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NON-CONFIDENTIAL Forestry EIA Report

Woodland Creation and Management

Cambusmore Estate, Sutherland
Volume 1

K R Greenland Farming

5 July 2019

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1 Introduction

K R Greenland Farming (hereafter referred to as 'the Applicant') is seeking consent for the planting of 1,258 hectares (ha) of native broadleaf, mixed conifer and shrubs of varying densities alongside ongoing management of land at Strath Carnaig, Cambusmore Estate in Sutherland, Scottish Highlands (hereafter referred to as 'the Proposed Development').

For reference Forestry Commission Scotland (FCS) became Scottish Forestry (SF), an executive agency of the Scottish Government, on 1st April 2019.

This EIA Report accompanies an application to Scottish Forestry (SF) under regulation 6(1) of the Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017 for consent to carry out an EIA forestry project.

Environmental impacts have been studied systematically through an iterative process, the results of which are presented within this EIA Report. The EIA Report is designed to inform readers of the nature of the Proposed Development, the likely environmental impacts and the measures proposed to protect and where possible, enhance the environment.

1.1 Development Site and Setting

The Proposed Development is located approximately 11 kilometres (km) south west of Golspie and 13km northwest of Dornoch, to the west of the A9 Inverness Wick trunk road, as illustrated in Figure 1 and comprises the planting of some 1,258 ha (see Figure 2) of open hills currently dominated by heath, bog and grassland habitats. The current land use comprises of rough grazing with some isolated non-grazing areas due to areas of deep peat.

The Proposed Development is located within the wider Cambusmore Estate which comprises some 5,000 ha. Elevations across the site vary considerably with the highest elevation of 307m above ordnance datum (AOD) at the summit of Meall an Eoin in the southeast dipping to circa 115m along parts of the existing access roads in the centre of the site.

The Proposed Development is located within the Strath Carnaig and Strath Fleet Moors Site of Special Scientific Interest (SSSI) and Special Protection Area (SPA) which is designated for its breeding population of Hen harriers *Circus cyaneus*, see Figure 4.

1.2 The Applicant

The Applicant is K R Greenland Farming, who are responsible for undertaking farming and land management activities on behalf of Cambusmore Estates Ltd. The Applicant runs agricultural herds together with undertaking woodland and sporting management on the Cambusmore Estate, with a strong emphasis on conservation and enhancing biodiversity. The Applicant has been active in promoting the farming and tourism interests of Sutherland and Caithness through its active participation in the success of North Highland Products Ltd.

Atmos Consulting Limited (Atmos) is an experienced environmental consultancy providing environmental assessment and planning expertise, working on behalf of the Applicant and is acting as agent for the Proposed Development.

1.3 Purpose of the EIA Report

This EIA Report presents the findings of the Environmental Impact Assessment (EIA) process by describing the Proposed Development, the current conditions at the Proposed Development site and the likely environmental impacts which may result from the Proposed Development. Where appropriate, mitigation measures designed to avoid, reduce or offset potentially significant impacts are proposed and residual impacts (those impacts that are expected to remain following implementation of mitigation measures) are presented.

This EIA Report has been submitted to SF as part of an application for EIA consent and has been prepared to inform SF, statutory consultees and the public about the potentially significant environmental impacts of the Proposed Development.

1.4 The EIA Regulations

The current EIA Regulations in place for woodland development are The Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017, which came into force in May 2017. These Regulations have been further amended by The Environment Impact Assessment (Miscellaneous Amendments) (Scotland) Regulations 2017.

These Regulations, formerly from 1999, were amended to reflect changes to the EIA Directive 2011. The EIA Directive requires an assessment of the effects of EIA forestry projects on the environment before consent can be granted for their development.

1.5 Requirement for an EIA

Part 2 of the EIA Regulations lists projects which may or may not require an EIA, depending on the following categories:

- The application is in one or more of the following categories – afforestation, deforestation, forest road works or forest quarry works;
- The area is above the relevant threshold (includes accumulated area); or
- The project is likely to have a significant effect on the environment and acceptable avoidance, off-setting or mitigation has not been proposed.

Reference to the above indicates that the Proposed Development falls within afforestation which is defined *as 'the creation of new woodlands and forests by planting trees (to convert the land to another type of land use). This category includes using direct seeding or natural regeneration, planting Christmas trees and short rotation coppice.'*

Schedule 1, Paragraph 2(2) of the EIA Regulations, states that *'subject to the exceptions in sub-paragraph (3), there is no threshold in relation to forestry projects where any part of the land covered or proposed to be covered by the forestry project is in a sensitive area'* with Part 1, Paragraph A defining Sensitive area as *'site of special scientific interest'*.

1.6 Structure of the EIA Report

The EIA Report is structured as follows:

- Volume 1: EIA Report Main Text (Confidential and Non-Confidential Versions);
- Volume 2: EIA Report Figures (Confidential and Non-Confidential Versions);

- Volume 3: Non-Technical Summary;

The EIA Report is structured around the following chapter headings:

- Chapter 1: Introduction;
- Chapter 2: EIA Approach and Methodology (including statement of competence and consultation);
- Chapter 3: The Development; (including Project Alternatives and Project Description);
- Chapter 4: Planning Policy and Legislation; and
- Chapter 5: Biodiversity and Nature Conservation.

In addition a number of supporting documents have also been prepared to support the Application. Further details of these can be found in the following Appendices;

- Appendix A: Issues Log;
- Appendix B: Draft Habitat Management Plan;
- Appendix C: Soils;
- Appendix D: Woodland Creation Potential Report;
- Appendix E: Archaeology;
- Appendix F: CONFIDENTIAL Hen harrier Report;
- Appendix G: Scottish Forestry Screening Response;
- Appendix H: Scottish Forestry Scoping Response; and
- Appendix I: RSPB and SNH Scoping Responses.

1.7 The EIA Team

The EIA was undertaken by Atmos with assistance from specialist consultants listed in Table 1 below.

Table 1: Project Team

Section	Team	Statement of Competence
Planning Non-Technical Summary Biodiversity and Nature Conservation	Atmos Consulting	Atmos has a proven track record in Environmental Impact Assessments. All in the team are appropriately qualified and members of relevant professional bodies.
Woodland Creation Potential Report and Soils Report	Andy Kennedy	Andy has a BSc in Forestry and approximately 38 years in the industry. He has previously worked for Scottish Forestry (prior to SF) for 10 years and the Forestry Research for 18 years as a research forester and field surveyor. The last 15 years Andy has specialised on soils and derived subjects. He has also taken roles as a soil surveyor, trainer of soils surveyors for FC across the UK, quality auditor of soil survey contractors and advisor to FC operations management and policy groups. The Woodland Creation Potential Report was supported by Malcolm Morrison who has a diploma in Forestry from the Scottish School of Forestry (1986) and has 32 years of experience of forestry in the Highlands of Scotland.

Section	Team	Statement of Competence
Archaeology	AOC Archaeology	AOC is one of the most experienced heritage consultancy practice and is registered is a Registered Archaeological Organisation (RAO) through the Chartered Institute for Archaeologists (CIfA).
Issues Log Draft Habitat Management Plan	Anthony Elletson	Anthony has 25 years' experience in woodland and related project management and contracting, solicitor (non-practising), regulatory consulting and strategic business planning frequently relating to sites with specific sensitivities.
	Ken Greenland	Ken is the owner of Cambusmore Estates, he is a farmer and land manager of 40 years' experience. Quantity Surveyor and project manager for 30 years gaining experience in a wide range of projects frequently involving sensitive sites.
	Jenny Bell	Jenny has more than 20 years' experience in ornithology. She has developed extensive knowledge of survey methods on both avian and non-avian ecology and has contributed to developing Scottish Natural Heritage (SNH) guidance using bespoke methodology.

1.8 Supporting Documents

1.8.1 Non-Technical Summary

The Non-Technical Summary is a requirement of the EIA Regulations and is a stand-alone document providing an overview of the EIA findings and is intended for review by the general public. It is brief and includes a description of the Proposed Development and a summary of the predicted significant environmental impacts and proposed mitigation measures in non-technical language to facilitate access to information on the environmental impacts for everyone with an interest in the Proposed Development.

1.8.2 Issues Log

The Issues Log has been compiled to record potential environment impacts and the associated mitigation and avoidance measures with regards to:

- Population;
- Human health;
- Biodiversity (e.g. protected species and habitats);
- Land (e.g. land take);
- Soil (e.g. organic matter, erosion, compaction);
- Water (e.g. hydromorphological changes, quantity and quality);
- Air;
- Climate (e.g. greenhouse gas emissions, impacts relevant to adaptation);
- Material assets;
- Cultural heritage including architectural and archaeological aspects; and
- Landscape.

This document is available in Appendix A.

1.8.3 Draft Habitat Management Plan

The Draft Habitat Management Plan (DHMP) sets out how Proposed Development will be managed. The DHMP has been prepared as a constituent part of Cambusmore Estate's application to undertake the Proposed Development in accordance with the requirements of Scottish Natural Heritage (SNH) and to afford a range of measures to mitigate potential adverse impacts of the scheme. The DHMP is provided in Appendix B and the final HMP will be agreed in consultation with SNH and SF in due course.

1.8.4 Additional Works

The following additional feasibility works have been undertaken as part of the Proposed Development. All additional works confirmed that there are no significant effects in relation to the Proposed Development and as such they are included for wider context but not assessed further in the EIA.

Soils Report

A Soils Report has been produced providing an overview of the Proposed Development in relation to geology, soils, vegetation, climate and hydrology. The report deems there to be no significant effects in relation to soils as a result of the Proposed Development. This report was not formally requested in the Scoping Opinion from SF, however, has been appended to the EIA to provide additional information on the considerations for the Proposed Development. The report is available in Appendix C.

Woodland Creation Potential Report

A report on the woodland establishment potential for the Proposed Development has been produced. An assessment of woodland creation potential was not formally requested in the Scoping Opinion from SF, however, the report has been appended to the EIA to provide additional information on the context and forestry considerations for the Proposed Development. The report is available in Appendix D.

Archaeology Survey

An archaeological assessment was undertaken to inform the Proposed Development. The assessment outlines the results of archaeological assessment as established through desk-based assessment, walkover survey, setting assessment and site visits. The assessment was made with reference to indicative proposals and all areas of potential planting have been surveyed. As there is deemed to be no significant effects in relation to archaeology the assessment was not formally requested in the Scoping Opinion from SF, however, the report has been appended to the EIA to provide additional information on the context and forestry considerations for the Proposed Development. The report is available in Appendix E.

1.9 Copies of the EIA Report

All volumes of the EIA Report can be purchased from Atmos for £500 for a paper hard copy or £10 for a CD copy.

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1.10 References

Scottish Government (2017). The Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017 [online] available at; http://www.legislation.gov.uk/ssi/2017/113/contents/made [accessed 11 March 2019]

Scottish Government (2017). The Environmental Impact Assessment (Miscellaneous Amendments) (Scotland) Regulations 2017 [online] available at; http://www.legislation.gov.uk/ssi/2017/168/pdfs/ssi_20170168_en.pdf [accessed 11 March 2019]

2 EIA Approach and Methodology

2.1 The EIA Process

EIA is the process of compiling, evaluating and presenting the predicted significant environmental impacts of a Proposed Development. The assessment is designed to help identify potential significant environmental impacts. This assessment can then lead to the identification and incorporation of appropriate mitigation measures into the design of the Proposed Development to enhance beneficial or minimise/avoid adverse environmental impacts.

The main steps which have been followed in this assessment process are as follows:

- Determining the requirement for an EIA ('Screening');
- Determining the scope of the assessment ('Scoping');
- Completion/compilation of baseline surveys/data to provide a description of the environmental character of the area likely to be affected by the Proposed Development;
- Identification of relevant natural and man-made processes that may change the character of the site in the future (without the Proposed Development);
- Consideration of the possible interactions between the Proposed Development and both existing and future site conditions;
- Prediction of the possible environmental impacts of the Proposed Development. Impacts may be direct and indirect; short and long term; beneficial or adverse and take into account the cumulative impacts with other known development proposals in the area;
- Proposals incorporated to avoid, minimise or mitigate adverse impacts and enhance positive impacts. Alterations to the design have been re-assessed through the iterative process and the effectiveness of mitigation proposals determined;
- Assessment of residual impacts, which will remain after mitigation; and
- Consultation (undertaken throughout the EIA process).

The results of the EIA are set out in this EIA Report. The various stages of the EIA process are outlined below.

2.1.1 Screening

Screening is an important part of the EIA process and represents the first step in the process of assessing the need for, and requirements of, an EIA. 'Screening' (as defined by Part 2, Regulation 6 of the Regulations) is the process of determining whether development is an 'EIA development' and therefore, that the EIA Regulations apply.

Consultation was undertaken as part of this process with a number of parties including;

- Scottish National Heritage (SNH);
- Scottish Environment Protection Agency (SEPA);
- Scottish Southern Energy (SSE);
- The Highland Council;
- Dornoch Community Council;
- Local MSP;
- Local MP;

- Dornoch Angling Club;
- Forest Enterprise;
- South East Sutherland Deer Management Group;
- Historic Scotland;
- RSPB;
- Raptorwatch;
- Kyle of Sutherland Angling Association; and
- Neighbours/adjoining landowners.

A Screening meeting was held with SF on 21st February 2018 to discuss the Proposed Development. At this meeting various aspects of the Proposed Development were discussed including the scale, common grazing, access, fencing and conservation. SF concluded that *'the proposal will significantly affect the biodiversity of the Strath Canaig and Strath Fleet Moors SSSI and SPA by impacting on the availability of the hen harrier nesting and foraging habitats'* and therefore requested that an EIA was undertaken for the Proposed Development. A copy of SF Screening Response can be found in Appendix G.

2.1.2 Scoping

Scoping is the second formal stage in the EIA process and is used to ensure that the environmental issues that could involve significant impacts are identified and appropriate methods for information collection and impact assessment are devised.

Following Screening, a Scoping meeting was held between the Applicant, SF, RSPB and SNH whereby SF sought further information on the potential impact of the Proposed Development on the SPA and SSSI.

The Scoping Opinion from SF dated 28th March 2018 (see Appendix H) highlighted the potential for significant impacts on the SPA's conservation objectives and highlighted various points to be included within the EIA Report, these are considered in Chapter 5.

