafts are no longer considered a priority measure, although the offer still remains, and the management agreement is in place, if SNH wish to proceed in the future. The other conservation benefits that would arise for this species, as highlighted in the 2013 ES Addendum, from removal of the Strathly South conifer plantation, are potentially reducing the likelihood of predation from pine marten, foxes, and corvids (whose populations would all be reduced as a result of forest clearance and subsequent management of open habitats).

Version 2 Outline Habitat Management Plan (2020)

- 1.18 This Version 2 document seeks to update the Version 1 Outline Habitat Management Plan¹² submitted for the Consented Scheme. The document includes all commitments made during the Public Local Inquiry for the Consented Scheme and subsequently included in the planning conditions attached to the deemed planning permission for the Consented Scheme. These include Condition 23 which includes the following requirements:
- 1.19 To form a Habitat Management Plan Steering Group:
- “23.3 In furtherance of the aim and for the better implementation and review of the Habitat Management Plan a Steering Group (HMP SG) shall be formed prior to the commencement of development. The membership of this HMP SG will include representatives of the Developer, the planning authority and SNH.”*
- 1.20 To provide monitoring timeframes and the prescribed years:
- “23.5 HMP monitoring (excluding sward height monitoring) shall be carried out by the Developer in operational years 1, 5, 10, 15 and 25 and shall be reported to the planning authority and the HMP Steering Group in writing by the Developer.”*

- 1.21 And the timeframes for providing monitoring results to the HMP Steering Group:

“23.6 The Developer shall submit a monitoring report to the planning authority, SNH and SEPA on the ongoing implementation of the Habitat Management Plan which will be provided no later than 6 months after the end of each HMP monitoring year. The monitoring report shall present an assessment of the implementation of the Habitat Management Plan, including:

• An assessment of the implementation of the Habitat Management Plan, and any reviewed such plan, in relation to the aims and objectives of the plan.

• The levels, if any, of habitat restoration delivered on site.

• The results of any monitoring and surveys required in compliance with the conditions of this deemed planning permission.”
- 1.22 A full list of the Conditions relating to the HMP and for the Consented Scheme are provided in Appendix 2 of this report.
- 1.23 In addition to those commitments made directly in association with the HMP, monitoring of sward height across the main site was also agreed to be implemented during the Public Local Inquiry, and was included in the subsequent Conditions for the Consented Scheme:

“20.7 Monitoring of sward height shall be carried out by the Developer in the months of July, August or September in operational years 1-5 (inclusive), 7 10, 15 and 25 and shall be reported by the Developer to the planning authority and the HMP Steering Group”, and
“20.8 A report detailing the results of the year’s sward height monitoring and any recommendations for the sward management of areas of cleared forestry shall be produced by the Developer at the end of each monitoring year, and shall be reported in writing by the Developer to the planning authority and the HMP Steering Group by the 31st December of Development construction years 1 and 2 and operational years 1, 2, 3, 4, 5, 7, 10, 15 and 25.”
- 1.24 The Applicant now proposes to extend the lifespan of the Proposed Varied Development to 50 years rather than the 25 years of the Consented Scheme. The Applicant is committed to continuing the management of this Version 2 Outline Habitat Management Plan for the full 50-year lifespan of the Proposed Varied Development, including all associated monitoring, reporting and management. As detailed in the Version 1 Outline HMP, the Applicant also continues to be committed to the removal of the existing forest track in the north west of the main site where turbines are not proposed, following felling of the conifer plantation and implementation of appropriate peatland restoration throughout this area.
- 1.25 The Aims and Objectives of the Outline HMP Version 1 remain the same for this Version 2 document. Prescriptions, where necessary, have been updated based on an increase in site and peatland restoration knowledge. For reference Figure 9.5.1 provides the extent of the HMP area and its management compartments. All Aims, Objectives and Prescriptions are provided below:-

Aim 1

Through the use of appropriate tree removal techniques, subsequent management of hydrology and micro-topography, facilitate the restoration of formerly forested areas to priority habitats (1,133 ha)

Objective 1.1

To undertake forest removal using suitable techniques to enable restoration post-deforestation.

- Prescription 1.1
- 1.26 Harvest or mulch trees and remove brash where practical. Remaining brash and stumps with be mulched across all previously forested areas where practical. These operations would be prioritised to remove the influence of trees (lowering water table levels and shading out peat forming vegetation) and restore the homogeneity of the ground surface.
- Objective 1.2
- To restore water table levels to help promote restoration of peatland vegetation.
- Prescription 1.2
- 1.27 Following tree removal, assess drainage function and characteristics and incorporate with results of previous habitat data, peat depth information and hydrological data, to identify appropriate restoration techniques taking into account, for example, any additional research findings from Environmental Research Institute (ERI), or other restoration programmes.
- Prescription 1.3
- 1.28 Following tree removal in the north-west of the site, the current forestry track would be restored to peatland habitats.
- Objective 1.3
- To control non-peat forming vegetation where this impacts on peatland restoration.
- Prescription 1.4
- 1.29 Control unwanted species including regenerating conifer trees and rushes where these would be likely to reduce the long-term effectiveness of restoration activities. Appropriate control methods would be implemented dependent upon the type of vegetation present.
- Aim 2
- To maintain and improve peatland habitats within moorland land units adjacent to the main site, but under the management control of the Applicant (235 ha)
- Objective 2.1
- To improve conditions for peatland plant species where appropriate.
- Prescription 2.1
- 1.30 Carry out vegetation and hydrological surveys to update assessments of habitat condition, in order to determine any scope for enhanced management of these areas.
- Prescription 2.2
- 1.31 Using appropriate restoration techniques, implement restoration where artificial drainage is identified through Prescription 2.1.
- Prescription 2.3
- 1.32 Control unwanted species including regenerating conifer trees where these would be likely to impact on the development and function of peatland habitats.

