Hare Hill Repowering and Extension

Technical Appendix 7.4: Outline Habitat Management Plan

November 2025

Index

Figure List

Abbreviations

Abbreviation	Description
Ha	Hectares
HMP	Habitat Management Plan
HMA(s)	Habitat Management Area(s)
Km	Kilometres
NPF4	National Planning Framework 4
SPR	ScottishPower Renewables
UK	United Kingdom

1. Introduction

1. ScottishPower Renewables (UK) Ltd ('SPR') is leading the UK in the development and operation of renewable technologies and proposes to develop Hare Hill Repowering and Extension (hereafter referred to as the 'proposed Development'), southeast of New Cumnock, straddling the administrative boundaries of East Ayrshire Council (EAC) and Dumfries and Galloway Council (DGC), Scotland.
2. The proposed Development comprises the installation of 23 turbines and associated infrastructure including hardstandings, substation and control building, and access tracks (see Figure 1).
3. This Outline Habitat Management Plan (hereafter referred to as 'HMP') has been prepared to support the Hare Hill Repowering and Extension Environmental Impact Assessment (EIA) and should be read in conjunction with **Chapter 7: Ecology and Biodiversity** and its associated Technical Appendices.
4. As part of the EIA for the proposed Development an assessment has been made of the potential ecological impacts. As such, this HMP has been developed both to mitigate for adverse impacts on biodiversity but also to significantly enhance the biodiversity of the local area through habitat management measures.
5. SPR manages all HMPs internally and is currently delivering HMPs at 30 windfarm sites across the UK, encompassing a total land management area of approximately 10,000 ha.

2. Purpose of the HMP

6. The overall purpose of the HMP is to implement positive land management for the benefit of biodiversity and nature conservation to compensate any adverse impacts that the windfarm may have. In addition to compensating for any adverse impacts, SPR (hereafter, 'the Applicant') is committed to enhancing the ecological value of the windfarm site and has taken the opportunity to provide not only compensation, but larger scale enhancement to provide wider benefits for nature and biodiversity. This HMP defines the aims and objectives of the habitat management measures that will be implemented to achieve this overall purpose. The focus of these measures is the restoration of degraded blanket bog habitat and native tree planting.

3. Policy and Guidance

3.1. National Planning Framework 4 (NPF4)

7. The delivery of positive effects for biodiversity is enacted through multiple policies within the NPF4.

8. Policy 3 is biodiversity focused and sets out new requirements for development projects to deliver positive effects for biodiversity. For major development projects (including Environmental Impact Assessments) it must be demonstrated that the project will leave biodiversity in a demonstrably better state than before the project.

9. A key criteria of Policy 3b that development proposals must meet is as follows:

"iv. significant biodiversity enhancements are provided, in addition to any proposed mitigation. This should include nature networks, linking to and strengthening habitat connectivity within and beyond the development, secured within a reasonable timescale and with reasonable certainty. Management arrangements for their long-term retention and monitoring should be included, wherever appropriate"[1].

10. The habitat management measures proposed in this HMP have been designed to meet the requirements of Policy 3 of NPF4.

3.2. Other Policy

11. Other policy that has been considered in the preparation of this HMP includes:

    - Scottish Biodiversity Strategy (2022); and
    - Scottish Government Draft Planning Guidance: Biodiversity (2023).

3.3. Mitigation Hierarchy

12. It is important at this stage to confirm that the design of the proposed Development has followed the mitigation hierarchy. Mitigation has been built into the design process and great care has been taken to minimise impacts on ecological features through avoidance of high value habitats such as blanket bog.

[1] *Scottish Government. 2023. National Planning Framework 4. Available online: National Planning Framework 4.*

3.4. Habitat Management Proposals

13. The habitat management measures proposed in this HMP will be delivered within Habitat Management Areas consisting of several areas where blanket bog restoration techniques will be implemented as well as an area of native tree planting. The location of these areas is shown on **Figure 7.4.1**.

3.4.1. Blanket Bog Restoration

14. Blanket bog restoration proposals constitute the restoration of approximately 497.7 ha of degraded blanket bog habitat. This area of restoration not only compensates for the 52.4 ha of degraded blanket bog that is estimated to be lost to the proposed Development but also provides significant enhancement by providing the required 10% enhancement threshold specified within the current NatureScot peatland guidance[2].

15. The habitat management measures proposed will create large areas of restored functioning blanket bog which will significantly enhance the biodiversity of the site.

16. The availability of degraded blanket bog suitable for restoration within the site is limited, in part due to large areas having already been previously subject to restoration. Therefore, this HMP proposes to split the 497.7 ha of proposed peatland restoration between the site (160 ha) and an offsite location (337.7 ha) which is to be determined post consent. The onsite peatland restoration areas are shown on **Figure 7.4.2**.

3.4.2. Native Tree Planting

17. Native tree planting is proposed across approximately 9.1 ha of upland grassland habitat within the Application Boundary which will provide significant biodiversity enhancement.

18. In addition to the providing an increased resource of an ecologically valuable habitat in the local landscape, the native tree planting will have numerous other benefits such as soil stabilisation (reducing sediment run-off into the water environment); and flood alleviation (slowing and reducing the transfer of water from rainfall into the channel).

19. For these reasons it is considered that native tree planting in this area constitutes significant biodiversity enhancement in terms of NPF4.