2.1.3 Consultation

Effective consultation is a fundamental part of the EIA process. At various points during the design and assessment process consultation has been undertaken with SF, RSPB and SNH in order to obtain baseline information or to agree aspects of methodology. Details of the consultation feedback are provided in Chapter 5 of this EIA Report. A copy of RSPB and SNH's Scoping Responses can be found in Appendix I.

2.2 Location of Information in the EIA Report

The approach to this EIA has followed the requirements of the EIA Regulations. Part 1 of the EIA Regulations sets out the information that must be included in the EIA Report, summarised in Table 2 below. This also identifies where the corresponding information can be found in the EIA Report.

Table 2: Information Contained within EIA Report

Required information (EIA Regulations)	Relevant Chapter of this EIA Report
A description and map(s) of the EIA forestry project comprising information on the site, design, size and other relevant features of the project.	Chapter 1, Chapter 3 and Supporting Figures
A description of the likely significant effects of the	Chapters 5

Required information (EIA Regulations)	Relevant Chapter of this EIA Report
EIA forestry project on the environment.	
A description of the features of the EIA forestry project and any measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment.	Chapters 3, Appendix A and Appendix B
A description of the reasonable alternatives studied, which are relevant to the EIA forestry project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the impacts of the EIA forestry project on the environment.	Chapter 3
A Non-Technical Summary of the information referred to in the points above.	Volume 3: Non-Technical Summary
Any other information specified in Schedule 3 of the Regulations relevant to the specific characteristics of the EIA forestry project or of the type of EIA forestry project in question and to the environmental features likely to be affected.	Appendix A

The approach has also been informed by relevant best practice guidance on EIA generally (for example the Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Impact Assessment) and on specific environmental subjects (for example ecology and ornithology). Technical guidance has been referred to in the appropriate chapters of this EIA Report.

The reporting of the assessment of environmental impacts in this EIA Report is presented in a consistent, structured format, with reference to technical standards, guidelines and legislation. The assessments have also taken into account the findings of consultation undertaken during Scoping and the EIA.

2.3 Publicity of EIA Report

Upon submission and registration of this EIA Report, notice of the proposed application will be published on SF's website, in the Edinburgh Gazette and in a local newspaper (the Northern Times). The notice will include the following information:

- Description of the application and the EIA forestry project;
- Statement that the EIA forestry project is subject to an Environmental Impact Assessment;
- Statement on where and when the report is available for viewing free of charge and how copies can be obtained, including the charge that may be made for copies;
- Statement on how and by what date comments about the EIA forestry project must be made (within 30 days of the date of the notice);
- Details on the public consultation including how further additional information will be shared, and how comments on that information can be made; and
- Statement that SF may decide either to grant consent subject to the mandatory conditions required by the Forestry EIA Regulations or subject to such further conditions as they see fit, or refuse consent.

A copy of the EIA Report will also be made available on SF's website and a hard copy will be available to view at the Scottish Forestry Office, Fodderty Way, Dingwall, IV15 9XB office.

2.4 Prediction and Evaluation of Impacts

Chapter 5 considers the prediction and evaluation of impacts along with the appropriate methodology of assessment.

2.5 References

Scottish Government (2017). The Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017 [online] available at;
http://www.legislation.gov.uk/ssi/2017/113/contents/made [accessed 11 March 2019]

3 The Development

3.1 Introduction

This chapter describes the Proposed Development, including, the aims and objectives, project alternatives, benefits of the Proposed Development, and details the finalised design proposed in this application.

Details are provided about the design at time of application. The planting areas have been defined and are detailed below. It is intended that planting will be carried out as described, but it may be necessary for operational reasons to introduce amendments to the planting regimes as described in this EIA report. Overall the aims of the Proposed Development would be unchanged, and any amendments to planting would be carried out in respect of this. As such, minor changes to planting regimes which could occur would be unlikely to affect the impact assessment carried out, given the scale of planting would remain unchanged.

3.1.1 Aims and Objectives

The Proposed Development has been designed around the overall need to increase the biodiversity and habitats for key species within the area. The Proposed Development seeks to create areas of low, shrubby, scrub interspersed with a heather acid grass mixture to afford ground nesting opportunities and promote vole prey populations interspersed with taller native broadleaves offering habitat for passerines and areas of high forest which in time will become of uneven aged stands.

It looks to meet objectives such as not disadvantaging the breeding and/or foraging habitats for Hen harriers and to secure and enhance the habitats for Hen harriers and its prey species. It also seeks to provide additional foraging and habitat opportunities for Hen harriers and to enhance the biodiversity on the estate as a whole.

The aims and visions of the Proposed Development look to arrest the 'favourable-declining' status of this part of the SPA and to provide additional protection for a wide variety of ground nesting birds. Objectives and aims of the Proposed Development are detailed further within Appendix B the Draft Habitat Management Plan.

3.1.2 Project Alternatives

Prior to the final design presented within this EIA Report numerous alternative uses were considered for the Proposed Development, these are discussed in more detail below.

Grouse Moor

A section of the Proposed Development was formerly used as a grouse moor and re-establishing this use was considered by the Applicant. There has been a considerable amount of expenditure of previous efforts to increase bags in the years prior to 2002 which had not proved particularly effective for the Applicant. Considerable expenditure is also required in rebuilding butts, upgrading estate tracks, employment of additional gamekeepers, extensive heather burning together with feeding costs and restrictions on sheep grazing. The above factors alongside the Applicant's desire to enhance the habitat and promote biodiversity of the Proposed Development

concluded that such a use would neither be financially viable nor compatible with the overall objectives for Cambusmore as a whole.

Continue Current Management

Consideration was given to maintaining the current management of the area contained within the Proposed Development. Efforts over a number of years to undertake muirburn had not been successful due in large part to climatic and ground conditions together with seasonal constraints around early ground nesting birds, this therefore inhibited efforts to promote heather and grass rejuvenation on the hill.

It was considered that maintaining the current management regime for the site would ultimately lead to a further decline in the quality of habitat as the open hill would continue to be exposed to sheep and deer grazing pressures alongside possible adverse impacts on Hen harrier foraging. As a refinement of continuing the current management the possibility of fencing off certain areas of grazing within the Proposed Development, was explored but discounted on the basis of considerable cost in erecting suitable fencing and the pressure of deer grazing would not be reduced leading to an unlikely overall beneficial impact on Hen harrier foraging habitat.

Although the Proposed Development does support various breeding waders it was not considered likely that the impact would be significantly adverse due to other parts of the estate undertaking positive wading bird management practices, with the rarer breeding wading birds being concentrated in areas distant from possible grazing enclosures. Such proposals were not believed to be likely to have an adverse impact upon either vole or meadow pipit prey availability for Hen harriers given where it was believed the greatest concentrations were to be found. This option was discounted as it was considered that it did not offer sufficient habitat enhancement potential and would result in considerable expenditure.

Commercial Woodland

Another consideration was the possibility that afforestation may afford. From the neighbouring Achormlarie woodland it was evident that acceptable crops of sitka spruce could be produced in the area and that lower down Strath Carnaig the Torboll Woods SSSI was flourishing.

Initial forestry considerations concentrated on the north and west of Loch Laoigh and following discussions with various parties a peat depth survey was undertaken to establish which areas could not be planted upon within the area under Cambusmore management. The peat depth survey led to the production of an initial proposal which identified some 3,030ha as being potentially plantable.

At an early stage of this consideration it was recognised that there were likely to be considerable constraints. Access too much of the potential planting area would have been difficult from the public highway due to large parts of the road running through Strath Carnaig physically limiting of heavy goods vehicles in relation to their size. Alongside this initial discussions with The Highland Council Highways department indicated that that the Strath Carnaig road would not be accepted as an Agreed Timber Transport Route. This meant that a large network of expensive roads would be required to be constructed which in turn questioned the financial viability of such a project. Whilst there could have been benefits to this consideration such as local economic benefits with employment opportunities, guaranteed supplies to local end

users and less CO2 emissions from shorter haulage distances these benefits could not outweigh the high infrastructure and establishment costs.

The background of all of the project alternatives was that the Strath Carnaig and Strath Fleet Moors Special Protection Area (SPA) impacted upon the very large part of Cambusmore estate lying to the west of the A9 trunk road. By the time this was taken into consideration alongside the impact it would be likely to have on a commercial woodland operation, it became clear that it did not make sense economically and was likely to have a negative impact upon Hen harrier habitats and thus the integrity of the SPA likely could not be maintained. Together these points militated against a commercial woodland operation and was considered to financially unviable.

RSPB Alternative Proposal

In developing the Proposed Development due note has been taken of comments made by RSPB Scotland, dated 21st March 2018. In particular the scale and nature of the planting have been considerably reduced as such that the area under consideration is significantly less than half the original proposal. The density of planting within the SPA is also considerably less than originally proposed.

Within the Proposed Development it is to be noted that in those areas where significant Hen harrier activity has been noted the scale of proposed planting is severely limited both as to density and species. The objective being the enhancement of both breeding and foraging habitat, by the exclusion of deer and sheep it is anticipated the risk of 'nest trampling' will be significantly reduced, whilst the Draft Habitat Management Plan aims to increase the heather grassland mosaic.

In relation to other matters proposed by RSPB Scotland increased levels of predator control are proposed. Bracken control may also be appropriate in certain limited areas (without the use of chemical control) though this has to be tempered by retaining habitat for the pearl Bordered Fritillary butterfly. As noted previously muirburn has been found not to be a viable means of vegetation control on Cambusmore Estate and the summer hill grazing of cattle is not likely to be a viable option in the short to medium term due to effects of trampling, though it is considered to be viable in the longer term (30 years + hence).

Whilst noting in general the concerns raised by RSPB Scotland the Applicant believes the Proposed Development to which this EIA relates addresses those concerns and seeks to enhance the status of the SPA within the Proposed Development area.

SNH Alternative Proposal

The Proposed Development has sought to take into account comments made by SNH. In particular the extent and scale of the proposal is significantly less than that to which their letter dated 20th March 2018 refers to. Details of alternative proposals are provided and specialist advice has been sought from a range of experts which has informed the design of the proposal, both as to negating any potential adverse impacts of the proposal and as to securing positive, long term, habitat enhancements for the benefit of the Hen harrier.

It will further be noted that all potential areas of deep peat have been removed from the initial proposal which formed the basis upon which the Scoping Opinion was based. Deer management is discussed within section 3.2.6 of this report with measures in hand with the support of SNH to develop an appropriate deer management plan for South

East Sutherland taking into account the Proposed Development and the interests of other members of the Deer Management Group.

SNH's Scoping Opinion response (dated 20th March 2018 and contained within Appendix I) comprised of a map of a proposed alternative planting scheme, amounting to some 476ha situated at the eastern end of the Proposed Development; the majority of which fell outside the SPA. Consideration was given to this proposal but on further investigation it had limitations. Large areas were unplantable due to peat depth, being situated on hill tops, encompassing crofting and common grazing land and taking a large part of the more productive grazing and winter fodder land within Torboll Farm.

Furthermore, SNH's proposal only marginally addressed the issues raised by grazing of sheep and deer and it was considered that to prevent further decline in the status of the SPA a more extensive approach was required which would not only enhance and extend hen harrier breeding and foraging habitat but also that for other species.

More importantly it was not considered that the SNH proposal addressed the Applicant's wider concerns about the long term biodiversity of that part of the SPA lying within the Cambusmore Estate. Notwithstanding that the SPA is so designated for the hen harrier the Applicant was concerned that the SNH proposal did not sufficiently address wider issues which it was considered would not only benefit the hen harrier but maintain and enhance biodiversity over a much wider area. This view was further substantiated by the necessity for a wider ranging long term Habitat Management Plan which could be more readily be implemented within the Proposed Development subject of this EIA.

3.1.3 Preferred Option

Following the feasibility studies undertaken as discussed above, the Proposed Development has the potential to host 1,258ha of plantable area. It was also recognised that the Proposed Development has the potential to enhance the wildlife and that large scale conservation plantations could fulfil this objective. Alongside this research on the neighbouring Achormlie woodland showed how it has prospered in not dissimilar conditions to those found in large parts of the Cambusmore Estate.

The Proposed Development presented in this EIA therefore comprises the planting of mixed conifer, native broadleaf trees and shrubs of varying densities alongside ongoing management. The planting proposal is proposed to be made up of the tree species as detailed further in section 3.2.1 and illustrated in Figure 2.

As noted above what has now become the Proposed Development started off as a much larger project which has undergone a number of iterations to arrive at what is now the subject of this EIA report. Having excluded all areas of deep peat, common grazing's and potential grazing areas.

The arrival of the final design of the Proposed Development was also informed by an NVC survey which afforded more detail as to species suitability. This was further refined by removing planting from hilltops and other areas which would be visually intrusive. Access to various Hen harrier records further refined the Proposed Development so as to secure and promote breeding and foraging habitat. This has resulted in large areas of open ground being designed into low and variable density planting of native broadleaves and Scots Pine across large parts of the Proposed Development area.

Having established what areas were able to be planted the decision was made to confine species selection within the SPA to native species of tree, shrub and scrub. This has resulted in areas of Scots Pine, Upland Birchwood and low density Native broadleaves together with one area on the eastern edge (and partially out with the SPA) proposed to contain limited quantities of Norway Spruce. There will be no diverse conifer within the SPA.

Recognising that parts of Cambusmore Estate to the west of the A9 trunk road lie out with the Strath carnaig and Strath Fleet Moors SPA consideration was given to incorporating these areas within the Proposed Development to create viable wildlife corridors between differing parts of the estate and also in an effort to offer a limited amount of potentially commercial woodland (albeit on a long term basis).

3.1.4 Benefits of Proposed Development

The Proposed Development is anticipated to offer a wider range of benefits including:

- Long term environmental benefits as well as specific benefits for Hen harrier;
- Preservation of all deep peat features;
- Better protection of notable archaeological features;
- Improved deer management opportunities;
- Given the success of the North Coast 500 Highland Initiative the present Proposed Development proposal will add another notable feature to this driver of the tourist sector of the Highland economy and is likely to bring additional income to the surrounding areas and corresponding employment opportunities;
- Employment; through site management, predator control and during construction;
- Limited high forest; offering long term potential local employment and resources for maintenance of the larger area; and
- Better management opportunities for the hill flock.

3.2 Project Description

The Proposed Development comprises the planting of mixed conifer, native broadleaf trees and shrubs of varying densities alongside ongoing management. Various other components are required for the Proposed Development and these are outlined below.