Aim 3

To enable a suite of habitat restoration and conservation management works, building on measures previously funded by SNH under a Peatland Management Agreement, at Armadale Farm, which are off-site but within the Caithness and Sutherland SAC/SPA (1,300 ha).

Objective 3.1

To improve the condition of designated habitats within the SAC to benefit key designated species of the SPA.

Prescription 3.1

- 1.33 To undertake moorland grip blocking to reduce water run-off from the site, thereby raising the water tables within key areas of degraded peatland habitat and reducing the associated detrimental effects associated with such drainage features.

Prescription 3.2

- 1.34 To support and advise on managed grazing throughout the proposed Armadale Farm Habitat Management Area for the lifespan of the Proposed Varied Development to aid in the conservation of designated habitats present.

Prescription 3.3

- 1.35 In tandem with grazing management, restrict muirburn to help ensure vegetation structure could evolve to benefit moorland breeding raptors.

Timeline for Construction and Associated HMP Prescriptions

- 1.36 Given the proposed three-year construction and commissioning process for the Proposed Varied Development, the detailed HMP would progress in stages with actions split into Phase 1 – pre-commissioning and Phase 2 – Post-commissioning. This ensures its relevance to the development and habitat management activities taking place at any one time. As shown in Table 9.5.1, enabling works would begin in 2022 and would continue through to 2023, with the delivery, erection and commissioning of turbines programmed for late 2023 and into 2024. Table 9.5.1 provides a schematic for the phased construction of the Proposed Varied Development and the relevant HMP prescriptions during each phase. Early off-site peatland restoration works in association with Aim 3 would commence in 2021 prior to enabling works commencing on the main site. A detailed timetable for implementation and monitoring of all prescriptions can be found in Appendix 1.

Table 9.5.1: Timetable for Construction of the Proposed Varied Development and Implementation of the Habitat Management Plan

Construction Stages of the Proposed Varied Development	2021	2022	2023	2024	2025	2026
	Pre-commissioning			Post-commissioning		
Enabling Works						
Construction						
Turbine Deliveries						
Turbine Installation						
Commissioning						
First Energy						

Construction Stages of the Proposed Varied Development	2021	2022	2023	2024	2025	2026
	Pre-commissioning			Post-commissioning		
Full Energy						
HMP Implementation	2021	2022	2023	2024	2025	2026
Aim 1: Facilitate restoration to priority habitats						
Pscr. 1.1 Harvest or mulch trees and remove brash where practical. Mulch remaining brash and stumps across all areas where practical.						
Pscr. 1.2 Following tree removal, finalise assessment of drainage characteristics incorporating results of previous data.						
Pscr. 1.3 Following tree removal in the north-west of the site, the current forestry track would be restored using appropriate techniques						
Pscr. 1.4 Control unwanted species including regenerating conifer trees and rushes						To 2075
Aim 2: To maintain and improve peatland habitats adjacent to the wind farm						
Pscr. 2.1 Carry out vegetation and hydrological surveys and associated monitoring						
Pscr. 2.2 Using appropriate restoration techniques as identified in consultation with ERI, implement restoration activities where artificial drainage						
Pscr. 2.3 Control unwanted species including regenerating conifer trees						
Aim 3: Enable a suite of habitat restoration and conservation management works						
Pscr. 3.1 To undertake moorland grip blocking and associated monitoring						
Pscr. 3.2 To support and advise on managed grazing						To 2065
Pscr. 3.3 Restrict muirburn to help ensure vegetation structure could evolve to benefit moorland breeding raptors						To 2065

2 TREE REMOVAL

Background Information

- 2.1
- The key aspect in achieving the aims of the HMP is undertaking tree removal in an appropriate manner. Tree removal, whilst not an aim in itself, forms the first prescription for many of the objectives to achieve the desired outcomes of those aims, associated with the main site.
- 2.2
- In liaison with SNH and Forestry and Land Scotland (FLS) (formerly Forestry Commission Scotland), it has been agreed that the priorities for tree removal (outside of the requirements for construction) are the compartments where tree growth has been limited, and remnant peatland vegetation is present. These generally relate to compartments where yield class is less than 8 and canopy cover has not as yet completely shaded out peat forming species. Similarly, the area in the north-west of the main site has been prioritised to increase connectivity with the surrounding SAC away from areas of construction activity. The proposed rationale for forest removal and a Phased Felling Plan are provided in Technical Appendix 9.6 (EIAR Volume 4). Figure 9.5.2 illustrates the phased approach to forest removal. All forest removal will be completed in consideration of Condition 23.9 of the deemed planning permission for the Consented Scheme:

“23.9 In implementing the Habitat Management Plan the Developer shall comply in full with the joint agency guidance "Use of Trees Cleared to Facilitate Development on Afforested Land - Joint Guidance from SEPA, SNH and Forestry Commission Scotland" LUPS-GU27 version 1 (April 2014) and SEPA waste management regulatory guidance "Management of forestry waste" WST-G-027 version 2 (July 2013) and in both cases any amending, substitute or replacement guidance.”
- 2.3
- Yield class categorisation was updated for the Strathy South conifer plantation in 2019 and has been used to prioritise tree removal within the Phased Felling Plan. Full details of the updated yield classes are provided in Technical Appendix 9.6 (EIAR Volume 4). This ensures that prioritisation of forestry activities for restoration purposes has been appropriately considered at all planning stages of the Proposed Varied Development and would ensure that the earliest possible start is made to halting damage to sensitive habitats which are currently afforested.
- 2.4
- Forest removal techniques are a continually evolving field, in particular when habitat restoration is to be completed following the deforestation of an area. Removal methods used are dependent of tree size / yield class of a compartment, with those of small yield class to be mulched, whereas larger stands will be removed either through standard harvesting methods or through basal shearing. Brash from tree felling (wherever practical) would be removed from site. Technical Appendix 9.6 (EIAR Volume 4) the Phased Felling Plan contains a three-phase approach to removal of the Strathy South conifer plantation which is summarised below:

Phase 1

- 2.5
- Key-holing of priority construction areas including access tracks, turbine hard-standings and borrow pit locations, and the top priority area of forest removal for habitat restoration.

Phase 2

- 2.6
- Key-holing of the wind turbine envelopes, coupled with felling and mulching of the conifer plantation in the northwest section of the site, where no construction activities are planned for the Proposed Varied Development.

Phase 3

- 2.7
- Felling or mulching of all further conifer plantation with lower yield compartments in the order of priority to aid in habitat restoration. Mulching would be applied in forest sub-compartments where ground conditions and / or Yield Classes do not allow for standard harvesting methods to be used.

3 ON-SITE MANAGEMENT

- 3.1
- As documented within the EIAR Volume 4: Technical Appendix 9.8 (which presents a copy of the 2013 ES Addendum Technical Appendix A10.2 Habitats, Vegetation and Protected Species), remnant habitats throughout the site (outwith afforested areas) are predominately peatlands consisting of a mosaic of wet and dry heath, and blanket and modified bog. Ground-truthing of this information in 2019 confirmed this information remains consistent for the Proposed Varied Development in 2020 and the assessment is detailed in Technical Appendix 9.1 – Habitats and Protected Species Survey Update (EIAR Volume 4). The network of habitats within the ride system of the plantation can be seen in Figure 9.5.3 using the results from the NVC surveys. Figure 9.5.4 presents the interpolated peat depths across the site created from data collated through the 2007 and 2013 submissions, and updated with further information collected by RPS and SLR through 2019 and 2020. These data would be used in conjunction with habitats, conifer plantation and other hydrological and topographic data to inform management decisions regarding the site.
- 3.2
- Currently the conifer plantation within the main site is having a detrimental effect on the surrounding peatland habitats within the Caithness and Sutherlands SAC. Areas within the SAC and in proximity to the main site have also been identified as containing moorland grips which are exacerbating the drainage impacts of the conifer plantation. Aims 1 and 2 and their associated objectives and prescriptions detail how this would be remedied to improve the peatlands present. Habitat Restoration Areas and Habitat Management Areas both within the main site and abutting this can be seen in Figure 9.5.1. In addition to these areas, within the main site the track which previously gave access to the northwest arm of the conifer plantation would be removed following tree removal. This would increase the hydrological integrity of the area and aid in full scale restoration.

Aim 1: To Facilitate the Restoration of Formerly Forested Areas to Priority Habitats

Prescription 1.1

- 3.3
- In ensuring Aim 1 of the HMP is successfully implemented, improving and restoring priority habitats across the main site, the conifer plantation would be removed as per the Phased Felling Plan (Figure 9.5.2), utilising the most suitable and up to date techniques.
- 3.4
- Tree removal would be undertaken through three phases as outlined in Section 2, initially targeting those compartments of low timber yield where significant remnant vegetation is present following removal of trees for construction purposes. Consideration would also be given to hydrological boundaries for peatland areas, with the conifer plantation within these removed at a similar time allowing restoration activities to commence across the whole hydrological unit. This would be an important facet in restoration of the hydrological integrity of the degraded peatland habitats. These actions would enable restoration of habitats to commence directly following removal of the conifer plantation.
- 3.5
- Across those areas where mulching would be programmed for tree removal, all timber would be mulched to ground level.
- 3.6
- In areas to be felled for commercial extraction this would be completed either using conventional harvesting or basal shearing techniques. All brash created through these methods would be removed from felled areas. Those areas in which conventional harvesting techniques are programmed would subsequently have remaining stumps mulched to ground level where practical.

Monitoring

- 3.7
- Weekly mapping of forest removal would be completed on a compartment basis to ensure the rate of forest clearance is documented. This record would be the basis for all other restoration activities on-site. All other forestry activities relating to the compartments would subsequently be added to this database to ensure a complete and up to date record is documented.