3.4.3. Summary

20. In summary, habitat management proposals will deliver habitat enhancements through blanket bog restoration across approximately 497.7 ha and native tree planting across approximately 9.2 ha. When these proposals are viewed in the context of the 52.4 ha of degraded bog habitats being lost to the proposed Development it is considered that the proposals will significantly enhance the biodiversity value of the restoration sites, and as such, meet the requirement of NPF4.

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[2] *NatureScot. 2023. Advising on peatland, carbon-rich soils and priority peatland habitats in development management. Available online: Advising on peatland, carbon-rich soils and priority peatland habitats in development management | NatureScot.*

21. Post-consent, further surveys will be undertaken to develop and refine a more detailed blanket bog restoration scheme and native tree planting plan.

3.4.4. Assessment Methodology

22. It is important to note that due to the absence of a biodiversity metric in Scotland, it is appropriate to demonstrate that a project can deliver significant biodiversity enhancement using qualitative professional judgement, as Scottish Government Biodiversity Guidance states[3]:

"4.6. It will be for the applicant to demonstrate, through the planning application, those ways in which biodiversity will be left in a 'demonstrably better state' than before intervention. NPF4 does not specify or require a particular assessment approach or methodology to be used, though the policy makes clear best practice assessment methods should be utilised.

4.7. Assessment may be qualitative or quantitative (for example through use of a metric) and where relevant should align with existing statutory and other assessment requirements, taking an integrated approach to avoid duplication and ensure efficiency. …"

23. As such a qualitative assessment approach has been followed in this HMP.

[3]*Scottish Government. 2023. Biodiversity draft planning guidance. Available online: Determining planning applications - Biodiversity: draft planning guidance - gov.scot (www.gov.scot)*

4. Site Location and Habitat Management Areas

4.1. Site Location

24. The proposed Development is located approximately 1.5 kilometres (km) to the south east of the village of New Cumnock, straddling the administrative boundaries of East Ayrshire Council (EAC) and Dumfries and Galloway Council (DGC). There are two proposed Habitat Management Areas (HMAs) associated with this HMP, one onsite (see **Figure 7.4.1**), and one offsite (location yet to be determined).

4.2. Land Ownership

25. Land within the Application Boundary is owned by a private individual and will be leased to the Applicant for the duration of the proposed Development. The lease agreements will include a provision to enable the Applicant to implement management works within the leased areas for the duration of the proposed Development.

4.3. Onsite Peatland Restoration Area

26. The Onsite peatland restoration area comprises extensive areas of degraded blanket bog, totalling approximately 160 ha. These areas have historically been subjected to drainage and historic overgrazing, resulting in significant hydrological alterations and the formation of hagged peat. These conditions have led to the degradation of the bog's natural structure and function. Peat depth varies across these areas with the deepest peat (*c.* 3 m) located in the centre of the site.

Photographs 1 and 2: Left – An example of hagging present throughout the Onsite HMA; and, Right – an example of one of the many drainage ditches present within the Onsite HMA, contributing to the degraded nature of the bog.

4.3.1. Habitat Management Proposals

27. Bog habitats in good condition provide a multitude of environmental benefits, particularly for biodiversity, ecology, hydrology and carbon storage, among others. Drainage of

blanket bog has many negative impacts on the underlying peat including altering the underlying hydrology, drying out the peat and ultimately leading to oxidation and loss of the peat mass. Blocking of drains and restoration of the underlying hydrology is key to restoring the overall habitat to a functioning bog for biodiversity, carbon storage and many other ecosystem services.

28. It is therefore proposed to restore the area (160 ha) of degraded blanket bog habitat to a functional bog habitat within the OnsIte HMA. Proposals include wave damming of drains and peat hagg reprofiling.

29. SPR will reuse as much of the existing infrastructure as possible for the repowering project, and any tracks or turbine pads that will not be reused will be decommissioned. The roads and turbines located within areas where habitat management works will be undertaken will be decommissioned and attempted to be restored to bog habitat where possible. This will include the removal of at least the top 100 cm of material (to be used in the repowering infrastructure), and in-filling the void with peat.

30. Peat soils excavated for the repowering infrastructure will be used for infrastructure reinstatement.

4.4. Offsite Peatland Restoration Area

31. A further area of degraded bog, approximately 337.7 ha in size, will be restored to a functional bog habitat within the Offsite HMA. As the location of the Offsite HMA will be determined post-consent, the requirements of the restoration methods are yet to be specified and will be updated when the final HMP is drafted post-consent.

4.5. Native Tree Planting Area

The Native Tree Planting Area is in the north of the Application Boundary, surrounding the access track to the west of Docken Burn, and is approximately 9.1 ha in size (see Figure 7.4.1). It is currently a mosaic of sloped upland acid grassland and rush pasture habitats over which sheep and cattle are grazed.

Photographs 3: Typical acid grassland and rush pasture habitats in which native tree planting is proposed.

4.5.1. Habitat Management Proposals

This area has been selected based on the opportunity it provides for native tree planting. Soils in this area are typically mineral to peaty gleys, which are considered suitable for several species of native trees, including downy birch (*Betula pubescens*), Rowan (*Sorbus aucuparia*), Scots pine (*Pinus sylvestris*) and alder (*Alnus glutinosa*).

5. Aims and Objectives

5.1. Delivery Process

32. The delivery of a HMP is based on achieving the various aims, which are assessed by measuring the extent to which clearly defined objectives and their associated condition indicators have been met. The definition of each objective is therefore a key requirement for a HMP to allow progress to be assessed in a quantified, objective way which has clear implications for whether the overall aims are likely to be met and any management measures which need to be put in place or amended.