3.2.1 Woodland Types

The Proposed Development comprises of distinct categories of planting (as illustrated in Figure 2). The planting will primarily comprise species native to the general area in which the Proposed Development is situated. Detailed below are the proposed categories of planting together with an indication of the component specie and the approximate amount of planting:

- **W18 Scots Pine** - juniper, silver birch, downy birch, rowan (approximately 263 ha);
- **W4 Upland birchwood** - with discrete areas of W17 downy birch, alder, goat willow, grey sallow, eared willow, bay willow (approximately 617ha);
- **Low Density Native Broadleaves/Natural Regeneration** - with certain identified areas being planted at a lower density, hawthorn, hazel, juniper, downy birch, silver birch,

holly, oak, rowan (approximately 290ha for both combined)

- **Diverse conifer** at the eastern periphery of the SPA, Scots pine, silver birch, Norway spruce, rowan (approximately 88ha).

Upon completion of the EIA process the detailed design of the Proposed Development will be finalised in consultation with SF.

Given the sensitivity of the site it is proposed to undertake minimal ground preparation to ensure minimal ground disturbance. A combination of cultivation and planting techniques will be employed including but not limited to invert mounding, conventional hinge mounding , both mechanical and hand screefing and where suitable single pass spot ground cultivation and planting/hand planting. The most appropriate method or combination of methods will be dependent upon local ground conditions prevailing at the time of operation.

All operations will comply with UK Forestry Standard (UKFS) and associated guidelines. the proposed development planting design has also been informed by the Forestry Commission Bulletin 112 Creating new native woodlands.

3.2.2 Access Track

The Proposed Development site already hosts a network of access tracks serving the southern and eastern parts of the site. It is proposed that the existing access tracks are used and no new access tracks are required.

Access will be required to the grazing areas for agricultural vehicles and equipment, four of which have existing roadside frontage. The two grazing areas which do not have roadside frontage are accessible by existing tracks.

Access to the plantable areas will be limited to low ground pressure vehicles and machinery for planting and management purposes, including deer extraction. A limited amount of maintenance work is required to the existing access tracks which will not necessitate any realignment or material extraction. Where access is required to areas with no existing tracks then such access will make use of open glades and wide rides built into the planting design or in areas of no planting making use of natural features to select most appropriate routes.

3.2.3 Management Areas

The Proposed Development area has been has been divided into three management areas surrounded by deer fencing two of which (Loch Buidhe and Dalnamain), lie to the north of the River Carnaig, whilst the third (Achineal), lies to the south and south east of Strath Carnaig.

The proposed deer fencing will enclose the Proposed Development together with areas of deep peat in the north west and south west divided by two roughly north- south oriented deer fences, creating the three management areas.

Within the two eastern management areas parcels of better, historic grazing land will be separately stock fenced and set aside for sheep and cattle grazing. There will be no planting within these areas. It is proposed that these areas be grazed at certain times of year by both cattle and sheep and the details of which will be contained within the habitat management plan to be agreed upon the completion of this EIA process.

In the longer term it is envisaged that when the young trees have sufficient resilience (after 25 – 30 years) cattle be permitted to graze the planted areas in the autumn but with sheep continuing to be kept off planted areas at all times. Prior to any reintroduction of cattle and or red deer grazing consultation will be undertaken with the then relevant regulatory authorities.

Fencelines have been designed, where feasible, to take into account historic nesting and foraging activity of the Hen harrier so as to avoid potential fence collision risks. In certain areas, most notably along march lines, efforts have been made to minimise the impact of fences. If considered appropriate suitable reflective fence marking can be applied in these areas. More information on these aspects is contained within Chapter 5.

Figure 3 shows the management areas alongside the grazing enclosures.

Loch Buidhe Management Area

Immediately to the north of Achormlarie plantation there are two high voltage power lines running in an easterly direction from the western end of Loch Buidhe. In accordance with standard utility practice there is a requirement that tall vegetation is kept at a distance of 35m which will have the effect of creating a corridor of low height vegetation (within which will be an access track) around 150m wide extending to some 66ha.

It is proposed that this area is managed to enhance foraging and nesting habitat with limited shrub planting along the outer edges of the power lines. The western end of the Loch Buidhe management area will be planted with variable density native broadleaves. The central part of this management area will be planted at variable density with mixtures of Scots pine *Pinus sylvestris* and native broadleaves.

At the eastern end it is proposed that work will be undertaken (flailing) to increase the heather/grass margin to afford increased foraging opportunities. Planting within this eastern end of the Loch Buidhe management area will be a mixture of low density (with some clumps) Scots pine and native broadleaves so as to offer increased habitat for potential prey species.

Dalnamain Management Area

The northwest part of the management area has the highest concentrations of meadow pipits Anthus pratensis and with one exception, in the Achineal management area, on ground designated as grazing the highest vole population densities.

The Dalnamain management area may conveniently be divided into three parts; north, central and southern. The northern part of this management area has recorded the highest recorded Hen harrier foraging activity but this is primarily concentrated in the southern and western parts of this section which it is not intended be planted. The majority of this northern section is not designated for planting though some planting is proposed in the south western part.

The central section of the Dalnamain management area contains four significant grazing areas which it is proposed will not be planted. Hen harrier foraging activity has been recorded within this section, primarily towards the western edge.

The southern section of the Dalnamain management area contain large areas where no planting is proposed and on which only limited foraging activity has been observed.

In those areas where planting is proposed this will largely be downy birch and shrubs with only limited clumps of pine. The objective of the planting is to enhance both breeding and foraging habitat. Accordingly wide rides and open spaces will be predominated with scrubby vegetation to support prey populations. Densities of planting will be variable but primarily of low density but with clumps of denser planting to promote nesting and increased heather grass margins.

The ongoing management of both the proposed planting areas and those areas not being planted will be finalised in the Habitat Management Plan to be finalised upon completion of this EIA process.

Achinael Management Area

This management area comprises of land lying to the south of the River Carnaig within the Proposed Development. The east and south of this area was subject to a large fire in 2014.

The Achinael Management Area contains three areas with relatively low vole populations, one in the south western corner which is an area identified as being suitable for the long term woodland creation of Scots pine seed trees whilst the other two areas are situated on grazing areas.

As this area is generally not favourable for Hen harriers it is proposed that there be larger areas of Scots pine woodland creation incorporating wide rides and extensive areas of open ground. There is a small area at the eastern end of this management area that falls outside the SPA which it is proposed be planted with higher density Scots pine. This management area will also feature diverse conifer.

The south eastern part of the Achineal management area contains few areas with suitable Hen harrier habitat, much of which lies to a large extent out of the SPA and generally have an eastern aspect affording little protection from the winds coming off Loch Fleet.

As regards potential foraging habitat there is one large vole population situated in a grazing area to the west of Loch Tarvie but Meadow pipit numbers are generally low with one area along the southern boundary having a generally higher population than the remainder of the management area. This particular area may be suitable for Hen harrier but is outside landowner control. As a consequence of the lack of potentially suitable Meadow pipit habitat it is proposed that there be areas of downy birch *Betula pubescens*, willow *Salix spp.* and where suitable rowan *Sorbus aucuparia* and juniper *Juniperus communis*; where appropriate other native low shrubs will be planted. As a significant part of this management area falls outside the SPA it is proposed that higher density Scots pine be planted in suitable areas.

As noted above this management area contains little terrain suitable for Hen harriers though very limited foraging activity has been noted in the northern part. It is also to be noted that significant areas of the eastern part of this management area though within the Proposed Development lie out with the SPA.

In those areas identified as being suitable (largely out with the SPA) for the planting of higher density Scots pine it is proposed that these be planted at 2,500stems/ha but incorporating wide rides, open ground and on the western edges suitable native broadleaves. The planting at the eastern end of this management area will incorporate a corridor linking the woodland areas of Torboll Woods SSSI and The Mound

Alderwoods SSSI with the area lying to the south eastern boundary of Cambusmore estate.

Management of this area as a whole will be in accordance with the Habitat management Plan to be finalised upon completion of this EIA process.

3.2.4 Grazing Areas

Within each of the three management areas there are areas of grazing which are proposed be isolated from the planting alongside open areas of ground isolated by stock fencing (see Figure 3).

All of the grazing areas contain archaeological interest with Achineal the west of Loch Tarvie being of particular interest. The avoidance of these archaeological features will allow the growth of scrub and long grasses, potentially increasing the suitability of Hen harrier prey habitat.

The grazing areas will enable sheep to be taken off the open ground and consequently longer grass and dwarf shrub are likely to flourish on the open ground. This will also be beneficial to voles by reducing the trampling and disturbance risk to nesting Hen harriers.

The grazing areas are predominantly grassland, however, they do contain a variety of habitats which are able to support a range of species and have the potential for foraging habitats for Hen harriers.

3.2.5 Fences

It is proposed to erect deer fencing around the perimeter of the woodland creation area with appropriate vehicular and pedestrian access point as necessary. The deer fencing will be constructed in accordance with all Joint Agency Fencing Guidelines requirements and provide sufficient points from which deer may be driven out.

The proposed fence line largely follows the Cambusmore Estate boundary except to the east where it follows the proposed woodland creation area, save for a short section alongside the A9 trunk road designed to minimise the potential for deer/vehicle collisions.

Large areas in the north and North West are proposed to be fenced, though not immediately adjacent to the woodland creation area so as to isolate areas of deep peat and protect them from deer grazing so as to assist with their protection, recovery and enhancement. Two additional deer fences are also proposed running in a north south orientation, these two fences are included to facilitate deer and woodland creation management.

In addition, to protect areas of bog/deep peat for grazing pressures the deer fencing is required to remove the browsing threat to young trees posed by deer (red, sika and roe) all of which are present within the woodland creation area. By keeping deer out of the woodland creation area the potential risk to nesting Hen harriers of trampling can be minimised.

It is also to be noted that the identified grazing areas will be surrounded either by stock fencing or a combination of deer and stock fencing. The purpose of fencing the grazing areas is to remove domestic livestock from within the enclosed area so as to

prevent overgrazing, promote new heather/acid grass growth, and to eliminate nest trampling and predation.

With suitable management (to be contained within the Habitat Management Plan to be finalised upon completion of this EIA process) it is anticipated that alongside additional suitable habitat maintained for upland waders but additionally the habitat can be maintained/enhanced for Hen harrier prey as well as seeking to protect archaeological features.

The woodland creation area holds a population of black grouse *Tetrao tetrix* and a number of lekking sites, recent and historic, are known to exist within the area. It is proposed that fences lying with 2km of knowing lekking sites be protected with approved fence marking in an effort to minimise fence collision fatalities. Subject to ongoing consultation and advice it may be that certain other areas of fencing are protected with suitable marking, possibly in areas where Hen harrier foraging is known to taken place and on parts of the southern boundary to protect neighbouring hawks.

Given divers flight characteristics and evidence of fence collisions in Orkney it is proposed that in the north western part of the woodland creation area reflective fence marking be applied to deer fencing, as this is likely to be in the line of the most direct flight paths to the nearest sea food sources. The nesting site in Loch Loaighe would be most unlikely to entail flight paths in a north westerly direction as the nearest seaward feeding would be to the east.

3.2.6 Deer Management

A deer management framework is currently being developed for the area to include the Proposed Development site. It will be a requirement of the Proposed Development that deer be excluded from the area until such time as the trees are robust enough to withstand browsing and trampling. Accordingly, in consultation with SNH, the South East Sutherland Deer Management Group and other relevant interested parties a detailed plan will be drawn up to control the number of deer.

Whilst the South East Sutherland Deer Management Group has been constituted and has in hand the preparation of a Management Group Plan it is only within the objectives of this larger scale plan that Cambusmore Estate will be able to produce its own, localised deer management plan.

It is recognised that it is likely to prove extremely difficult to drive out all the deer which include Roe *Capreolus* and Sika *Cervus nippon* as well as Red *Cervus elaphus*. Recognising that driving out all deer is unrealistic and so as to avoid additional deer pressures on neighbouring landowners and in consultation with the South East Sutherland Deer Management Group it is intended that appropriate, and agreed, levels of reduction and or compensatory culling be undertaken and vigilance maintained as planting progresses. The target is to have a deer population density not exceeding 0 per km2 although once woodland is established and in accordance with an agreed habitat management plan this could be increased to 5 per km2.

The Proposed Development holds an unknown quantity of three deer species as noted above. Though a count of red deer was undertaken in 2017 this was a snapshot at a particular time and is not necessarily indicative of numbers of red deer resident. Roe and sika numbers are unknown.

Current cull levels on Cambusmore Estate as a whole will not be sufficient to reduce deer number to required levels. As noted above, and subject to agreement with the South east Sutherland Deer Management Group the first objective would be to drive the deer out of the woodland Cceation area. Recognising that driving out all deer is unrealistic a cull of remaining deer will be undertaken and vigilance maintained as planting progresses. Subject to consent of relevant authorities it is proposed that consent be secured for out of season and night time culling to meet likely SF requirements.

There is a limited amount of stalking, averaging 15 red deer and 3 sika and over the last five years and some 12 roe.

Concern has been expressed about the number of vehicle/deer collisions on the A9 trunk road and where practical and feasible within the constraints of the overall woodland creation proposal deer fencing has been incorporated within the design so as to minimise the potential for such collisions on a steep, fast, section of road leading down to the Cambusavie bends.

Though not within the Proposed Development Mound Alderwoods and certain areas of the lower lying fields at Torboll Farm are an ongoing concern to SNH. It is noted that the deer fencing alongside the railway running beside the Mound to Lairg road to the north of the River Fleet has recently been upgraded. Cambusmore wish to resolve outstanding matters relating to the Mound Alderwoods and numerous considerations are currently being considered. One consideration would be to install a deer grid as close to the A9 as possible on the Loch Buidhe Road. A further option would be to considerable extend deer fencing within the Proposed Development but this would have no immediate benefit to the proposal and lies out with the SPA and thus the scope of the EIA report.

4 Planning Policy and Legislation

4.1 Introduction

This chapter sets out the planning policy context for the Proposed Development. The chapter focuses upon the main policy relevant to the Proposed Development and does not seek to repeat in detail the contents of relevant planning policy documents.

4.2 The Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017

The current Regulations are The Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017, which came into force in May 2017. These Regulations have been further amended by The Environment Impact Assessment (Miscellaneous Amendments) (Scotland) Regulations 2017. These Regulations, formerly from 1999, were amended to reflect changes to the EIA Directive 2011. The EIA Directive requires an assessment of the effects of EIA forestry projects on the environment before consent can be granted for their development.