Prescription 1.2

- 3.8
- For successful restoration of a number of peatland habitats, the initial step is stabilisation or reinstatement of a hydrological regime suitable for supporting mire forming species such as *Sphagna*.
- 3.9
- Objective 1.1 of this HMP would be to raise watertables to help promote restoration of peatland vegetation, where drainage for forestry purposes has drawn the natural watertable level well below that of an active and healthy mire habitat. Raising of the watertable through appropriate restoration techniques following removal of the conifer plantation would decrease surface water flow, increase the time taken for water to exit the site, raising watertables back towards ground surface level. Data reviewed in association with Prescription 1.1 would inform the detailed felling programme ensuring habitats and entire hydrological units are prioritised and restored at the same time.
- 3.10
- Following tree removal at each compartment, an appropriate habitat restoration approach would be designed.

Monitoring

- 3.11
- Monitoring of restoration would be undertaken one to three months post-implementation to ensure successful establishment and that areas are retaining water. Any modification to restoration would be undertaken at this juncture and a record made of the actions.
- 3.12
- Hydrological monitoring of watertables would be developed in consultation with Environmental Research Institute (ERI), Thurso.
- 3.13
- Baseline monitoring at fixed locations would be completed post-felling for years 2022 to 2026 (the duration of the Phased Felling Plan, Figure 9.5.2) of each area felled in a particular year to collect an initial baseline of vegetation presence through this period; this would be year 1 of monitoring for each area. Subsequent monitoring of vegetation recolonisation would be conducted at all locations in years 5, 10, 15, 25, 35 and 50 post-construction to ensure that all locations are monitored at a single reference year given their different felling and restoration commencement dates. Given the slow rate of recolonisation for these species such a timescale is required to be able to discern changes in vegetation structure and species assemblages. Vegetation monitoring would follow the Common Standards Monitoring (JNCC, 2006)¹³.
- 3.14
- Fixed point photography would be conducted across the Proposed Varied Development. Points would be selected to ensure complete coverage of the site from a variety of angles is achieved incorporating 180° panoramic photography. This would allow an assessment of the success of restoration actions on a landscape scale. These actions would similarly provide a photographic record of the rate of tree removal during the initial construction period. The record would commence prior to tree removal in 2022 with points revisited every 6 months during the construction period, and for years 1, 5, 10, 15 and 25,.35 and 50 post-construction.
- 3.15
- Monitoring would be designed in consultation with ERI to compliment data analysis and facilitate dissemination of results to the wider peatland restoration community.
- 3.16
- All monitoring will be reported to the planning authority, SNH and SEPA (the HMP Steering Group) no later than six month following completion of monitoring.

Prescription 1.3

- 3.17
- Following felling and extraction of the conifer plantation in the north west of the site, and the implementation of subsequent peat restoration activities, the forest track running through this north west “arm” of the main site will be removed. This will allow the total area to be restored to peatland without this additional hydrological barrier remaining. Removal of this track will take place during the construction phase of the Proposed Varied Development.

¹³ Joint Nature Conservation Committee (2006) Common Standards Monitoring Guidance for Upland Habitats.

Monitoring

- 3.18
- Monitoring of the restoration of the area of the track would follow that as outlined in for Prescription 1.2 with fixed vegetation monitoring locations and fixed-point photography used to gauge the rate and success of restoration of the footprint of the track. Timelines of monitoring would similarly follow those described for Prescription 1.2.

Prescription 1.4

- 3.19
- For successful peatland restoration to be implemented, non-peat forming vegetation, or vegetation which could cause continued drying of mire areas of the main site would need to be managed. This would ensure the natural successional process of returning degraded habitats to their former pre-afforestation states could be successfully achieved.
- 3.20
- Although much of the main site covers areas of deep peat (that which is greater than 50 cm in depth, see Figure 9.5.4) and so is the focus of much of the restoration works, it should be noted that areas of dry heath on drier mineral soils and rock outcrops, and wet heath in areas of peat less than 50 cm deep are also present (Figure 9.5.3). Raising watertables would benefit areas of wet heath, potentially allowing more drought tolerant and ‘invasive’ species to recede in abundance and could eventually contribute to these forming mire habitats.
- 3.21
- Where dry heath habitats are present, an assessment of their condition would be undertaken following CSM methodology (JNCC, 2006)¹³ to ascertain the requirement for further restoration actions to move their condition towards a favourable conservation status if needed.
- 3.22
- Conifer regeneration occurs from the remaining seed bank once tree removal has taken place. Typically for Sitka spruce this occurs in the first two years following such activities. An assessment of the level of regeneration would be undertaken within each compartment three years following the removal of the conifer plantation in conjunction with the vegetation monitoring as described in Prescription 1.2. Dependent on the rate of regeneration, an appropriate method of removal would be implemented.

Monitoring

- 3.23
- The rate of conifer regeneration for each compartment would be ascertained in conjunction with the vegetation monitoring points for Prescription 1.2. This would enable the requirement for controlling actions to be assessed. Control measures could either be through manual or mechanical means, and would also be dependent on the accessibility of the compartments.
- 3.24
- ‘Invasive’ species such as rushes or aggressive recolonising species such as tufted hair-grass (*Deschampsia cespitosa*) which could, if left unchecked, out-compete other mire forming species, would similarly be monitored. Monitoring would be completed in years 1, 5, 10, 15 and 25, 35 and 50 post-construction with appropriate methods of removal determined dependent on the species present.

Aim 2: To Maintain and Improve Peatland Habitats Adjacent to the Main Site

Prescription 2.1

- 3.25
- As shown within Figure 9.5.1, a number of areas within the SAC and in close proximity to the main site are under the management control of the Applicant (Habitat Management Areas). Site investigations conducted for the 2013 ES Addendum submission identified that a number of these areas exhibited characteristics consistent with drainage impact of moorland grips or forestry. Habitat condition and hydrological monitoring would be carried out to inform the scope for enhanced management.