33. A summary of the stages is shown in **Diagram 1** which has been applied to each objective within this HMP. For objectives where the required management is not obvious, or the processes not well enough understood to allow them to be defined in detail, a programme of trials is advocated to allow the methods, costs, rates and effects of management measures to be assessed before being implemented more widely.

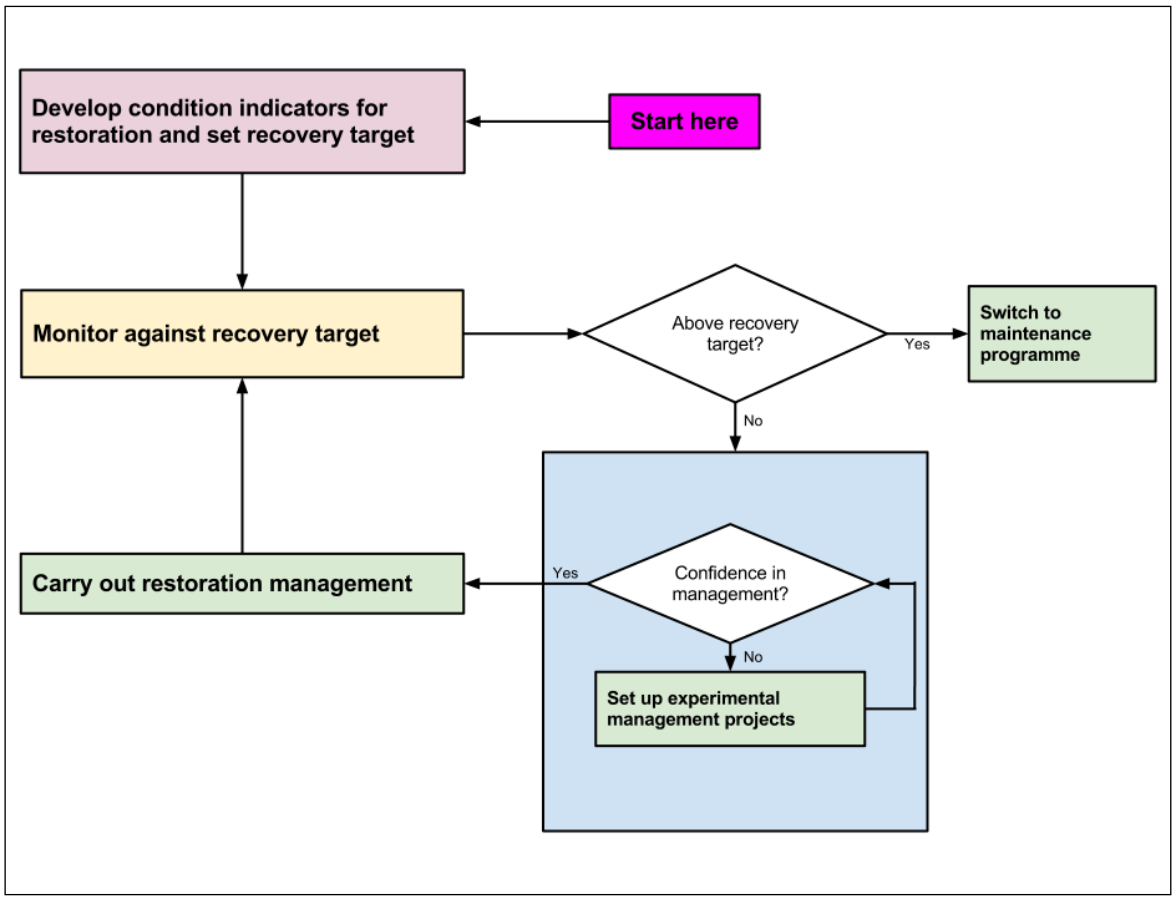

Diagram 1: Process for monitoring and management to achieve habitat restoration, redrawn from Hurford and Schneider (2007).

5.2. Quantifying Restoration Outcomes

5.2.1. Blanket Bog Habitats

34. Some objectives are considered to be more fundamental than others to achieve in order for blanket bog habitats to be restored and have therefore been weighted accordingly (see individual objectives within each Aim for the weighting). This allows an overall weighted average score for the entire site to be produced out of 100 and compared against with **Table 1** below, with 100 demonstrating each objective is met at every sample location. This method allows an overall assessment of restoration progress to be made.

Table 1: Scoring system for HMP targets.

Condition Class	Weighted Average Score
Very poor	< 60.0
Poor	60.01-70.0
Acceptable	70.01-80.0
Good	80.01-90.0
Excellent	90.01-100

35. **Table 2** shows an example of the breakdown of each individual objective together with the weighting which is based on the relative importance for bog functioning. The highest weighting is given to bog water table as good hydrology in critical to the function of a healthy bog habitat. Higher weighting is also given to the *Sphagnum* moss objectives as these are the constants of blanket bog habitat and also indicate the basic hydrology is intact.

Table 2: Weighted score given to each objective.