4.3 Forestry Commission Scotland Environmental Impact Assessment for Forestry Projects (2018)

This guidance describes how the Forestry EIA Regulations 2017 are applied to forestry projects, namely afforestation, deforestation, roads and quarries. If SF, the competent authority, decides that proposals for one of these projects is likely to have a significant effect on the environment then under EIA Regulations you, the Applicant, must obtain SF's consent for the work.

An EIA Report must include:

- A description and map(s) of your EIA forestry project comprising information on the site, design, size and other relevant features of the project;
- A description of the likely significant effects of your EIA forestry project on the environment;
- A description of the features of your EIA forestry project and any measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;
- A description of the reasonable alternatives studied by you, which are relevant to your EIA forestry project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the impacts of your EIA forestry project on the environment;
- A Non-Technical Summary of the information referred to in the points above; and
- Any other information specified in Schedule 3 of the Regulations relevant to the specific characteristics of the EIA forestry project or of the type of EIA forestry project in question and to the environmental features likely to be affected.

The EIA Report must be prepared by competent experts and must be accompanied by a statement outlining the relevant expertise or qualifications of those experts. As

previously stated, it must focus on the likely significant effects as outlined in the Scoping Report and Scoping Opinion.

4.4 Other Consideration

4.4.1 Analysis of Current Arrangements for the Consideration and Approval of Forestry Planting Proposals (2016)

Although not formal policy or legislation The Mackinnon Review, 2016 guides the Forestry EIA process for Forestry projects and the extent to which these assessments could be improved and streamlined. The review sets out to analyse the current arrangements and assess the scope for reducing the complexity and increasing the efficiency of the process. The review is based on meetings with over 200 individuals representing a wide range of interests across the forestry sector. In addition, the review considers written comments and a range of related reference and research materials.

The review comes as a result of failure to meet the Scottish Governments target of planting 10,000 hectares per annum and of speeding up and streamlining approval processes for sustainable planting schemes in line with its Programme for Government 2016-17. The Forestry Industry identified procedures to obtain grants for new planting through SF as one of the barriers to achieving this rate of planting.

The review provides a bullet list of recommendations of which this EIA has considered:

- The design of the planting scheme should be separate from the grant application;–
- Accredited agents should be appointed to certify all woodland creation schemes which are below the threshold for EIA screening and the majority of schemes where it is determined that an EIA is not required;
- SF should set up a central team to deal with particularly sensitive/complex proposals and all projects where an EIA is required;
- With the exception of grant applications above a certain value, or where there are concerns over a potential overspend, grant applications up to £250,000 should be determined by conservancies on an ongoing basis.
- Conservancies should make EIA Screening determinations without the need for consultation;
- A more rigorous and focused approach is required on Scoping, with the EIA focused solely on issues which raise potentially significant environmental effects;
- Informing and engaging communities should happen much earlier and should be proportionate to the scale and impact of a planting scheme;
- Pre-application discussions are vital and the issues/actions should be recorded by agents and subsequently agreed by attendees;
- SF and consultees, where they are involved, must have the confidence to give clear and consistent advice on issues to be addressed;
- Revised protocols setting out the involvement and approach of SNH, SEPA and HES should be agreed and implemented within three months of the Scottish Government's decision on this review;
- Requests for information must be clearly justified and there should be an understanding by SF and consultees of the cost/time implications of additional studies;

- Performance targets should be introduced for EIA screening determinations and grant applications;
- Planting targets for conservancies should be considered;
- Focused and post related programmes of training and development should be introduced;
- Better publicity for the scheme – both online and in hard copy - should be introduced;
- Better management information should be available;
- Conservancies should hold stakeholder seminars;
- An annual report should be produced looking at performance and prospects;
- A pilot scheme with a willing local authority to identify areas for large scale planting schemes should be considered; and
- Scottish Government should discuss with Forest Enterprise Scotland the current approach to restocking on the National Forest Estate.

It concludes that Forestry is a vitally important sector of the Scottish economy creating vast amounts of GVA and employment in rural areas. Embedding culture change through empowerment, trust and proportionality are vital for the sector to fulfil its environmental and economic potential. Arguably, even more important is for the industry to be valued in its own right and for forestry professionals to demonstrate that a presumption in favour of planting that meets the UKFS will secure the long-term supply of productive timber, sustain jobs in rural areas and help Scotland achieve its ambitious climate change targets.

4.5 References

Forestry Commission Scotland (2018). Environmental Impact Assessment For Forestry Projects [online] available at; https://scotland.forestry.gov.uk/images/corporate/pdf/environmental-impact-assessment-for-forestry-projects.pdf [accessed 11 March 2019]

Scottish Government (2017). The Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017 [online] available at; http://www.legislation.gov.uk/ssi/2017/113/contents/made [accessed 11 March 2019]

James Mackinnon (2016). Analysis of Current Arrangements for the Consideration and Approval of Forestry Planting Proposals [online] available at; https://www.gov.scot/binaries/content/documents/govscot/publications/corporate-report/2016/12/mackinnon-report/documents/5cf7a1d7-1a2c-4d2e-9a43-85b2003edb78/5cf7a1d7-1a2c-4d2e-9a43-85b2003edb78/govscot%3Adocument [accessed 11 March 2019]

5 Biodiversity and Nature Conservation

5.1 Introduction and background

This chapter addresses the biodiversity and nature conservation implications of the Proposed Development. Taking account of the Scoping Opinion (section 5.3), it:

- describes the baseline nature conservation interests of the Proposed Development site;
- assesses the importance of the nature conservation interests of the Proposed Development;
- identifies mitigation which will be adopted to protect those nature conservation interests;
- describes the impacts which could result on those interests; and
- assesses the scale of impact on those interests.

This chapter is supported by Appendix F Cambusmore 2018 Hen harrier Survey which describes the work carried out to inform the understanding of the nature conservation interests of the Proposed Development.

5.2 Consultation

A Scoping Opinion for The Proposed Development was provided in March 2018 based upon a Proposed Development which included a planting area of 3000 ha. A summary of the responses provided by stakeholders is given below with copies of the scoping response and the scoping opinion provided in Appendix H and I.

5.2.1 Scottish Natural Heritage (SNH)

Protected Areas

SNH identified that since there was a likely significant effect on the Strath Carnaig and Strath Fleet Moors Special Protection Area (SPA), Scottish Forestry (SF) would be required to carry out an Appropriate Assessment to identify if the Proposed Development could be carried out without an adverse effect on the integrity of the SPA.

SNH had concerns about the Proposed Development, since the area it encompassed supports 30% of the breeding Hen harrier *Circus cyaneus* population of the SPA. A proposal of this scale would result in the loss of a significant area of suitable open foraging ground in addition to the displacement of breeding Hen harriers. Nesting opportunities could also be reduced as woodland developed. The condition of the SPA may deteriorate if suitable foraging/nesting habitat are lost.

They suggested that the proposal be reworked to take greater account of Hen harrier.

Peatlands

SNH identified that the Proposed Development contains areas of carbon rich soil, deep peat and priority peatland habitats including areas identified as class 1 and class 2 on the Carbon and Peatland 2016 map; these are considered to be nationally important.

SNH considered it unlikely that woodland could be established in these areas. They welcomed the proposal to carry out a peat depth survey and the fact that no planting is proposed on areas with a peat depth greater than 50 cm. They advised that results of the peat depth survey should be included in the EIA Report.

Deer Management

SNH advised that an assessment of impacts on deer welfare, habitats, neighbouring and other interests should be presented with the EIA Report. A draft deer management statement would be required if significant impacts may be caused. They encouraged collaboration with other neighbouring landowners and interested parties.

Consideration of Reasonable Alternatives

SNH considered it would be helpful if the EIA Report could demonstrate if alternative proposals have been considered and justification provided as to why these proposals have not been taken forward. They highlighted that they had provided an alternative proposal in March 2017.

5.2.2 Royal Society for Protection of Birds Scotland (RSPB Scotland)

RSPB Scotland had serious concerns about the negative impacts on Hen harrier and a possible adverse effect on the Strath Carnaig and Strath Fleet Moors SPA and considered the scale of planting (at that time covering approximately a quarter of the available habitat within the SPA) too great a scale to occur within a Hen harrier SPA.

RSPB Scotland advised that the area to be planted should be reconsidered and reduced and identified management options which could be considered under the Scotland Rural Development Programme (SRDP) Agri-Environment Climate Scheme.

They also provided a more detailed Annex detailing what they considered the Applicant should need to consider if the application were to proceed:

- Impacts on Hen harrier:
  - Consideration of changes in prey populations/availability, changes in nest/roost predator species populations, changes in competing species, fledging success and changes in levels of predator control,
  - Some open habitats may be of limited area but used disproportionately (e.g. narrow streamside grasslands). Assessment of impacts needs to be able to look at the impact of planting and regeneration on a very fine scale, and
  - Levels of disturbance during any management or maintenance operations should be assessed. The assessment should also consider the potential for maximising benefits and minimising negative impacts associated with the proposed planting. Future changes over a longer term should also be considered;
- Impacts on other bird species:
  - RSPB Scotland identified a number of other sensitive species which it considered impacts should be addressed on. These were:
    - Merlin *Falco columbarius*
    - Short-eared owl *Asio flammeus*
    - Golden eagle *Aquila chrysaeos*

  - White-tailed eagle *Haliaeetus albicilla*
  - Black-throated diver *Gavia arctica*
  - Red-throated diver *Gavia stellata*
  - Black grouse *Lyrurus tetrix*
  - Curlew *Numenius arquata*
  - Golden plover *Pluvialis apricaria*
- It also considered that the impacts on species breeding in the surrounding area and particularly the agricultural breeding waders such as Curlew and Lapwing *Vanellus vanellus*, and
- Breeding bird surveys should be undertaken for all the above noted species, using recognised good practice.

- Cumulative and in-combination effects:
  - The EIA report should consider other developments that might have "in combination" impacts on bird populations in the proposed planting area. In particular they asked that the developments at Garvary and the Loch Buidhe – Lairg OHL developments be taken into consideration, and
  - Black grouse habitat requirements should also be addressed;
- Mitigation:
  - Clear mitigation should be developed to avoid, minimise or otherwise address potential adverse impacts, and
  - The EIA Report should also include habitat management plans for Hen harrier and Black grouse.

RSPB Scotland also confirmed they held no relevant survey data for the area.

5.3 Scoping Opinion

The Proposed Development which went to scoping included a planting area of approximately 3000 ha.

Taking account of a scoping meeting held on the 21st of February 2018, and of responses from SNH and RSPB Scotland, SF considered that the EIA Report needed to address the following matters:

- The part of the Strath Carnaig and Strath Fleet Moors SPA within the application site supports 30% of the breeding Hen harriers within the SPA. A woodland proposal of this scale is likely to have a significant effect on the SPA's Conservation Objectives.
- The EIA Report must demonstrate that the woodland creation proposal will not adversely affect the SPA's Conservation Objectives which are:
- To avoid deterioration of the habitats of the qualifying species (Hen harrier) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
- To ensure for the qualifying species (Hen harrier) that the following are maintained in the long term:
  - Population of the species as a viable component of the site
  - Distribution of the species within site
  - Distribution and extent of habitats supporting the species
  - Structure, function and supporting processes of habitats supporting the species

  - No significant disturbance of the species
- To help inform the above the EIA report must provide an assessment of the short and long term impacts of the proposals including changes in:
  - Foraging habitat, including prey levels and availability
  - Nesting and roosting sites and habitats
  - Potential for displacement of breeding Hen harriers
  - Risk of predation
- The assessment of prey levels and risk of predation should include consideration of potential or predicted changes in prey populations, populations of nest and roost predator species, competing species, fledging success. Current and proposed levels of predator control should be set out.
- The assessment of foraging habitat should include consideration of the importance of the small areas of open habitats such as narrow streamside grasslands and flushes along seepage lines/springs, which are likely to support good small mammal populations.
- The level and nature of any disturbance during any management or maintenance operations should be considered. The retention of suitable nest habitat should be on a scale to accommodate movement of nest locations by Hen harrier.
- The SPA is currently is favourable declining condition. The EIA report should set out the current land use and as part of the assessment of the above factors, it should consider options for the scale, location and type of planting.

5.3.1 Post consultation actions

As a result of the consultation, additional work was carried out to address concerns raised, which resulted in a reduction of the area to be planted from approximately 3000 ha (at time of scoping) to approximately 1,258 ha. As a result, the scheme has changed considerably from that scoped as a response to the Scoping Opinion.

5.4 Methodology

5.4.1 Scope of Assessment

The Scoping Opinion has stated that the EIA Report should focus on the potential impacts of the Proposed Development on the SPA and its qualifying features of the breeding Hen harrier population. Further consultation with SF[1] confirmed that the EIA Report should be focussed on this area.

As a result this chapter will address only impacts associated with the effects of the Proposed Development on the SPA and the associated Hen harrier population.

Additionally, the scoping opinion required information to be provided which would allow an Appropriate Assessment to be carried out. As such, the assessment will be provided with the understanding it is also to inform an Appropriate Assessment, so more detail may be provided in some areas than would normally be required for an ecological impact assessment.

[1] Telephone call 1st March 2019 between SF staff and Atmos staff

5.4.2 Desk Study

Data on Hen harrier breeding records between 2003 and 2018 was requested and received from the Highland Raptor Study Group (HRSG).

5.5 Field Work

Appendix F details the ornithological and ecological survey work carried out in 2018 to support the application. A short summary is provided here.

5.5.1 Hen Harrier Surveys

Four visits using the methodology set out in published methodology (Hardey, 2013) were carried out between April and July 2018.

The survey area was the proposed planting area plus a 2 km buffer, except where this fell outside the SPA. No access was also permitted into the woodland south of Loch Buidhe.

5.5.2 Habitat Surveys

Botanical survey to National Vegetation Classification (NVC) system standard was carried out within the entire proposed planting area, following standard methodology.

Using the results of the NVC survey, Common Standards Monitoring (CSM) points were selected randomly across the site. As per guidance (JNCC, 2006), at least 25 survey quadrats of 2x2m were selected in each CSM habitat classification. At each survey point the percentage cover of each plant and moss species was recorded, vegetation heights were measured and the full range of CSM criteria assessed. This then allowed the condition of each habitat type present at Cambusmore to be measured.