Monitoring

- 3.26 Habitats surrounding the main site are within the SAC and as such monitoring would follow CSM guidance (JNCC, 2006)¹³ for assessing their current condition. A grid of permanent monitoring locations would be instigated during construction throughout the Habitat Management Areas. Initial monitoring results from these would be compared with the SAC’s latest site condition monitoring results for each of the habitats recorded. The results would act as a baseline against which monitoring would be conducted in years 1, 5, 10, 15, 25, 35 and 50 post-construction and would guide the requirement for additional management within these areas.

Prescription 2.2

- 3.27 An assessment of the extent of artificial drainage present within the Habitat Management Areas would be completed during construction. Mapping of all moorland grips will be undertaken along with an assessment of their status including width, water depth, and signs of erosion and occlusion.
- 3.28 Following this mapping and assessment exercise, if deemed appropriate, targeted blocking of any active drains would be completed using suitable methods and the latest techniques available. These activities would aim to decrease water transmission away from water dependent habitats allowing diversification of the peatland sward and re-establishment of the necessary hydrological regime. Any required grip and drain blocking would be completed by a competent contractor.

Monitoring

- 3.29 Monitoring of all restoration activities would be undertaken one to three months post implementation of the restoration measures to ensure they have successfully established and are retaining water. Any modifications would be undertaken at this juncture and a record made of the actions.

Prescription 2.3

- 3.30 Given the proximity of the conifer plantation to the SAC, it is likely that natural conifer regeneration will have commenced out with the main site boundary across the surrounding peatland habitats. This regeneration, if unchecked, will have an adverse effect on the designating habitats of the SAC. Consequently, a walk over survey of a 200 m buffer of the main site boundary would be conducted during the construction period, and areas of conifer regeneration mapped within this. Where necessary, this would subsequently be removed via mechanical or manual means within those areas under the management control of the Applicant. Consultation with other surrounding landowners would be undertaken to determine if this activity could be implemented for the entire area between the main site boundary and the boundary for the associated buffer area.

Monitoring

- 3.31 Following removal of the mapped conifer regeneration, mapping surveys and conifer regeneration removal would be repeated in years 1 and 3 post-commissioning, by which time all conifer plantation would have been removed from the main site and any remnant seed bank would likely cease to be active.

4 OFF-SITE MANAGEMENT

- 4.1 In addition to the proposed management and monitoring programme for the main site and immediate surrounding area, the Applicant has secured a landowner agreement with Armadale Farm to complete a suite of enhancement measures across an area of the SAC to the west of the Strathly North Wind Farm (see Figure 9.5.1). This area was previously included within management control by SNH and equates to approximately 1,300 ha of the SAC. Funding of the Peatland Management Agreement for this area ended in 2011 and although some management activities have continued, without sufficient resources the ability to manage continually such practices in the long term is extremely challenging.
- 4.2 The landowner has successfully managed the land towards a favourable condition for many of its designating features (Site Condition Monitoring Appraisal, 2014)¹⁴. Without continued long-term support however, which the Applicant is able to provide for the lifespan of the Proposed Varied Development, it is a continual challenge to maintain this to the same extent and not possible to capitalise on further opportunities to benefit priority habitats and species.

Aim 3: Enable a Suite of Habitat Restoration and Conservation Management Works

Prescription 3.1

- 4.3 Land within the south of the Armadale Habitat Management Area surrounding Loch Meala and Loch Buidhe Mor has historically been drained through creation of moorland grips for the purposes of increasing the suitability of the area for livestock grazing. Blocking of these moorland grips would decrease the rate of release of water from these areas, storing water through raised watertables enabling mire and wet heath species to colonise and diversify.
- 4.4 Blocking of moorland grips would be implemented during the construction period following an appraisal of the suitability of the drains highlighted in Figure 9.5.1. Suitability appraisals would include drain size (width and depth), how active the drain is (whether it is already occluded and therefore not transmitting water away from the area), and if erosion such as undermining of the banking is currently occurring. This information would enable drains to be prioritised as to where the greatest impacts to the SAC are occurring, with these areas blocked first. Drain blocking would use the latest available techniques, with preference of peat dams used to limit the amount of additional materials introduced to the peatland habitats. Peat dams are assumed to be the most suitable given the anticipated narrow width of the majority of these drains.

Monitoring

- 4.5 Fixed point photography would be implemented across the area allowing landscape scale monitoring of the proposed actions in conjunction with that across the development area.
- 4.6 Following blocking of moorland grips, dams would initially be checked one to three months after construction to ensure they have successfully established with any remedial work undertaken at this point. Throughout the area initial vegetation surveys following CSM protocols (JNCC, 2006)¹³ would be completed at fixed locations. Points would be revisited in years 1, 5, 10, 15, 25, 35 and 50 post construction of the Proposed Varied Development.