Overarching Aim	Group	Objective	Short Description	Weighting
Aim 1: Underlying Conditions	Bog Water Table	1.1	Water Table in drought: <20 cm	7.5%
		1.2	Water Table in drought: <10 cm	5%
		1.3	Water Table in drought: 0 cm	2.5%
	Tree regeneration	1.4	Trees absent	5%
		1.5	If present trees <1 m height	5%
Aim 2: Conservation Status	Sphagnum & Peat	2.1	Sphagnum present on plots	15%
		2.2	Thick Sphagnum present on plots	10%
		2.3	Sphagnum cover >30% on plots	10%
		2.4	Sphagnum trampling absent on plots	5%
		2.5	Bare peat cover <1% on plots	10%
		2.6	Eriophorum present on plots	10%

	Higher Plants	2.7	Calluna present on plots	7.5%
		2.8	Calluna >20 cm & <20% browsed	2.5%
		2.9	True grass cover <5% on plots	2.5%
		2.10	Key plant cover <75%	2.5%

36. The score for a treated area is therefore calculated as follows: Weighted Average Score = Sum (% Samples which meet Obj. 1.1 * 0.075, % Samples which meet Obj. 1.2 * 0.05..., % Samples which meet Obj. 2.10 * 0.025).

37. Aims and objectives are described for the for the habitat management proposals below. The management measures are described in **Section 6**, and a description of the monitoring is included in **Section 7**.

Aim 1: Restore conditions for blanket bog habitat (Onsite HMA)

Definition and Distribution

38. The definition of blanket bog habitat covered by Aims 1 and 2 is defined as all degraded areas within the Onsite HMA where peat depth is >0.5 m.

39. These areas have been identified as supporting degraded bog habitat which would benefit from positive management activities (**Figure 2**). The area of modified bog covers approximately 160 ha and is located within the turbine area and surrounding plateau.

Background

40. The condition of the bog habitat across the site is generally poor as a result of historical management. In order to create the underlying conditions required for the establishment of typical bog species, works will need to be carried out to reverse these negative activities and prevent further degradation.

Condition Requirements

41. The conditions required for blanket bog within these areas are defined as follows:

    - Water table depth must be close to the surface, including during the drought period April – July; and
    - Tree species must be absent.

42. Based on these requirements a set of objectives have been defined which will allow progress to be monitored.

Objectives

43. A number of indicators have been used to formulate objectives which reflect different aspects of blanket mire quality over time. These will be compared against suitable reference areas where possible to allow the quality of the restored blanket mire to be assessed in context. An objective is considered to be met when at least 70% of sample plots meet the criteria.

Table 3: Objectives for Aim 1.

Group	Objective	Description	Weighting
Bog water table	1.1	The water table should be no deeper than 20 cm from the surface of the main peat mass on each sampled plot when assessed in summer 'drought conditions' (defined as the time at which water table levels on site are considered to in the lowest 10% of their measured range, and rainfall has been negligible for at least 3 weeks; surveys undertaken any time between 1st April and 31st August).	7.5%
	1.2	The water table should be no deeper than 10 cm below the surface of the main peat mass on each sampled plot when assessed in summer 'drought conditions'.	5%
	1.3	The water table should be at or above the surface of the main peat mass on each sampled plot when assessed in summer 'drought conditions'.	2.5%

Tree regeneration	1.4	Conifer trees, broadleaf trees and exotic shrubs (e.g. Rhododendron) should be absent from each sampled plot.	5%
	1.5	Conifer trees, broadleaf trees and exotic shrubs (e.g. Rhododendron) should be < 1m in height if present.	5%

Aim 2: Improve quality of modified blanket bog habitat (Onsite HMA)

44. The definition of blanket bog habitat covered by Aims 1 and 2 is defined as all degraded areas within the Onsite HMA where peat depth is >0.5 m.

45. These areas have been identified as supporting degraded bog habitat which would benefit from positive management activities (Figure 2). The area of modified bog covers approximately 160 ha and is located within the turbine area and surrounding plateau.

Background

46. The long-term aspiration (>5 years) is to restore the blanket bog habitat to a high quality. However, the precise vegetation assemblage which would be expected is difficult to define and variation is expected. The response of certain indicators of blanket bog quality will be monitored as a long-term trend which will ultimately help to gauge success by making comparisons with other reference sites.

Objectives

47. A number of indicators have been used to formulate objectives which reflect different aspects of blanket bog quality over time. These will be compared against suitable reference areas where possible to allow the quality of the restored blanket bog to be assessed in context. An objective is considered to be met when at least 70% of sample plots meet the criteria.

Table 4: Objectives for Aim 2.

Group	Objective	Description	Weighting
Sphagnum and peat	2.1	At least one species of Sphagnum should be present (predicted community M17, 18 or 19) on each sampled plot.	15%
	2.2	Sphagnum papillosum or S. magellanicum should be present (where expected type is M17 & 18) on each sampled plot.	10%
	2.3	Sphagnum spp. should account for at least 30% of basal cover on each sampled plot.	10%
	2.4	Visible trampling or uprooting impacts of large grazing mammals on Sphagnum hummocks (or lawns) should be absent on each sampled plot.	5%
	2.5	Bare peat should comprise <1% of 'basal' cover on each sampled plot, in situations where it is arising due to trampling effects or disturbance by machinery	10%
Higher plants	2.6	Eriophorum spp. should be present on each sampled plot.	10%
	2.7	Calluna vulgaris should be present on each sampled plot.	7.5%

	2.8	Calluna vulgaris of at least 20 cm average canopy height and with < 20% leading shoots browsed by deer/sheep on average should be present on each sampled plot.	2.5%
	2.9	'True grasses' foliar cover should be less than 5% on each sampled plot.	2.5%
	2.10	The combined cover of Calluna vulgaris, Eriophorum spp. and Tricophorum cespitosum should account for no more than 75% of foliar cover on each sampled plot.	2.5%

Aim 3: Establishment of native woodland (Onsite HMA)

Definition and Distribution

48. Areas within the onsite HMA have been identified as suitable for native tree planting, totalling approximately 9.1 ha.