5.5.3 Vole Surveys

A vole presence/absence survey was carried out across the survey area. As per survey guidance, 25 survey points were randomly selected in each basic habitat type, giving 150 survey points in total. At each survey point, a 2x2m quadrat was examined for the presence of vole signs, in the form of either fresh vole faeces or fresh grass/rush clippings. A score was given to each quadrat, 0 for no vole signs, 1 for the presence of either faeces or clippings and 2 when both types of field signs were present.

5.5.4 Meadow Pipit Transects

Forty meadow pipit transects (10km in total) of random orientation were selected across the site. Using GIS software, the random selection of transects was manipulated to achieve an even spread of basic habitat types across the site. Each transect was 250m in length and meadow pipits were recorded to a 25m distance from the transect. This was due to an expected pipit detection rate of 100% within 25m of the transect (Calladine, Chamberlain, & Harding, 2004). All transects were undertaken between 6am and 9am. Surveys were undertaken in June and early July, this coincided with the period when meadow pipits are the primary prey source for harriers.

5.6 Assessment Methodology

The CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018) (henceforth referred to as the CIEEM guidelines) form the basis of the impact assessment presented in this chapter. These guidelines set out a process of identifying the value of each ecological/ornithological receptor and then characterising the impacts that are predicted, before discussing the effects on the integrity or conservation status of the receptor, proposed mitigation and residual impacts.

The initial action for assessment of impacts is to determine which features should be subject to detailed assessment. The ornithological receptors to be the subject of more detailed assessment should be of sufficient value that impacts upon them may be significant in terms of either legislation or policy. The receptors should also be vulnerable to significant impacts arising from the development.

5.6.1 Determining Value

The CIEEM guidelines recommend that the value of ornithological features is determined based on a geographic frame of reference. For this project the following geographic frame of reference is used:

- **International** (nature conservation designation, habitat or populations of species of international importance, e.g. a Special Protection Area (SPA) or significant numbers of a designated population outside the designated site);
- **National** (nature conservation designation, habitat or populations of species of Scottish importance, e.g. a Site of Special Scientific Interest (SSSI) or a National Nature Reserve (NNR), a nationally important population/ assemblage of a species listed on Schedule 1 of the Wildlife and Countryside Act 1981 or Annex 1 of the Birds Directive);
- **Regional** (a regionally (i.e. within Highland) important population of birds which have a high conservation value (e.g. Schedule 1, Annex 1, Scottish Biodiversity List (SBL) or Birds of Conservation Concern (Eaton, et al., 2015) (BoCC) amber or red species);
- **County** (i.e. within the Natural Heritage Zone) (a population of high conservation birds which represent an important part of the county population of that species);
- **Local** (i.e. within 5 km) (a population of any species which is important at the local level); and
- **Less than local** (a population of birds which has little or no intrinsic nature conservation value).

It should be noted that for this assessment, due to the size of the unitary authority, 'County' has been defined as the smaller Natural Heritage Zone (Zone 5 the Peatlands of Caithness and Sutherland) while Regional has been defined as the larger unitary authority.

5.6.2 Valuing Species

In assigning a level of value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. Rarity is an important consideration because of its relationship with threat and vulnerability although, because some species are inherently rare, it is necessary to look at rarity in the context of status. A species that is rare and declining should be assigned a higher

level of importance than one that is rare with a stable population. Reference is made to a number of categorisations of ornithology conservation status, including

- **Annex I**: Annex I of Directive 2009/147/EC on the conservation of wild birds (the Birds Directive) lists species that are of conservation importance at a European level;
- **Schedule 1**: Rare breeding species in the UK, and/or species under threat of human persecution are listed on Schedule 1 of the Wildlife and Countryside Act (WCA) 1981 (as amended), which provides additional legal protection for such species at or around their nests;
- **Schedule 1A**: Certain Schedule 1 species are also listed on Schedule 1A of the WCA, which protects them from harassment year round;
- **Schedule A1**: Certain Schedule 1 species are also listed on Schedule A1 of the WCA, which protects their nests year round.
- **UK Birds of Conservation Concern (BoCC)**: A national classification that categorises breeding bird populations in the UK using a traffic light system to indicate an increasing level of conservation concern. Species are assessed against objective criteria such as population and distribution trends; those that have a declining range and/or population, or that are vulnerable to population effects due to their small population size are categorised as Red or Amber listed species, depending on the extent of the decline or vulnerability.
- **Scottish Biodiversity List (SBL)**: species which are identified as being important from a conservation viewpoint within a Scottish context are listed on the SBL;
- **Local Biodiversity Action Plan (LBAP)**: operates at a local authority level and identifies priority habitats and species for which conservation/enhancement measures are underway or planned.

5.6.3 Predicting and Characterising Impacts

In accordance with the CIEEM guidelines, when describing impacts, reference is made to the following, where appropriate:

- Confidence in predictions - the level of certainty that an impact will occur as predicted, based on professional judgement and where possible evidence from other schemes – this is based on a four point scale: certain/near certain; probable; unlikely; and extremely unlikely;
- Magnitude – the size of an impact in quantitative terms where possible;
- Extent – the area over which an impact occurs;
- Duration – the time for which an impact is expected to last;
- Reversibility – a permanent impact is one that is irreversible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A temporary impact is one from which a spontaneous recovery is possible; and
- Timing and frequency – i.e. whether impacts occur during critical life stages or seasons.

Both direct and indirect impacts are considered: Direct ornithological impacts are changes that are directly attributable to a defined action, e.g. the physical loss of habitat occupied by a species during the construction process. Indirect ornithological impacts are attributable to an action which affect ornithological resources through effects on an intermediary ecosystem, process or receptor.

5.6.4 Significance Criteria

In accordance with the CIEEM guidelines, a significant impact, in ornithological terms, is defined as "an impact (whether negative or positive) on the integrity of a defined site or ecosystem and/or the conservation status of habitats or species within a given geographical area, including cumulative and in-combination impacts".

The approach adopted here aims to determine an impact to be significant or not on the basis of a discussion of the factors that characterise it, i.e. the ornithological significance of an impact is not dependent on the value of the feature in question. The value of a feature that will be significantly affected is used to determine the geographical scale at which the impact is significant, e.g. an ornithologically significant impact on a feature of local importance would be considered to represent a significant impact at a local area level. This in turn is used to determine the implications in terms of legislation, policy and/or development control.

Any significant impacts remaining after mitigation (the residual impacts), together with an assessment of the likelihood of success of the mitigation, are the factors to be considered against legislation, policy and development control in determining the application.

5.6.5 Mitigation, Compensation and Enhancement

It is important as part of any EIA, wherever possible, to clearly differentiate between mitigation, compensation and enhancement and these terms are defined here as follows:

- Mitigation is used to refer to measures to avoid, reduce or remedy a specific negative impact *in situ*. Mitigation is required for negative impacts assessed as being significant or where required to ensure compliance with legislation.
- Compensation is used to refer to measures proposed in relation to specific negative impacts but where it is not possible to fully mitigate for negative impacts *in situ*. Compensation is only required for negative impacts assessed as being significant or where required to ensure compliance with legislation.
- Enhancement is used to refer to measures that will result in positive ornithological impacts but which do not relate to either specific significant negative impacts or where measures are required to ensure legal compliance.

5.7 Baseline Description

5.7.1 Designated Sites

The Proposed Development lies within the Strath Carnaig and Strath Fleet Moors SPA. It is described as an area of upland moorland incised by broad straths and small streams. The predominant habitats of the SPA are extensive heather moors and upland acid grasslands. There are also areas of commercially planted conifer forest and semi-natural broadleaf woodland. All of these habitats are important in supporting breeding and foraging Hen harriers.

The SPA supported 12 breeding pairs of Hen harriers (mean value 2002-2004) at the time of designation, which equated to about 2.5 % of the UK population.

The conservation objectives for the SPA are:

- To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
- To ensure for the qualifying species that the following are maintained in the long term:
  - Population of the species as a viable component of the site,
  - Distribution of the species within site,
  - Distribution and extent of habitats supporting the species,
  - Structure, function and supporting processes of habitats supporting the species, and
  - No significant disturbance of the species.

The SPA is underlain by the Strath Carnaig and Strath Fleet Moors SSSI. This too has been designated for the Hen harrier population although the citation also notes the occurrence of a diverse mosaic of habitats including wet and dry heath, blanket bog, acid grassland, native woodland and plantation woodland with open areas.

Because the reason for designation of the SPA and the SSSI are the same, with the qualifying features for both being only Hen harrier, it will be assumed that consideration of impacts on the SPA will also address impacts on the SSSI and these will not be considered separately.

By virtue of being a European site, the SPA is considered to be of international value.

5.7.2 Hen Harrier

Breeding Activity

Hen harrier surveys carried out in 2018 identified 4 territories (Figure 9). Two confirmed nests were located [redacted]. Both nests fledged young. The nests were only 1 km apart, but it was confirmed they were not a polygynous territory pair as there were two distinct males present, one on each territory.

A possible territory was identified [redacted] where display was observed but despite repeated searches, no further evidence of breeding within the survey area was located. Birds can display over a large area before laying (Hardey, 2013) [redacted]

A probable territory was also located [redacted]

[redacted]

[redacted]

Historically the number of territories present within the area of the Proposed Development is shown in Table 1 and on Figures 5-7. Where territories are uncertain due to grid reference resolution these have been reviewed. For some it is clear if they are likely to be within or out with the Proposed Development [redacted]). Where there was uncertainty, it was assumed to be within the Proposed Development to allow a precautionary approach.

Table 3: Annual numbers of Hen harriers breeding within or close to the Proposed Developments

Year	Total. No. of territories	Within Proposed Development	Outside Proposed Development
2003	3	0	3
2004	3	2	1
2005	2	1	1
2006	2	1	1
2007	2	1	1
2008	3	1	2
2009	3	1	2
2010	4	1	3
2011	1	1	1
2012	2	1	1
2013	7	6	1
2014	0	0	0
2015	3	3	0
2016	6	6	0
2017	1	1	0
2018*	3 (4)	3 (2)	0 (2)

* Atmos survey results are given in brackets.

An increasing proportion of breeding activity has taken place within the Proposed Development in the last five years, both relatively and absolutely. [redacted] (Figure 5).

Figure 7 shows the historic data against both the planting regime but also the results of the 2018 NVC survey (Figure 6). Care must be taken as this may not be representative of the NVC communities throughout the 15 years for which data is available but Table 5 shows what NVC communities were present in 2018 in the location for each historic nest. Nests with insufficient resolution (i.e. less than 8 NGR numbers) were excluded from this analysis. These nests appear on gridlines within the associated figures.

Table 4: NVC communities where territories were pinpointed

NVC Community	2nd NVC community (where territory lies between two areas)			
	None	[redacted]	[redacted]	Total
[redacted]	3	3		6
[redacted]	1		1	2
[redacted]	2	1		3
[redacted]	5			5
Total	11	4	1	16

The Proposed Development clearly holds a significant proportion of the breeding population of the SPA population. This would make the Hen harrier population of the Proposed Development of international importance.

Foraging Activity

A study of foraging activity (flight paths) was also undertaken (Figure 8). Activity was predominantly associated with nest locations so may not be so indicative of foraging activity so much as activity around the nest site. It is known that females predominantly forage within 300-500m of the nest location (Arroyo, et al., 2009) with most activity up to 1km (Arroyo B. L., 2014) but males forage further from the nest with most time spent within 2km of the nest, but with activity out to 4km.

Most activity was observed in the vicinity of the two territories detected, [redacted]

Features which might determine the distribution of Hen harrier within the Proposed Development

The surveys carried out in 2018 were aimed at establishing habitat features or prey distributions which might affect Hen harrier distribution within the Proposed Development. Full findings of those surveys are presented in Appendix F.

It was found that the area which contained the Hen harrier territories, and which, historically has also contained a relatively high number of territories was characterised by the following features

Mosaic habitats

[redacted]

[redacted]

Vegetation depth

[redacted]

Prey densities

[redacted]

Similarly, there was a consistent vole presence across this area (Figure 11 b) and plots within this area also showed most evidence of voles (although it should be noted that the vole surveys were not suitable for detecting density only allowing presence/absence to be identified).

[redacted]

This tends to agree with what is known of Hen harrier habitat preferences. Hen harriers are known to prefer areas with habitat mosaics (Geary , Haworth, & Fielding, 2018) and are negatively associated with grazed areas. These preferences are also observed in foraging behaviour of breeding birds (Arroyo, et al., 2009).

5.8 Identified Mitigation

The Proposed Development aims to improve the suitability of the Proposed Development area from a nature conservation viewpoint. As such, during the design process, and taking account of consultee comments as a result of the scoping consultation, the scheme was re-designed to ensure that it met the objective in a way which reduced the impact of the proposals on sensitive receptors so as to avoid significant impacts while meeting that aim.

It was recognised that while planting had the potential to be beneficial, it had to be carried out in a way which was sensitive to the ecological/ornithological and archaeological sensitivities of the area.

As a result, there was a substantial scheme re-design following the consultation to take account of comments received from the consultees which included:

- Reduction in area of planting overall;

- Protection of areas of archaeological interest which means they are retained as open ground and not planted, contributing to the mosaic structure of the area;
- Removal of forestry and amendment of planting proposals in areas known to be key to Hen harrier, [redacted]; and
- Identification of fenced enclosures for grazing pastures which would continue to allow grazing on the Proposed Development but in a managed way which allows grazing to be reduced elsewhere on the Proposed Development.

In addition, it is proposed that fencing (such as deer fencing) will be marked with reflective fence markers to reduce chances of collision with birds, including Hen harriers across the Proposed Development.

A Draft Habitat Management Plan (DHMP) has been developed and is provided in Appendix B: Draft Habitat Management Plan. This details a predator control programme, targeted particularly at foxes *Vulpes vulpes* and corvids (Carrion crow *Corvus corone* and Hooded crow *Corvus cornix*). The aim would be to manage the populations of these species to reduce predation on Hen harrier and other species as well as managing impacts on sheep. Control would be most intense around the breeding season and would be undertaken using experienced controllers, using legal methods of control.

In addition, the Habitat Management Plan details how the Proposed Development will be managed in the future, to maintain a mosaic of habitats to benefit Hen harrier while increasing the diversity of habitats present. This will include sward management and management of regeneration to ensure that open areas are maintained within the Proposed Development following reduction in grazing across much of the area.

There is potential for disturbance during initial planting and management of the area. To eliminate disturbance, [redacted]. Operations will not occur within 750 m of an active nest.