Prescription 3.2

- 4.7 Throughout the Armadale Habitat Management Area managed grazing would be implemented. This would follow the stocking levels agreed within the 2006-2011 Armadale Peatland Management Scheme Agreement¹⁵. This states that no supplementary feeding of stock or deer is

¹⁴ http://gateway.snh.gov.uk/sitelink/siteinfo.jsp?pa_code=1072.
¹⁵ SNH / Armadale Farm (2006). Armadale Farm Peatland Management Agreement Appendix 2 – Specific Management Details. SNH reference SIT/NATC/PEAT/2727/PMS3.

to take place, and that a maximum head of sheep equating to 0.3 Livestock Units per hectare (LU/ha) could be hefted across the agreement area during March to November only. This stocking level has successfully resulted in the improvement of the SSSI within the management area to a favourable condition for a number of designating features from its previous condition assessment completed in 2006¹⁶.

Monitoring

4.8 Fixed point photography monitoring would be implemented across the management area including those locations for monitoring Prescription 3.1. Site wide vegetation monitoring using CSM protocol (JNCC, 2006)¹³ will be used to assess the effectiveness of the current stocking regime in moving habitats towards a favourable condition. In consultation with the landowner stocking for the area would be agreed following a review of the monitoring results.

Prescription 3.3

- 4.9 Muirburn has historically occurred across the SAC, partly as an intentional sporting or agricultural management tool, but also notably from accidental fires. Sometimes that have started outside the SAC, but then spread into it.
- 4.10 SNH's Armadale Farm Peatland Management Agreement set out the following conditions in relation to muirburn:
- 1. Burning may only take place between 1st October and 15th April;
 - 2. Burning may only take place in the areas identified (see Figure 9.5.1);
 - 3. Any burning that takes place must be strictly in accordance with the Muirburn Code (2017)¹⁷.
- 4.11 The purpose of this stipulation was to highlight the areas where any permitted agricultural or sporting muirburn could be sanctioned by SNH (Figure 9.5.1). The aim of the HMP however, is to support the landowner with additional resources to help limit, wherever possible, the incursion of accidental fires that originate from outside Armadale but would threaten its habitats.

Monitoring

4.12 Monitoring of site condition would follow protocols and methods used for Prescription 3.2.

¹⁶ Scotland's Environment Map <https://www.environment.gov.scot/data/data-analysis/protected-nature-sites/?pagenumber=1&resetmap=true&siteid=1072> (accessed 26.06.2020).

¹⁷ Scottish Natural Heritage (2017) The Muirburn Code: Management of Moorland by Burning and Cutting <https://www.nature.scot/sites/default/files/2017-11/Guidance%20-%20Management%20of%20Moorland%20-%20Muirburn%20Code.pdf> (accessed 15.05.20).

5 BIRD AND DEER AND ADDITIONAL VEGETATION MONITORING

- 5.1 As highlighted above, monitoring is a key aspect of any HMP, so that progress towards its objectives can be assessed, and results can inform the targeting and nature of management activities. Reports regarding prescriptions and their associated monitoring would be compiled annually. Results from these would determine modifications and requirements for ongoing works.
- 5.2 In combination with the above management prescriptions, it is proposed to implement a supplementary suite of bird monitoring at the main site and an appropriate surrounding buffer. This would include ornithological surveys following guidance advocated by SNH on monitoring operational wind farm impacts on birds (SNH 2009)¹⁸, along with monitoring prey abundance for key bird species, deer monitoring in association within the site's Deer Management Plan and additional monitoring of vegetation sward height to inform site management to reduce habitat availability for key bird species.
- 5.3 All monitoring for the Proposed Varied Development would be integrated with the comparable monitoring already underway at Strathy North Wind Farm. As RSPB carry out a range of monitoring at its adjacent Forsinard Flows Nature Reserve, the Applicant's aspiration is that the Proposed Varied Development monitoring would supplement, and be complimentary to this monitoring as well.
- 5.4 Monitoring would include:
- Site wide monitoring at fixed locations for vole and meadow pipit abundance. These surveys would follow the successful existing protocol designed and implemented at the Strathy North Wind Farm for monitoring these key prey species and would be completed in years 1 and 2 of construction and years 1-5, 7, 10, 15, 25, 35 and 50 of operation of areas of cleared forest;
 - Site wide sward monitoring as required by Conditions 20.7 and 20.8 of the deemed planning permission for the Consented Scheme would be completed in years 1 and 2 of construction and years 1-5, 7, 10, 15, 25, 35 and 50 of operation in areas of cleared forest. A report detailing the results of the monitoring would be provided to the HMP Steering Group by 31st December in each monitoring year detailing the results of the survey and any recommendations for sward management for the Proposed Varied Development;
 - An assessment of suitable hen harrier nesting habitats would be conducted across the main site and suitable surrounding buffer in operational years 1, 3, 5, 10, 15, 25, 35 and 50. This would involve a walkover visit including checks of areas known to have historically provided suitable nesting locations for hen harriers. The surveys would establish which habitats are currently being used by hen harriers in the area, and would assess the availability of suitable tall heather for nesting. Surveys would also investigate any likely changes as a result of other management measures (for the Proposed Varied Development, Strathy North wind farm and Strathy Wood wind farm), and, any refinements to the proposed Habitat Management Areas which could be required to preserve nesting habitat away from the turbines.
 - Monitoring of breeding birds and flight activity, on-site and up to 1 km (for breeding waders), 2 km (for breeding raptors) and 3 km (for breeding divers) following SNH Guidance¹⁸ would be completed in operational years 1, 3, 5, 10, 15, 25, 35 and 50. The results of such monitoring will be reported as soon as practicable to the planning authority and HMP Steering Group; and,
 - Implementation of the Deer Management Plan (EIAR Volume 4: Technical Appendix 9.3) to ensure the forest removal for the purposes of constructing the Proposed Varied Development would not impact on the habitats of the surrounding SAC through dispersal of the current resident deer population.