49. Final planting areas and species composition will be agreed in a finalised HMP following consent.

Background

50. Native broadleaf planting has been chosen as a measure to significantly enhance the biodiversity of the onsite HMA in line with the requirements of NPF4.

51. Tree species will be selected taking into consideration species in the local landscape, the geographic location of the Site, altitude and soil type, however it is likely a mix of common, native species, of local provenance (where possible) will be planted such as birch, rowan, Scots pine and alder. Exact species/species composition and locations will be confirmed post-consent following a more detailed site survey.

Objectives

52. This Aim is to ensure that the trees are planted appropriately and maintained in such a manner that will maximise their establishment and meet the Objectives set out below (Table 5). An Objective is considered to be met when at least 70% of sample plots meet the criteria.

Table 5: Objectives for Aim 3.

	Objective	Description	Weighting
Native tree planting	3.1	Achieve target density of 1600 stems/ha within planted areas after 5 years.	75%
	3.2	Achieve mean height >1m after 10 years.	25%

6. Habitat Management Measures

6.1. Habitat Management Areas (Onsite and Offsite)

53. Each HMA may requires a different management approach due to the habitats present. Management measures within the Onsite HMA will include drain blocking, hagg reprofiling and native tree planting. Measures within the Offsite HMA will be determined once a suitable location is identified.

6.2. Physical Interventions on degraded bog habitat (Onsite HMA)

54. Physical interventions are defined as measures which comprise mechanical treatment to an area of land.

6.2.1. Description

55. The Applicant is at the forefront of research and innovation into peatland restoration techniques and was appointed lead author by the International Union for Conservation of Nature (IUCN) of the chapter on deforested peatland restoration within the Commission of Inquiry on Peatlands Report[4].

56. For the Onsite HMA, it is considered that a combination of wave damming and hagg reprofiling techniques would likely be most effective in restoring the degraded bog habitat, however final restoration methods will be determined post-consent. (See **Appendices A and B** for further details of bog restoration methods).

6.3. Native Tree Planting (Onsite HMA)

57. A final planting plan will be determined post-consent. As mentioned in Aim 3, species will be of local provenance and selected based on geographic location of the Site and soil type.

58. Planted trees will be routinely monitored until they become suitably established. Maintenance, such as replacing dead trees to maintain the desired planting density of 1,600 trees/ha, herbicide and fertiliser application will be undertaken as required.

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[4] Robson et. al., 2019. Commission of Inquiry on Peatlands Update 2017-20: Peatlands and Forestry. Available online: CoI Forestry and Peatlands.pdf.

7. Monitoring Proposals

59. The Applicant has developed protocols to monitor vegetation in relation to the objectives set out within this HMP based on extensive experience monitoring similar habitats across Scotland.

7.1. Bog Monitoring

60. Monitoring will be undertaken on a set of permanent 1 m radial samples in both the Onsite and Offsite HMAs.

61. At each 1 m radial sample the following information is collected for species relevant to the objectives (target species):

- Presence/absence of target species;
- By eye cover targets of key metrics (see 2a below);
- Height and offtake of *Calluna;*
- Depth to water table (using fixed dipwell); and
- 3 pin hits of foliar and basal vegetation cover equally spaced along a 20m transect (long format only).

62. There are two monitoring methods used: a long monitoring protocol and short monitoring protocol. The short monitoring protocol only records items 1, 2, 3 and 4. The protocols will be applied according to the programme shown in **Table 7.**

Table 7: Monitoring programme.

Year	1	2	3	4	5	7	9	15	20
Method	Long	Short	Long	Short	Long	Short	Long	Long	Long

63. Following the initial monitoring programme which covers up to year 20, the long monitoring protocol will be carried out every 10 years for the duration of the operational life of the windfarm.

64. In addition to the vegetation and hydrological monitoring, the Applicant will undertake visual checks of the site on an annual basis to confirm compliance with the aforementioned management measures and to check the overall condition of the habitat management areas.

7.1.1. Field Protocol

Frequency Assessment

65. At each monitoring sample plot a rope demarcated at 0.25 m, 0.50 m and 1 m will be used to form a radial quadrat. Starting with the smallest distance and working up to 1 m, the presence of each target species is to be recorded, noting the smallest distance at which a species is recorded. This nested unit size allows different sizes of sampling units to be applied to species of differing abundances for trend monitoring i.e. common species are assessed in smaller units, rarer species are assessed in larger units.

General Cover Assessment

66. Record each by eye cover assessment within each frequency point (1 m radial quadrat):

    i) is *sphagnum* cover > 30% (if unsure record lower);
    ii) is bare peat cover < 1% (if unsure record higher);
    iii) is true grass cover (excluding *Molinia*) < 5% (if unsure record higher); and
    iv) is the combined cover of *Calluna*, *Eriophorum* and *Trichophorum* < 75% (if unsure record higher).

Calluna Height and Offtake

67. Record the height of a representative Calluna plant within each 1m radial quadrat. Record Calluna height from top of the basal layer the depth of the basal layer to peat surface separately. Record the percentage of Calluna long shoots browsed.

Dipwell Protocol

68. Permanent dipwells will be installed at each monitoring sample plot. During a drought period where there has been no significant rainfall in the preceding 14 days (typically between April and June, although can occur at other times), the dipwells will be measured by measuring from the top of the dipwell to the water table (termed “water depth”), and from the top of the dipwell to the main peat mass surface (termed “peat offset”). By subtracting the peat offset from the water depth it is possible to calculate the true value of the water table within the bog. On a good quality, healthy bog the water table should remain within 20 cm of the surface of the peat mass throughout the year.