Ongoing management may be necessary [redacted] during the breeding season; however, given the legal protection from disturbance breeding Hen harriers are afforded, it could go ahead only if there was certainty that there would be no reckless disturbance of active nests. Activity would follow published guidance (e.g. FCS 2006) operations would be informed by communication with the annual bird monitoring regime, which would provide a traffic light system of areas during the season that operations could occur in without restriction, areas where works may need to be reviewed and areas where due to the presence of a Schedule 1 species breeding, all operations should cease.

As described in the DHMP, a monitoring regime will be drawn up which will aim to monitor the following aspects of the Proposed Development site:

- Hen harriers – breeding activity and foraging activity:
  - Monitored annually, using (Hardey, 2013) for Hen harrier (and other raptor) methodology and VP observations of flight activity;
- Breeding birds:

  - Monitored every three years, using (Brown, 1993) to monitor breeding birds within the HMP area. In the long term, frequency of monitoring may be reduced as woodland achieve maturity;
- Passerine/prey species levels:
  - Monitored every three years, standardised transects would be walked using (Calladine, Chamberlain, & Harding, 2004);
- Black grouse occurrence:
  - Lek surveys would be undertaken every three years using (Gilbert, 1998) to monitor populations;
- Vegetation coverage changes:
  - Aerial photography would be used to monitor changes in habitat cover on a three-yearly basis.

5.9 Impacts

Through the consultation process and scoping, a number of potential impacts have been identified which could occur on Hen harriers, either directly, or on processes or systems which support them. These include:

- Changes to availability of nesting and roosting sites and habitats;
- Changes to foraging habitat, including prey levels and availability;
- Potential for displacement of breeding Hen harriers; and
- Changes to risk of predation.

These impacts will be addressed in turn.

5.9.1 Changes to availability of nesting and roosting sites/habitats

The proposals allow for some relatively large scale planting with a view to changing/altering some of the habitat within the Proposed Development. This is being done with a view to improving the area for use by Hen harrier; however the evidence needs to be considered to establish what impacts the proposed changes would have on Hen harrier.

There is a body of work on Hen harrier habitat requirements, from a range of locales. Generally, Hen harriers are an upland species. Breeding has been recorded in a variety of habitats including moorland/heather, grassland and open canopy forest (Hardey, 2013) although on a large scale analysis of Scottish data, an association was noted for deep heather (Redpath, et al., 1998). Preference for pre-thicket woodland plantation has also been recorded (Wilson, et al., 2012) Mosaics of those habitats have been found to sustain higher nest intensities (Geary , Haworth, & Fielding, 2018) and those were positively correlated with increasing levels of moorland and scrub, open canopy forest and closed canopy forest but were negatively correlated with grazed land.

[redacted]. Figure 7 shows the proposed planting with the historic breeding locations superimposed; [redacted]

There are effectively four types of habitat changes being made to the Proposed Development. The likely effects of those habitats and associated changes are summarised with respect to their potential impacts on breeding Hen harrier.

Low Density Native Broadleaves/ Natural Regeneration

This envisages an open habitat, with small scattered plantings of native broadleaves and shrubs. As such, ground cover is likely to be largely influenced by what is currently present, but the introduction of trees may have localised effects on vegetation. At least 50% of this area will remain as open ground, with functionally, 50-70% likely to remain open.

Small areas will also not be planted but will be allowed to regenerate naturally and managed to allow regeneration into this habitat

However this is likely to maintain and possibly even increase the attractiveness of these areas to breeding Hen harrier. Sheltering effects of trees may improve some microhabitats increasing the availability of nest locations within those areas and at worst, maintaining the existing availability of breeding habitat in the long term.

W18 Native Scots pine

A number of areas have been identified as being suitable for Scots pine *Pinus sylvestris* planting planted at a relatively high density. These include the area north of Loch Buidhe and some larger areas to the south east of the Proposed Development. Up to 15% of the area would remain unplanted, while other native species would be included at variable density (c. 10 – 15%).

In the short and medium term, the planting would continue to provide breeding opportunities for Hen harrier (Wilson, et al., 2012) but canopy closure would ultimately preclude breeding across much of the area. Large rides would be incorporated into the woodland such that limited suitable habitat would be present. Breeding within rides and openings has been noted in woodland in Ireland (Wilson, et al., 2012) and there was a long established territory found in the plantation to the south of the Proposed Development. The addition of woodland also means there is additional forest edge habitat which can also be valuable for this species.

W4 Native upland birch woodlands

This would be included to provide a more scrub-like habitat. While predominantly downy birch *Betula pubenscens*, other native species such as willow *Salix* sp. and rowan would be included in suitable ground conditions and at a variable density. The canopy structure is likely to be irregular as a result. Up to 15% of the area would remain unplanted.

As with other planted areas, nesting opportunities will be available within the short/medium term but as trees mature, nesting opportunities will decrease. However the more irregular canopy structure may mean that some breeding opportunities persist into the long term.

Diverse conifer

There would also be areas in the east of the Proposed Development planted as diverse conifer, in which 40% of the planting would be Scots pine, 40% would be other conifers

with the remainder being low density broadleaves and open ground. This planting type is the most dense of the woodlands, and would only be used outside the SPA.

Enclosed grazing

A number of areas would be enclosed to provide managed grazing for sheep; this would eliminate sheep grazing freely across the Proposed Development, and instead restrict it to these areas.

While enclosed grazing is likely to continue to provide open habitat potentially suitable for Hen harrier, grazing pressure is likely to reduce the suitability for Hen harrier breeding within this area by limiting vegetation depth and favouring the development of grassland over heather which could reduce attractiveness of the area (Geary, Haworth, & Fielding, 2018) (Redpath, et al., 1998) as well as increasing nest loss by animal trampling.

As such, grazing enclosures are likely to have reduced utility for breeding Hen harrier.

5.9.2 Assessment of Effects

[redacted]

However, long term limited loss of suitability [redacted] will be offset by changes across the entire Proposed Development, aimed at improving suitability across areas where there was reduced suitability previously.

Alongside the planting within the Proposed Development there would be also be the reduction of grazing across the Proposed Development, brought about by deer management and exclusion of sheep from much of the Proposed Development and into dedicated (and enclosed) grazing areas. This would allow vegetation depth to increase in areas where it has been held back by grazing and potentially increase the availability of deeper grass and heather for breeding Hen harrier. Increased shelter provided by edge effects of tree planting and the scattered trees within the variable density areas would also have potential to create more suitable habitat.

The planting would have the effect of increasing the mosaic nature of the area which has been strongly indicated as being linked with increased Hen harrier breeding intensity (Geary , Haworth, & Fielding, 2018).

Overall, the loss of functionality of breeding habitat lies largely but not entirely within areas which currently are not used by breeding Hen harrier. There is some overlap in the western central portion of the Proposed Development, which impacts on five previous

The planting would have the effect of increasing the mosaic nature of the area which has been strongly indicated as being linked with increased Hen harrier breeding intensity (Geary , Haworth, & Fielding, 2018).

Overall, the loss of functionality of breeding habitat lies largely but not entirely within areas which [redacted]. However, the management planned would provide an increase in suitability/functionality in areas where currently Hen harrier functional breeding habitat is limited such that overall the effect of the Proposed Development would be to increase the available suitable habitat for breeding on the Proposed Development. Given the importance of the population being affected, this would be considered a major beneficial effect which would occur over the medium to long term, and the effect would be permanent (or so long as management maintained this habitat within the Proposed Development). Confidence in this prediction is considered near certain.

[redacted]

Hen harriers generally roost in rank vegetation (Hardey, 2013) mainly on the ground, although tree roosting can also occur. Roosts vary in their site fidelity, and individual Hen harriers may make use of a network of roosting sites across an area. While the suitability of habitat for roosting will be decreased by some of the planting proposed, for the reasons outlined above, as with an increase in the function of breeding habitat, there would be improved functionality for roosting habitat as a result of the Proposed Management. However, birds roosting within the Proposed Development may not form part of the SPA population, as the SPA is designated for breeding birds only. Roosting birds would remain a sensitive ornithological receptor, but not of the same conservation sensitivity as an SPA population. Given that, and the limited recent evidence of use by roosting birds this would be considered a minor and significant beneficial effect. Confidence in this prediction is near certain.

5.9.3 Changes to Foraging Habitat

When assessing changes to foraging habitat, there are two processes which should be addressed:

- How changes to habitat affects Hen harrier's use of the habitat
- Changes to prey populations – will there be more or less prey available as a result of the habitat changes?

There is a considerable body of evidence of Hen harrier preferential use of habitats during the breeding season.

Generally, Hen harriers prefer to forage in more open habitats such as moorland, grassland or open canopy forest (e.g. newly planted forest before canopy closure occurs) (Madders M. , 2000), with Madders finding a preference in western Scotland for pre-thicket forest over heath/bog and acid or neutral grassland, which were again preferred over closed canopy forest. Irish birds have also shown a preference for pre-thicket forestry (Wilson, et al., 2012) although in some locations, a negative relationship

between second rotation pre-thicket forestry and breeding success has been identified.

Within those habitats, in a study (Arroyo, et al., 2009) covering three SPAs across Scotland (Orkney, Glen App and Langholm) Hen harriers were found to prefer a mosaic of heather and rough grassland with an optimum level of 50% heather coverage. Males, which ranged more widely, were found to avoid areas of improved grassland; females generally had less exposure to that habitat type as it was rarely found within their foraging distance from the nest.

In Orkney (Amar & Redpath, Habitat use by Hen Harriers Circus cyaneus on Orkney: implications of land-use change for this declining population, 2005), where birds have little exposure to forests, habitat preferences have been identified with males showing a preference for foraging in unmanaged grass compared with heather and managed grass whereas females showed a negative relationship with vegetation height (i.e. they spent more time hunting in areas with shorter swards). There was also a positive relationship between breeding success and extent of rough, unmanaged grass (Amar, Arroyo, Meek, Redpath, & Riley, 2008).

Generally, highest prey densities occurred in areas with longest vegetation; this reflects what is known about the ecology of these species (e.g. (Vanhinsburg & Chamberlain, 2001) (Wilson, et al., 2012)).

Planting with woodland is likely to increase the biomass of prey available, with it still being fairly readily available through the pre-thicket stages of growth (Madders M. , 2000). Following this, vole densities will decline (New, Buckland, Redpath, & Matthiopoulos, 2011) and canopy closure will prevent Hen harriers having access to most of the species living within the canopy, although rides and edges will continue to provide foraging opportunities. Hen harriers have been found to forage in accordance with the distribution of field voles and Meadow pipits (Madders M. , 2010) although field voles have also been shown to have a greater effect on breeding success (New, Buckland, Redpath, & Matthiopoulos, 2011).

In the short and medium term, the planting plans will increase prey availability across the areas of planting while providing more habitats that Hen harriers prefer to forage in. As the canopy closes on the densely planted area, prey availability will decrease but there would still be some availability in rides and on edges. Low density planted areas would retain their suitability for foraging birds.

Removal of sheep and deer management will allow greater vegetation growth and potentially more diversified habitat to occur in areas which are not planted; this is likely to increase suitability and habitat quality for foraging Hen harriers although this could occur more in the medium – long term.

Enclosures, which are likely to experience higher grazing rates, would become less suitable for Hen harrier.

Taking that information into account, and combined with the current usage of the Proposed Development, it would suggest that the overall change to foraging habitat would be to improve the Proposed Development. There would be areas where long term, the quality/suitability for foraging would have declined but this would be counterbalanced by the improvement of areas such as the variable density planting and the reduction of grazing across much of the Proposed Development.

As a result, the effect of the changes on an internationally important population would be considered to be major and beneficial over the long term. The confidence in this prediction is considered likely.

5.10 Potential for Displacement of Breeding Hen Harriers

As identified within section 5.9.2 and 5.9.3 there will be some likely localised displacement of Hen harrier due to the longer term development of closed canopy forests which would prevent birds both from largely breeding in the closed canopy forests and also reduce foraging opportunities. [redacted] the scope for displacement in the long term due to changes in habitat is limited. In the short to medium term displacement is not likely to occur as much of the additional planting in the early stages would be beneficial to Hen harriers. Ultimately, long term negative effects of displacement are considered to be outweighed by the benefits that would come from restricting grazing across much of the Proposed Development, which would allow a more diverse plant community to flourish and creating more habitat diversity which would improve habitat in areas where currently there is little Hen harrier activity, potentially allowing expansion into those areas.

The removal of sheep into enclosures would concentrate sheep-related activities into those areas, which would increase human activity in those areas but decrease it elsewhere. There could be a limited displacement effect associated with that, [redacted]

Initial planting and ongoing management may create more disturbance and therefore displacement within the Proposed Development. [redacted]

This would limit disturbance and displacement effects of human activity such that there would be no significant displacement effects of Hen harrier due to human activity. The confidence in this prediction is near certain.

5.11 Changes to Risk of Predation

Studies in Skye have identified that predation by ground dwelling predators such as fox can be a significant cause of nest failure (McMillan, 2014). In the study 53% of nests failed, with the majority of failures being due to nest predation. The Skye study cites a number of studies across a range of habitats where fox predation on Hen harriers has been observed.

Edge effects are also known to increase predation effects (Wilson, et al., 2012), so while the increase in forest edge may be a benefit in terms of prey availability and breeding habitat availability, there would be a possibly detrimental effect on predation levels.

Predation has been observed by the HRSG in the data provided in the Strath Carnaig population with at least two of the nests lost to predation (one of which the predator was undetermined and the other was thought to be Raven *Corvus corax*), and five lost for reasons not known.

Some fox control already occurs within the area, but a predator control programme has been proposed to ensure that predation within the area is controlled. It would be targeted at foxes initially although corvid control would be considered. Fox control

Predation may therefore be particularly critical when canopy closure starts to occur and other prey populations (such as voles) start to decline in response. This would be highlighted in the predator management programme.

There is cited evidence (McMillan, 2014) that fox control can be effective at reducing predation on Hen harriers although it does note that not all programmes are effective. As a result, the efficacy of the predation control would be monitored during the monitoring programme to ensure that predation is being minimised.

As a result the potential impacts of the increased predation from foxes in particular would be mitigated by the predator control programme put in place to control predators which could impact on the Hen harrier population. As a result, there would be no significant impact on the Hen harrier population. The confidence in this prediction is near certain.

5.12 Cumulative Assessment

Developments of a wind farm at Garvary and a new overhead line (OHL) between Loch Buidhe and Lairg were identified in scoping as being developments to possibly consider. Added to these, Lairg wind farm has also been included.