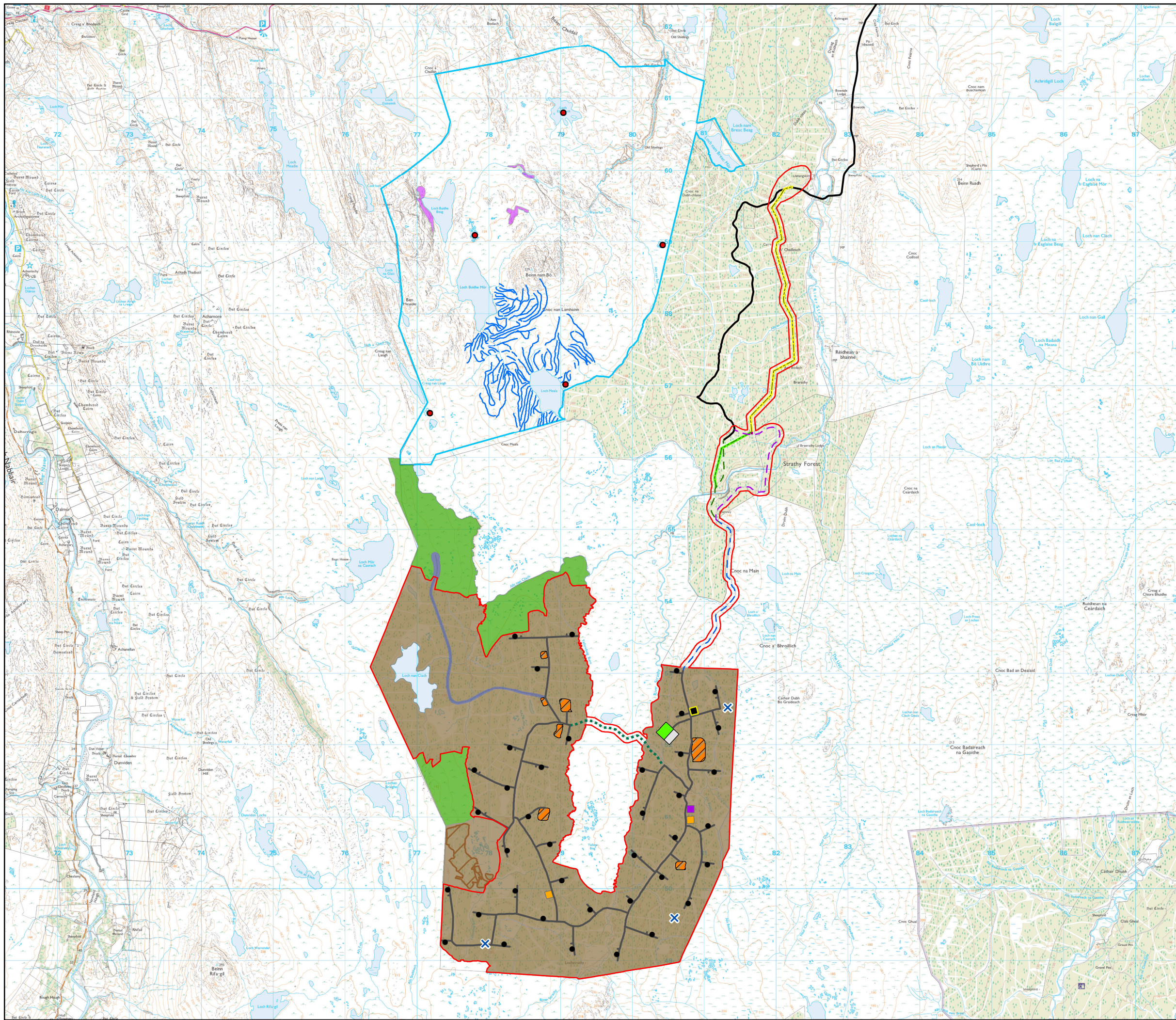
¹⁸ Scottish Natural Heritage (2009). Guidance on Methods for Monitoring Bird Populations at Onshore Wind Farms.



6 HMP IMPLEMENTATION BY CONDITION OF CONSENT

- 6.1 Condition 23 for the Consented Scheme details requirement for the implementation of the Strathy South HMP. Implementation of the Version 2 HMP, as presented in this Technical Appendix 9.5, would therefore be required as a condition of consent for the Proposed Varied Development. HMP implementation would be guided by the HMP Steering Group which would include representatives of SSE, the planning authority and SNH, providing the formal mechanism to ensure management prescriptions and monitoring results were routinely reviewed, and results targeted to evolve and deliver the HMP's Aims and Objectives.