Pin Hits

69. At each monitoring sample plot a rope demarcated at 1 m, 11 m and 19 m is set out to the east. At each marker point a laser pointer is stood on the north side of the rope and used to record any living plant species, litter or bare peat that it hits directly below. Both basal layer and higher vegetation species are to be recorded.

7.2. Native Broadleaf Tree Monitoring

70. Monitoring will be undertaken on 50 m x 50 m systematic grids within the Tree Planting Area.

71. Within each grid there will be a set of permanent equally spaced radial sample plots of 100 m^2 (radius = 5.64 m).

72. There will be a minimum of 30 sample plots per grid where possible.

73. In each sample plot the following data will be collected:

    - Number of trees in each plot;
    - Species;
    - Height; and
    - Condition (see **Table 9**).

74. Monitoring will be undertaken between June and September in monitoring years.

75. Monitoring will be undertaken in years 1, 2, 3, 5, 10, 15, 20 and 25.

***Table 9**: Tree Condition Codes*

Tree Condition	Abbreviation
Healthy	H
Vole/hare damage	V
Deer browsing	B
Deer rubbing	R
Thrashing	Th
Leaning	L
Disease	Ds
Weevil	W
Fertilizer	F
Choked	C
Tubed	T
Dead	Dd

Appendix A: Wave Damming Summary

The Process

1. Identify the drain. The excavator has tracked down the drain, flattening the vegetation and exposing the oxidised peat slope either side of the cut channel. The excavator will straddle the drain, facing upslope. The operator will begin working at the top of the slope, building the dams as they move downhill.

2. The operator will start work on one side of the dam, on the oxidised peat slope. The operator uses the bucket to cut into the peat mass circa. 800 mm depth. The bucket is then used to pull the peat towards the excavator, thrusting material upwards. Care should be taken to ensure that the operator does not flip the peat during this process, and the vegetated surface remains on top.

3. Using the back of the bucket, the operator pushes the back of cut peat towards the machine so that it is compressed into place with a ramped face.

4. The operator will repeat this action a second time, in the middle of the drain.

5. The operator will then repeat this action a third time on the other side of the drain, on the oxidised peat slope. The dam is now three bucket widths wide, although additional width can be achieved using additional bucket widths.

6. The operator then uses the bucket to flatten and compress the top of the dam.

7. The operator then uses the bucket to flatten the edge of the cut face behind the dam. This will enable any livestock a way to climb out of the dam.

8. The finished process.

About Wave Damming

Timing

The time taken to build a wave dam is on average about 1 minute; significantly faster than traditional dams which take over ten minutes to build.

Spacing

The wave dams are installed close together, roughly every 3-4 m. This spacing was specified so that there was not more than a 10 cm drop in ground level between each dam location so that water stored behind the dam can re-wet the intermediate drain space and adjacent ground. The spacing of dams is also dependent on local gradient.

Width

The width of the dam ensures that not only the ditch itself is blocked, but also the collapsed oxidised slopes on either side of the channel. This reduces the likelihood of a new hydrological flow around the side of the dam and encourages the water to spread out and rewet the wider bog.

Appendix B: Hagg Re-profiling Summary

Formation of Haggs

Haggs are erosion features resulting from various factors, including site drainage, peat cutting, and overgrazing. These features typically form along the edges of large gullies but can also develop into complex eroding networks that were once pool systems. The continuous erosion of peat haggs is driven by the combined effects of freeze-thaw cycles, wind erosion, and cantilever collapse (where the peat collapses after being undercut). The actively eroding and exposed haggs create a highly inhospitable environment for vegetation, necessitating re-profiling before the bare peat can be covered.

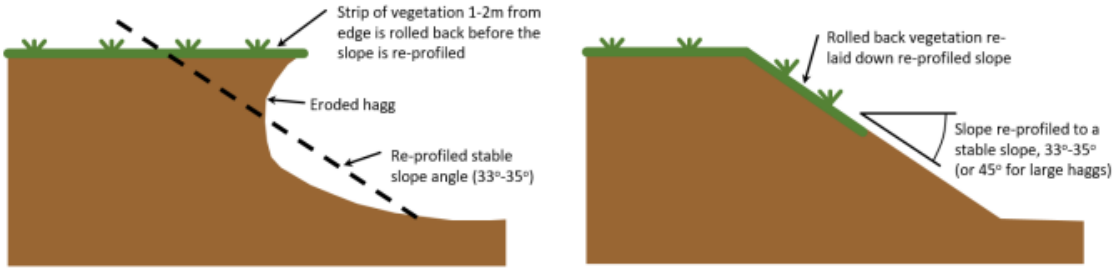
Photo: An example of extensive hagged degraded bog within the Onsite HMA.

Hagg Re-profiling Angles

The re-profiling or stabilization of haggs involves reducing the angle of a peat hagg from an overhanging or vertical position to approximately 35°. This process includes 'rolling back' the vegetation on top of the hagg, excavating the underlying peat to create a gentler and more stable slope, and then repositioning the vegetation over the bare peat. Any remaining bare peat is re-vegetated by spreading the turf that has been laid back down on the re-profiled hagg. If necessary, additional turf is sourced from nearby 'borrow pits'. A drawing of this is shown below.