In addition, changes to the overall area of woodland within the SPA are also considered.

5.12.1 Changes in woodland area

Table 5 shows how the Proposed Development alters the area of woodland with the SPA. Data on existing woodland was provided by SF.

Table 5: Changes to forestry area

	Strath Carnaig and Strath Fleet Moors SPA (southern part)	Entire SPA
Area (ha)	9749.00	14701.44
Area of woodland within the SPA (ha)	1749.72	2611.29
% of SPA consisting of woodland	17.95 %	17.76 %
Increase in woodland as result of Proposed Development	1258 ha	1258 ha
% of woodland cover as a result of Proposed Development	30.85 %	26.32 %
Change in % cover as a result of the Proposed Development	12.82 %	8.56 %

This shows that the areas to be planted or regenerated as woodland within the Proposed Development comprise 12.8 % of the southern part of the SPA, and 8.6 % of the entire SPA. However, given that some of the woodland types will have an open structure, not all of this area will actually comprise woodland; for example, within the low density native broadleaves, the woodland will consist of approximately 50% open ground. That equates to approximately 1.5% of the southern portion of the SPA.

Overall the Proposed Development leads to a significant increase in woodland cover within the SPA, but as detailed above, when taking into account the impacts on the Hen harrier population, there are adverse and beneficial impacts associated with this

low density native broadleaves, the woodland will consist of approximately 50% open ground. That equates to approximately 1.5% of the southern portion of the SPA.

Overall the Proposed Development leads to a significant increase in woodland cover within the SPA, but as detailed above, when taking into account the impacts on the Hen harrier population, there are adverse and beneficial impacts associated with this and no significant adverse effects have been identified. As a result, this increase in woodland cover would not be considered significant.

5.12.2 Lairg – Loch Buidhe OHL

This proposed 132 kV OHL runs between Loch Buidhe substation and the Dalchork substation, 3 km north of Lairg. It passes through the Strath Carnaig and Strath Fleet Moors SPA at the point where it connects into the Loch Buidhe substation. It also passes through the western edge of the northern portion of the SPA as it passes east of Lairg.

Because of the sensitive nature of the species, data related to its activity in the vicinity of the OHL route has been kept confidential. However, with the information available from HRSG related to the Cambusmore portion of the OHL, while there is potential for there to be cumulative disturbance effects if construction of the OHL and the tree planting were to occur simultaneously, [redacted] both projects have put in place mitigation to ensure Hen harriers are protected from disturbance. As a result, there would be no significant impact of construction disturbance. Confidence in this prediction is near certain.

Once constructed, the OHL could have a displacement effect on Hen harriers which could, in combination with displacement due to the Proposed Development limit the available habitat for Hen harrier.

[redacted]

As a result, there would be no significant effect of displacement as a result of the cumulative effects of the Proposed Development and Lairg – Loch Buidhe OHL. Confidence in this prediction is near certain.

5.12.3 Lairg II and Garvary wind farms

These wind farms lie adjacent to each other, west of Strath Carnaig and Strath Fleet Moors SPA and south east of Lairg. Garvary wind farm is still at scoping, so limited information is available. The site is located to the west of the Proposed Development

Lairg II, which is an application for a 14 turbine wind farm has been submitted (19/01096/FUL) so non-confidential reports are available. In addition, some consultee comments have been received which enables further conclusions to be drawn about the potential impacts of the development.

The two developments are located approximately 3 km apart (boundary to boundary) so the capacity for direct impacts is reduced, but not eliminated. Both developments have mitigation in place to manage disturbance to Hen harrier during the construction

process so there would be no significant issues as a result of cumulative effects. Confidence in this prediction is near certain.

Hen harrier appear to be relatively tolerant to wind farm developments (SNH 2015) and as such, displacement will be limited as a result of this wind farm. Displacement as a result of the Proposed Development would also be limited and as the habitat develops, should actually attract in more breeding pairs. As a result operational displacement would not have a significant negative effect. Confidence in this prediction is near certain.

5.12.4 Effects on other sensitive species

In the scoping opinion for the Proposed Development effects on other sensitive species was scoped out and the EIAR was required to focus on effects on Hen harrier only. However as Figure 16 shows, the Proposed Development was identified as holding a number of other sensitive species.

Table 6 provides a brief summation of the species and an informal assessment based upon professional judgement on how the long term effects of the Proposed Development could impact on the species identified during the bird surveys.

Table 6: Consideration of impacts on other species

Species	Likely effect	Comments
Red-throated diver	Neutral	Lochans used not within affected area
Black-throated diver	Neutral/positive	[redacted]
Curlew	Negative	Some habitat loss in eastern portion of the Proposed Development with 3 territories affected. Could be offset by improvements in habitat as a result of reduced grazing and predator control
Golden plover	Neutral	Territories do not lie within areas to be planted. Predator control may be beneficial
Lapwing	Netural/negative	One territory with areas to be planted; increase in heather cover could reduce habitat suitability but enclosures will provide habitat. Predator control could be beneficial
Greenshank	Positive	[redacted] They can breed within woodland so increased woodland could increase habitat suitability. Predator control could be beneficial
Snipe	Negative	Three territories present within areas to be planted.
Common sandpiper	Neutral	One present within planted area but associated with

Species	Likely effect	Comments
		watercourse so habitat will remain suitable
Merlin	Positive	For the same reasons as Hen harrier, the development will have a positive effect on Merlin

5.13 Assessment of Residual Effects

There are no potential impacts which have been identified as having a significant adverse effect. Beneficial significant effects have been identified for:

- Availability of suitable breeding habitat; and
- Availability of suitable roosting habitat.

5.14 Conclusions

The Ecological Impact Assessment has considered the potential impacts of the Proposed Development on the Hen harrier population of the SPA. Mitigation has been identified which would reduce the effect of the Proposed Development on the Hen harrier population and its supporting habitats.

A number of impacts have been assessed namely:

- Changes to availability of nesting and roosting sites and habitats;
- Changes to foraging habitat, including prey levels and availability;
- Potential for displacement of breeding Hen harriers; and
- Changes to risk of predation.

A cumulative assessment has also been carried out, focussing on disturbance effects in the construction periods and displacement effects following development.

No significant negative impacts have been identified. It is considered that the Proposed Development would have significant benefits in increasing the availability of suitable breeding habitat and increasing the availability of suitable roosting habitat.

5.15 Review Against Conservation Objectives

Although it is the responsibility of SF to carry out the Habitat Regulations Assessment (HRA), to assist in that process, the conservation objectives are reviewed in Table 7 for the impacts on Hen harrier by the Proposed Development.

Table 7: Review of Conservation Objectives

Conservation objective	Hen harrier
To avoid deterioration of the habitats of the qualifying species or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained	The habitats within the SPA would be improved by the careful planting of forested areas which would increase the mosaic aspect of the SPA habitats and by the control of grazing, allowing unplanted areas to increase their suitability for Hen harrier. There would be no significant disturbance to Hen harrier. As such, the conservation objective would be met and the integrity of the site would be maintained.

Conservation objective	Hen harrier
To ensure for the qualifying species that the following are maintained in the long term:	
• Population of the species as a viable component of the site	Predator control would be carried out to ensure predation associated with increased woodland coverage would not adversely impact the population. Increased prey availability as a result of habitat changes would have the potential to increase breeding success and/or reproductive output with potential to increase the population. As such, the conservation objective would be met and the integrity of the site would be maintained.
• Distribution of the species within site	[redacted] There could be some very localised impacts in the long term; however these are offset by the greater availability of better quality habitat in areas where Hen harrier activity is currently limited. As such, the conservation objective would be met and the integrity of the site would be maintained.
• Distribution and extent of habitats supporting the species	There would be changes in overall distribution of habitats within the SPA, but the greatest changes occur in areas where there is currently limited use and these would have a net beneficial effect. As a result, there would be an increase in the overall extent of habitats supporting the species. As such, the conservation objective would be met and the integrity of the site would be maintained.
• Structure, function and supporting processes of habitats supporting the species	The project is aimed at improving the habitats within the SPA with a view to better supporting the species within the Proposed Development.
• No significant disturbance of the species	Measures have been put in place which would limit disturbance of the species. As such, the conservation objective would be met and the integrity of the site would be maintained.

5.16 References

Amar, A., & Redpath, S. (2005). Habitat use by Hen Harriers Circus cyaneus on Orkney: implications of land-use change for this declining population. *Ibis 147*, 37-47.

Amar, A., Arroyo, B., Meek, E., Redpath, S. M., & Riley, H. (2008). Influence of habitat on breeding success in Hen harrier Circus cyaneus in Orkney. *Ibis 150*, 400-404.

Arroyo, B. L. (2014). Ranging behaviour of Hen Harriers breeding in Special Protection Areas in Scotland. *Bird Study*, 1-8.

Arroyo, B., Amar, A., Leckie, F., Buchanan, G., Wilson, J. D., & Redpath, S. (2009). Hunting habitat selection by hen harriers on moorland: Implications for conservation management. *Biological Conservation 142*, 586-596.

Brown, A. &. (1993). A method for censuing upland breeding waders. *Bird Study*, 189-195.

Calladine, J., Chamberlain, D., & Harding, N. (2004). *Ornithological survey of a proposed wind farm site at Hill of Nigg.* BTO Research Report 375.

CIEEM. (2018). *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine.* Winchester: Chartered Institute for Ecology and Environmental Management.

Eaton, M., Aebischer, N., Brown, A., Hearn, R., Lock, L., Musgrove, A., . . . Gregory, R. (2015). Birds of Conservation Concern 4: The population status of birds in the UK, Channel Islands and Isle of Man. *British Birds 108*, 708-746.

FCS (2006) Forest operations and birds in Scottish forest. Forestry Commission Scotland Guidance Note 32

Geary , M., Haworth, P. F., & Fielding, A. H. (2018). Hen harrier Circus cyaneus nest sites on the Isle of Mull are associated with habitat mosaics and constrained by topography. *Bird Study* , 1-10.

Gilbert, G. G. (1998). *Bird Monitoring Methods.* RSPB: Sandy.

Hardey, J. C. (2013). *Raptors A Field Guide for Surveys and Monitoring 3rd ed.* Edinburgh: TSO.

JNCC. (2006). *Common Standards Monitoring Guidance for Upland habitats.* ISSN 1743-8160: JNCC.

Madders, M. (2000). Habitat selection and foraging success of Hen harriers Circus cyaneus in west Scotland. *Bird Study 47*, 32-40.

Madders, M. (2010). Hen Harrier Circus cyaneus foraging activity in relation to habitat and prey: In west Scotland, the birds foraged in accordance with the distribution of prey and vegetation associated with early-growth conifer forests. *Bird Study 50*, 55-60.

McMillan, R. (2014). Hen Harriers on Skye, 2000–12: nest failures and predation. *Scottish Birds*, 30-39.

New, L. F., Buckland, S. T., Redpath, S., & Matthiopoulos, J. (2011). Hen harrier management: insights from demographic models fitted to population data. *Journal of Applied Ecology 48*, 1187-1194.

SNH 2015 (2015) Wind farm proposals on afforested sites – advice on reducing suitability for hen harrier, merlin and short-eared owl. SNH. Battleby.

Redpath, S., Madders, M., Donnelly, E., Anderson, B., Thirgood, S., Martin, A., & McLeod, D. (1998). Nest site selection by Hen Harriers in Scotland. *Bird Study 45*, 51-61.

Vanhinsburg, D. P., & Chamberlain, D. E. (2001). Habitat associations of breeding Meadow Pipits Anthus pratensis in the British uplands. *Bird Study 48*, 159-172.

Wilson, M., O'Donoghue, B., O'Mahoney, B., Cullen, C., O'Donoghue, T., Oliver, G., . . . O'Halloran, J. (2012). Mismatches between breeding success and habitat preferences in Hen Harriers Circus cyaneus breeding in forested landscapes. *Ibis 154*, 578-589.

Appendices

Appendix A. Issues Log

CAMBUSMORE ESTATE

WOODLAND CREATION PROPOSAL

This Issues Log sets out key issues identified by the Applicant and stakeholders comments (please see Scoping Opinion and Stakeholder annex) as set against the UK Forest Standard together with appropriate mitigation measures in respect of possible negative impacts.

It should be noted that in the interests of conciseness items appearing under more than one heading within UKFS have not been commented upon multiple times.