Figures

- Figure 9.5.1: Strathy South Habitat Management Plan Overview**
Figure 9.5.2: Phased Felling Plan
Figure 9.5.3: National Vegetation Classification Surveys Results (2011)
Figure 9.5.4: Interpolated Peat Depth Map





Site Boundary

Turbine

Permanent Met Mast

Access Track

Preferred Access

Alternative Access

Common Access

Preferred Indicative Cable Route through Strathly North

Alternative Indicative Cable Route through Strathly North

Common Indicative Cable Route through Strathly North

Strathly North Access

Substation

Substation Temporary Laydown

Batching Plant

Amended Laydown

Construction Compound

Borrow Pit

Habitat management

Habitat restoration

Forestry track restoration

Unplanted, ploughed areas

Proposed Muirburn Areas

Potential Diver Raft Lochans

Current Drains

Armadale Farm HMP Land Management Boundary

Scale 1:51,000 @ A3

0

0.5

1

km

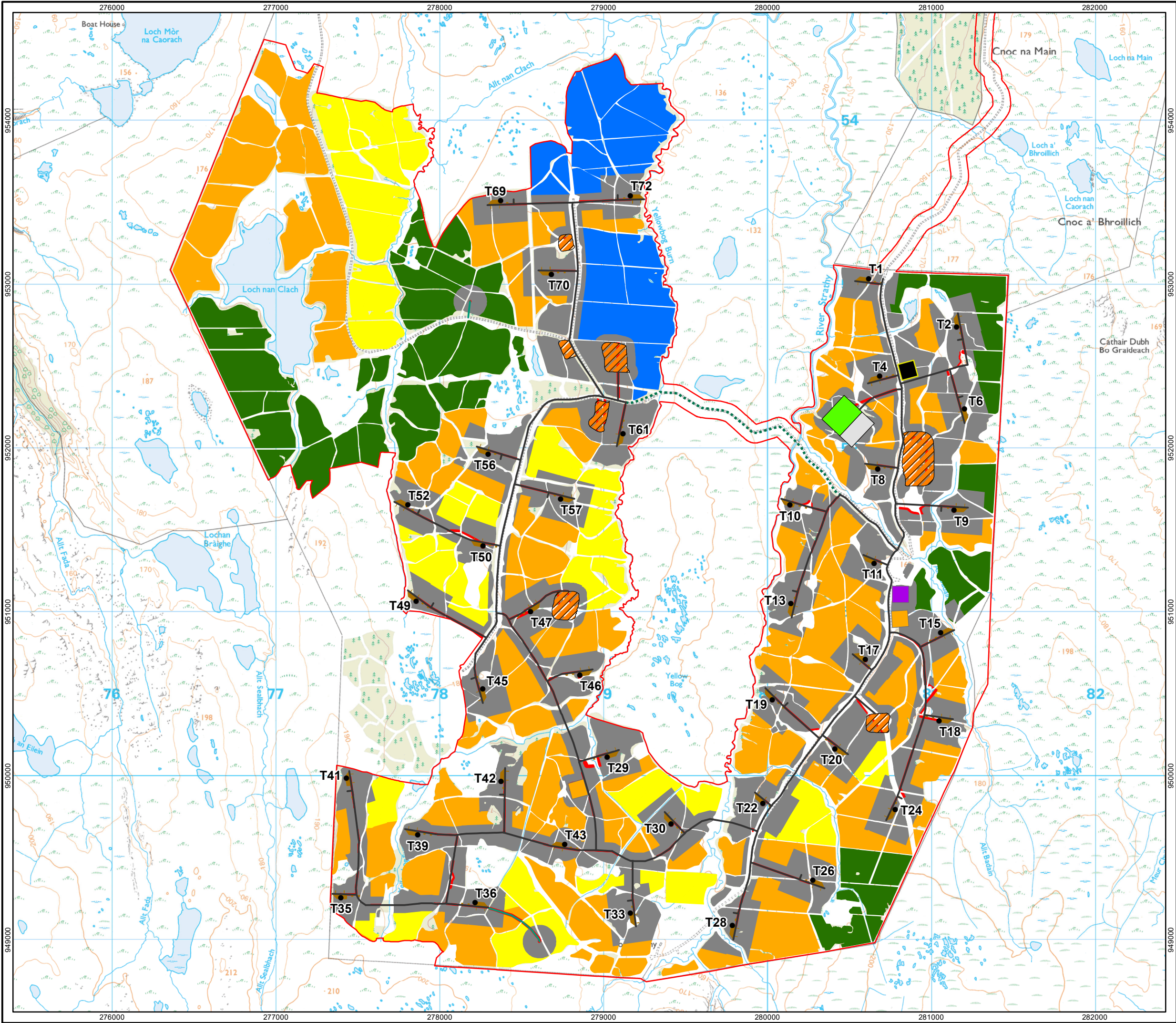
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Figure 9.5.1
Habitat Management Plan Overview

Strathly South Wind Farm
EIAR 2020

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W:\8589SEC - SSE, Strathly South Ecology 2019\Technical\Graphics\GIS\MXDs\Figures\EIAR figures\SEC8589-0021-TA9 5-002 Phased Forestry Felling Plan.mxd



- Site Boundary
- Turbine
- Access track
- Hardstand
- Substation
- Substation Temporary Laydown
- Batching Plant
- Amended Laydown
- Construction Compound
- Borrow Pit
- LiDAR Track
- Revised Felling Plan
 - Construction Felling Year 1
 - Year 2 Felling
 - Year 3 Felling
 - Year 4 Felling
 - Year 5 Felling
 - Site Investigation Works

Scale 1:22,000 @ A3

0 0.5 1 km

N

Figure 9.5.2
Phased Forest Removal Plan

Strathly South Wind Farm
EIAR 2020