The primary goal of hagg stabilization is to achieve a slope with a stable angle of 33°-35° that is well vegetated. However, for haggs adjacent to smaller gullies (less than three metres

wide or deep) or those associated with dams or baffles, steeper slopes may be required to prevent material loss into the central watercourse or damage to the adjacent peatland. Similarly, larger haggs (greater than three metres high) may necessitate a moderate slope of 45° due to insufficient material.



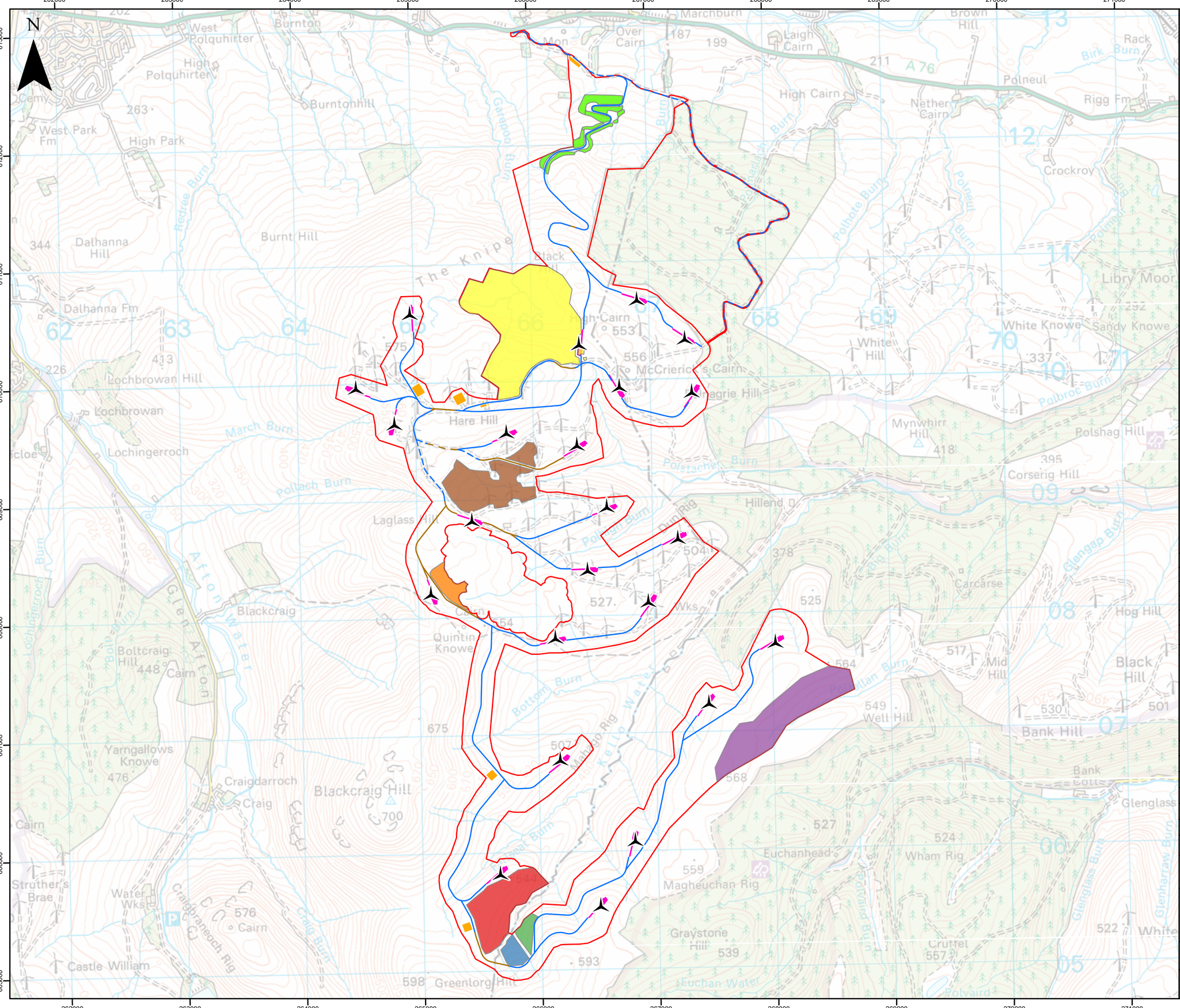
Section through eroded hagg prior to re-profiling

Section through hagg after re-profiling

The Process

Excavators are employed for hagg re-profiling. Smaller haggs can be re-profiled using a single excavator, and for very small or nearly 'self-healed' haggs, it may only be necessary to flatten the hagg with the excavator bucket.

- A 1-2 metre length of vegetation is rolled back on the top of the hagg to a depth that retains the root structure. This vegetation is rolled back sufficiently to allow for the removal and re-profiling of the underlying peat.
- The peat is excavated to create a stable 33° slope or a moderately stable 45° slope from the top of the hagg to the base. This typically results in the hagg extending further into a gully than before re-profiling, necessitating the creation of baffles at the base of the hagg to protect it from water flow if required.
- The vegetation is then rolled back over the bare peat, compacted, and carefully spread out to cover all remaining bare peat.
- Any remaining bare peat at the base of the haggs is covered with turf collected from borrow pits. A toothed digger bucket is used to collect thin strips of turf and roots. The borrow pit is then raked over at a 90° angle to the original turf cuttings to distribute the remaining turf across the borrow pit, aiding in recovery.



LEGEND

- Planning Application Boundary
- Proposed Turbine
- Floating Access Road
- Proposed Access Road
- Existing Floating Access Road
- Existing Access Road
- Proposed Compound Infrastructure
- Proposed Crane Pad
- Onsite HMA - Native Tree Planting Area

Onsite HMA - Phase 1 Peatland Restoration

- Black Craig South 1
- Black Craig South 2
- Black Craig South 3
- Southern Plateau
- Star Bog
- The Knipes

Onsite HMA - Phase 2 Peatland Restoration

- Site Centre

REV	DATE	BY	CHK	APR	REVISION HISTORY
D	24/11/25	CH		JA	Amendments.
C	21/11/25	CH	HA	JA	Amendments.
B	19/05/25	BB			Second Issue.
A	16/05/25	BB			First Issue.

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ISSUE DETAILS	
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DATUM: OSGB 1936	PROJECTION: TM

SCALE: 1:30,000 (0 0.5 1 km)

TITLE

FIGURE 7.4.1 - OVERVIEW OF PROPOSED DEVELOPMENT AND ONSITE HABITAT MANAGEMENT AREA

PROJECT

HARE HILL REPOWERING

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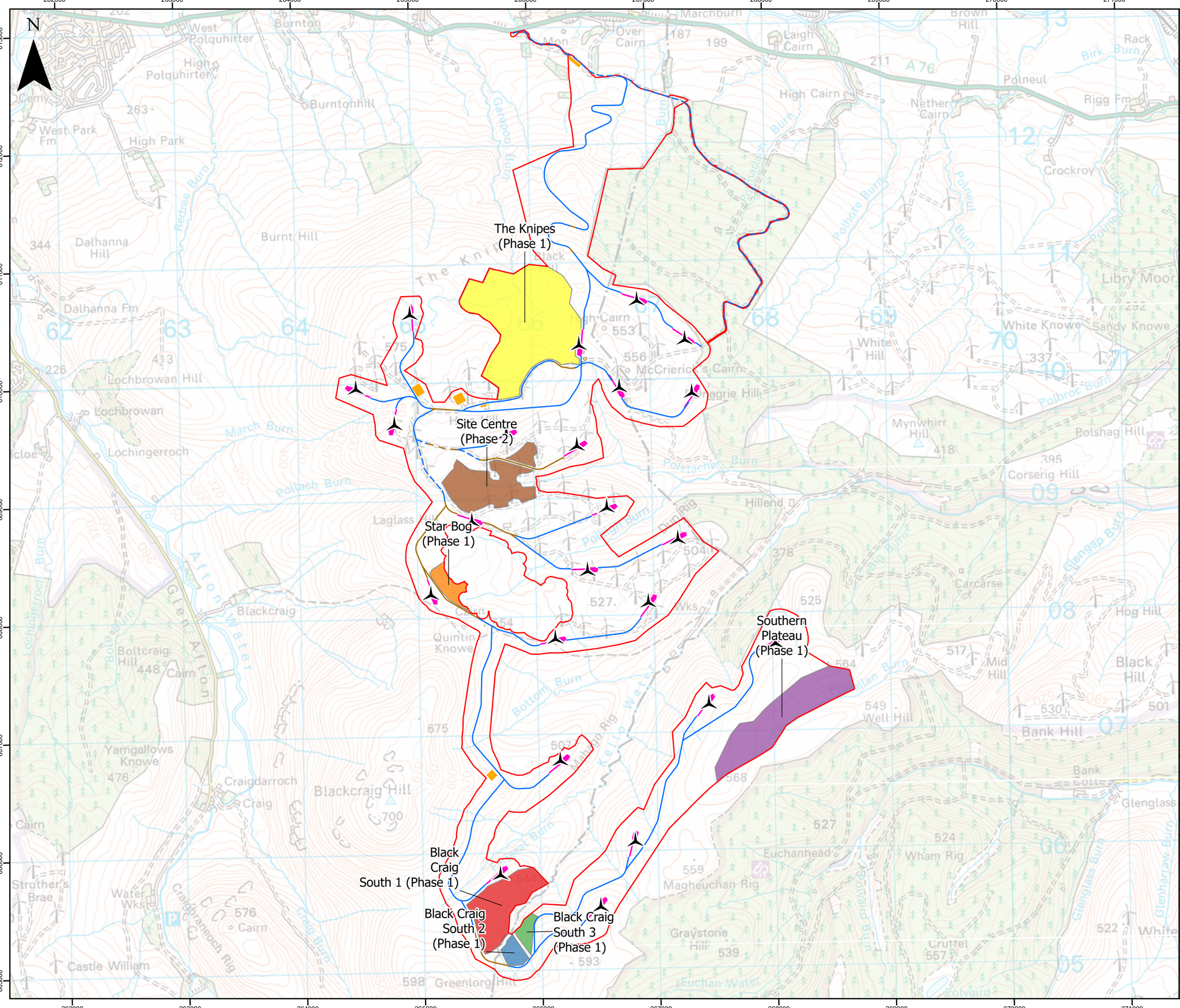
HHR-I-041



LEGEND

- Planning Application Boundary
- Proposed Turbine
- Floating Access Road
- Proposed Access Road
- Existing Floating Access Road
- Existing Access Road
- Proposed Compound Infrastructure
- Proposed Crane Pad

Onsite HMA - Phase 1 Peatland Restoration

- Black Craig South 1
- Black Craig South 2
- Black Craig South 3
- Southern Plateau
- Star Bog
- The Knipes

Onsite HMA - Phase 2 Peatland Restoration

- Site Centre

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FIGURE 7.4.2 - ONSITE PEATLAND RESTORATION AREAS

PROJECT

HARE HILL REPOWERING

DRAWING NUMBER

HHR-I-042