Issue	Mitigation
General Forestry Practice	The Cambusmore Estate Woodland Creation Proposal is being put forward by the legal owner of the land to which it relates and this Issues Log comprises a constituent part of the requisite Environmental Impact Assessment and is submitted in accordance with current applicable statutory requirements. The Owner will meet all UK Forestry Standard Requirements and Guidelines in addition to those matters more particularly referred in this Statement.
Climate Change	The Woodland Creation Proposal is predicated upon the planting of a diverse range of native species of appropriate provenances to accommodate anticipated climatic changes over what may be considered a 'first rotation' time span. In line with The Scottish Government Draft Woodland Strategy 2019 – 2029 the Cambusmore Woodland Creation Proposal is designed to use only native trees of suitable provenance for the climatic, soil and site conditions prevailing and anticipated according to current forecasts.
Carbon Capture	Additional planting enhances carbon sequestration. The Scottish Government Woodland Strategy 2019 – 2029 anticipates each hectare of new forest sequesters 7 tonnes of $CO_{2...}$ The Cambusmore Woodland Creation Proposal extends to some 1,258ha with consequential additional $CO_{2.}$ sequestration benefits in the order of 10,100mt of CO_2 per annum.
Species Suitability	In line with UKFS Requirements and Guidelines all trees to be planted will be of a provenance suitable to the area, site and conditions prevailing, Restricted availability of certain species may have an impact upon the timing of certain operations but not such they will impact upon those areas identified as having no operations during the breeding and lekking seasons. Whilst the woodland planting will be designed to meet the species and open ground Guideline requirements there is a desire to encourage juniper but as the site lies within or just outside Juniper Conservation Zone 2 specialist guidance will be required as to any juniper planting. It is anticipated that reduced stock grazing

	and deer removal will afford some, limited, opportunities for additional juniper planting, in suitable locations.
Soil	
Peat depth	Soil survey work has been undertaken both in the field and in desk top exercises. An initial peat depth survey was carried out which identified areas where peat depth precluded planting. Subsequent NVC surveys have identified those areas potentially suitable for planting and have informed the species selection for identified areas. None of the areas identified as Class 1 and 2 on the Carbon & Peatland Map 2016 are included within the Cambusmore Woodland Creation areas. No planting will take place in locations with a peat depth of 50cm or greater.
Soil damage/compaction	Consideration has been given to appropriate ground preparation techniques and it is proposed that the technique appropriate to the ground conditions and selected species will be employed which would include: • Inverted mounding Hinge mounding Surface screefing Mechanical spot cultivation and planting (single pass) Due consideration has been given to ensuring minimal ground damage by the use of low ground pressure machinery where feasible (tracked and/or LGP tyred)
Nutrient availability	Given the inherent characteristics of the soils over the Cambusmore Woodland Creation area it is anticipated that an application of 50g P and K per planted tree be surface hand broadcast at or very shortly after the time of planting so as to maintain nutrient levels.
Chemical use	To guard against the risk of possible aquatic pollution appropriate buffers will be observed in the application of fertiliser; with a minimum of 10m where any watercourse is less than 2m wide, 20 m where a watercourse exceeds 2m in width and a 50m radius around any water abstraction point. Operations will be conducted in accordance with Confor Guidance Note Forest & water Scotland Know the Rules. With the exception of areas of bracken it is anticipated that herbicides will not be used. Where the use of herbicides is unavoidable (for example if mechanical means of control are not feasible) then specialist advice and that of the competent regulatory authorities will be sought. At the current time no use of pesticides is anticipated but should their use become unavoidable then the relevant specialist advice will be sought and acted upon and relevant regulatory approval sought. Operations in the wetter areas will take place during the summer and the higher, drier, areas during late

	autumn and winter so as to avoid soil damage. This will be carried out so far as is possible while avoiding key Hen harrier nesting and foraging habitat during the breeding season (mid-March to mid-August) ground conditions permitting. In general it is not proposed that any works will be undertaken within those areas identified as key nesting areas for the hen harrier and black grouse during the period from mid-March to mid-August. See also Biodiversity section
Cultural heritage	
Large number of archaeological features on site	Please refer to Appendix E for full Archaeological Survey and Report. As will be noted from the above Report Cambusmore has a rich cultural heritage with a number of Scheduled Monuments around which a minimum buffer zone of 30m will be maintained (this is in excess of the minimum required level of buffer required by UKFS– 20m for Scheduled Monuments). It is intended that a buffer zone 10m either side of other archaeological features (non Scheduled Monument) be maintained (this is in excess of the required level of buffer). The guidance provided by FCS Historic Resource Guide will also be followed. Where large numbers of archaeological features are closely grouped it is intended that the buffer zones around them be designed to provide a contiguous area of open ground to best protect and 'showcase' the feature. Included within the historic features are a number of larger sites and the proposal has been designed so that they fall within grazing areas and are outside proposed woodland creation areas.
Salmon ladder	Though within the SPA (and more specifically within the Torboll Woods SSSI) the Victorian era salmon ladder (situated on the River Carnaig) is the subject of further detailed consideration as to its renovation. This will be a major undertaking and is likely to form the subject of a separate application when further studies and funding options have been considered. This feature is not within the Cambusmore Woodland Creation area.
Fencing	As both deer and stock fencing form an integral part of the Cambusmore Woodland Creation Proposal the design and construction of fence lines will be such as to avoid crossing significant archaeological features. It may, however, be necessary, on occasion, to cross dykes (stone walls) but care will be taken to minimise damage to the feature.
Forests and the Landscape	
Impact on landscape	Impact of woodland creation to be mitigated by following UKFS Requirements and Guidelines so as to avoid negative impact on local landscape; including no hilltop planting, incorporation of irregular edges, variable density planting, variety of species to be planted, taking account of topography and ground conditions and avoiding linear planting..

Impact of fences	Deer fencing to be minimized. A perimeter fence with two additional, roughly, north south fence lines taking account of landscape and vegetation features to minimise impact. Fencing will be designed and constructed in accordance with Joint Agency Fencing Guidelines. Stock fencing will be confined to flatter areas of grazing land; standard stock fencing height (lower than deer fencing), where necessary working with topography. In limited parts of certain grazing areas deer fencing will be used as a part of the grazing area boundary but working with the topography to fit it within the landscape. This designed to minimise the total amount and impact of fencing.
Tracks	Existing tracks will be used; no new tracks will be created. The wide rides incorporated in the planting design will afford access for maintenance and management operations. Avoidance of straight lines up hills, avoiding going along ridges. Following a visual appraisal of the landscape impact of fencing will be reduced by working with topography to disguise fences in the landscape and to minimise visibility from vantage points and the road running through Strath Carnaig. The majority of the site is away from oft frequented viewpoints and those areas which are so visible will be designed for minimal impact
Roads	There is a single, unclassified, road running through the Woodland Creation area; running west from the A9 at the south end of The Mound in the east up through Strath carnaig to Loch Buidhe and thence to Bonar bridge. The road affords views of a large part of the Woodland Creation area. Given that the majority of the planting which will be visible is proposed to be of variable density and native species containing large areas of open ground it is not considered that the visual aspect will be adversely affected. Hilltops will not be planted, wide rides will be incorporated, there will be no linear planting and there will be areas of shrubs. The objective is to build on what, to a limited extent, presently exists and create a natural looking cover of mixed vegetation.
Visual Impact	Within the Woodland Creation area there are a number of highpoints but from none of them is the entire Woodland Creation area visible. Access to the high points on Cambusmore Estate is very rarely taken and there are very few people who exercise their rights under the Scottish Outdoor Access Code. The only area, albeit, infrequently, accessed is to the rear of Cambusmore Lodge where there are several rockfaces which climbers use. In line with statutory requirements Cambusmore seek to protect these areas during the breeding season as they are known to hold crag nesting birds from time to time. There is likely to be a limited visual impact when traveling both north and south along the A9. There are only relatively short stretches of the road (in both directions), from which the Woodland Creation area will be

	visible and it is considered that the design will blend well with existing vegetation cover; much of the area and locality surrounding the Woodland Creation area is forested and additional woodland cover will not look out of place. In all respects the design of the woodland Creation will meet the Requirements and Guidelines of UKFS
Population and Human Health	
Residents	There is only one person living within the Woodland Creation area, situated within the central section of the Woodland creation area on the very edge and within a grazing area. This is an isolated property and specific fencing arrangements will be put in place so as to satisfy their needs and requirements. The proposal has been discussed with the resident and any potential impacts explained. At all times as the proposal progresses they will be updated and any concerns they may have will be taken into account and measures taken to address those concerns.
Drinking water	There is a water supply for the single resident and steps will be taken to identify, mark and protect the supply with a 50m radius buffer zone of the abstraction point in accordance with UKFS Requirements. Some 200m to the south of the abstraction point is an area where no planting is anticipated. Within the 50m buffer zone it is not intended to undertake any planting and further buffer areas will be maintained along such watercourses as feed the abstraction point. In line with UKFS Guidelines no pesticides, fertilisers or other chemicals will be applied or stored within the buffer area and in all other respects UKFS Requirements and Guidelines relating to Forests and Water will be adhered to. It is not anticipated that any plant or machinery will be operated within the buffer but if necessary it will only be for the purposes of deer and or stock fence erection. There is a second domestic water supply, serving Torboll Farm which was within the originally proposed Woodland Creation area but this has now been removed and the nearest point to this supply within the proposed Woodland Creation area is some 300m distant. The area within which the abstraction point is situated will continue to be used for grazing. Loch Loaigh (in the south eastern part of the proposed Woodland Creation area) acts as a backup supply to Loch Lanssaigh which provides drinking water to the Dornoch area. A buffer area of 50m will therefore be put in place in respect of such planting as may be undertaken around Loch Loaigh. In all respects regarding planting and forestry operations UKFS Requirements and Guidelines relating to Forest and Water will be adhered to.
Public access	Much of the proposed Woodland Creation area is freely open to access by the public though relatively few people take advantage. The area's most frequently accessed are at the two ends of Loch Buidhe (primarily for fishing) in the west and the track leading up to Loch Laoigh in the southeast. During the spring there are a number of bird watchers but they seldom venture far from their vehicles.

	Given that deer fencing will be erected around the perimeter of the area falling within the proposed Woodland Creation area access will be afforded along the length of Strath Carnaig. It is not proposed that vehicular access be afforded to the proposed Woodland Creation area other than along the public highway running from the A9 (at the southern end of The Mound) to Loch Buidhe and thence Bonar Bridge. There is an area at the eastern end of Loch Buidhe where a limited amount of parking is available and the other access is the track leading to Loch Loaighe which will continue to be available to members of the Dornoch Angling Club, though rarely used in practice. Any other vehicular access on and within the Woodland Creation area will only be with prior consent. All access point and gates will meet the requirements of the Scottish Outdoor Access Code. It is proposed that suitable explanatory signage be provided at all access points indicating the sensitivity of the Woodland Creation area as a whole and in particular for ground nesting birds. Visitors will be encouraged to keep to existing tracks and trails, to cause minimal disturbance and to keep dogs on leads at all times. Suitable signage will further be provided when and where works are being undertaken to meet health and safety requirements and otherwise in accordance with UKFS Requirements and Guidelines. Of necessity there will be a number vehicular access points but these will be for management purposes only; and afford no public vehicular access. Any other vehicular access (public, private or management) will be through gates meeting the relevant requirements per Forest Research Technical Guide, Forest Fences.
Neighbours	Neighbours, estate residents and workers are kept informed of proposals. Various organisations and potential stakeholders have been contacted and where comments have been received these have been taken into account. There are a number of local residents from the Balvraid area who regularly access areas of the estate falling within the proposed Woodland Creation area though they do not tend to venture far on to the hill. To permit continued access detailed fence design will include provision for pedestrian access. In accordance with the Scottish Outdoor Access Code and Joint Agency Fencing Guidelines.
Common Grazing's	Concern has been expressed by a crofter about the possibility of the planting proposal impacting upon the Torboll Common Grazing Area. After discussions with the crofter he has been reassured that the proposal will not impinge upon the Common Grazing. As noted below (Common Grazing's) all common grazing's have been removed from the woodland Creation Proposal.
Bird strikes - fencing	A neighbour has expressed concern about the possibility of his hunting birds flying into fencing. It is proposed to install appropriate marking, whether within or out with a grant funded area. See also Biodiversity
Pony trekkers	Occasional access to the Estate by pony trekkers has been noted. In detailed fence design it is proposed that there be suitable access points and appropriate signage indicating approved pony routes particularly

	during the bird breeding season.
Forest Enterprise	It is understood that Forest Enterprise are likely to commence felling operations within their Achormlarie holding in the next 12 months on a long term basis. This block of woodland forms the southern and south-western boundary of Cambusmore. Cambusmore will liaise closely with Forest Enterprise as regards operations each may undertake so as to ensure there are not likely to be adverse impacts on the hen harrier or other species during the breeding season. Cambusmore are working with Forest Enterprise as regards common fencing and deer control.
Monitoring	Cambusmore and FES are in regular contact regarding deer, hen harriers and fencing. Agreement has been reached, informally, to share data relating to common concerns and where necessary to take appropriate action in the common interest. Cambusmore have been in touch with several academic institutions regarding long term monitoring of the proposed Woodland Creation area both as regards the more general biodiversity impacts of the proposal and the particular impact upon hen harrier breeding and foraging though the latter aspect is likely to continue to be monitored by the Highland Raptor Study Group.
Water	
Buffer Zones	It is not intended that any chemicals will be stored overnight within the proposed Woodland Creation or Habitat Management Plan areas. Such chemicals as are required for daily use will be stored in an approved container at least: • 10 metres from any watercourse 50 metres from any borehole or drinking water supply Where the use of chemicals is necessary they will only be applied in accordance with the guidance provided in CONFOR guide Forestry & Water Scotland Know the Rules. A copy of which will be provided to operators prior to chemical use. Where the use of chemicals is necessary the requisite buffer zones as required by UKFS Forests and Water will be adhered to; namely: • no fertiliser within 5 meters of any drainage ditch, surface water or wetland no fertiliser within 50 meters of any borehole or water supply
Drainage	In carrying out operations full regard will be had to UKFS Forest and Water Guidelines and the General Binding Rules; no machine to operate in watercourses and no machine operations, no cultivation within 2m of surface water nor within 5m of any spring, well or waterlogging. Please refer to People, above, in respect of private water supplies. It is not anticipated that any drainage works would be undertaken and consequently there are unlikely to be

	any adverse impacts resulting from increased flow levels in either the River Carnaig, or further downstream in the River Fleet. It is not therefore anticipated that salmon spawning grounds would be adversely affected. During the course of planting activities and subsequent maintenance operations it is intended to minimize traveling over the ground so to ensure minimal impact on drainage and where possible low ground pressure machinery will be used. It is anticipated that with limited, hand planting, there will be improvements to riparian woodlands by affording increased dappled shading and riverbank stabilisation and protection; also affording enhanced habitat for otters and a variety of river and riverbank species. As there will be no continuous cultivation (no continuous mounding, no continuous screefing and no ploughing) the risks of diffuse pollution will be minimised. There are a number of historic drains situated within the Woodland creation area which have not been maintained for many years. Subject to agreement with SNH and in accordance with the Habitat Management Plan to be completed upon completion of this EIA process a programme of drain blocking may be undertaken in areas of deep peat. Any necessary works to other drainage features will be undertaken after due consultation with SEPA and any other relevant authorities to ensure no adverse impact on the Rivers carnaig and Fleet
Tracks	Where existing tracks require maintenance work such will be undertaken as to meet the UKFS Requirements and Guidelines and General Binding Rules as regards drainage, run off and diffuse pollution risks. Where it becomes apparent that significant maintenance works are required to any tracks it is intended that SEPA be contacted and consulted with for advice and where necessary appropriate regulatory consents obtained. Whilst no new tracks will be constructed open ground areas and sufficiently wide rides will be left within the planting design to afford access for management purposes. Measures will be taken to ensure that such watercourse crossings as may be necessary do not necessitate works in the watercourse. Necessary culverts will be constructed to ensure minimal impact on any fish or other aquatic organisms.
Chemicals	On planting areas the use of chemicals will be avoided where possible save in certain specific circumstances where their use is unavoidable (e.g. bracken control). In such cases the consent of relevant authorities will be obtained and work/application programme agreed. Fuels and oils will only be stored in accordance with UKFS and CONFOR guidelines as stated above for within approved bunded containers.

	All relevant operations will comply with UKFS Requirements and Guidelines
Fuels and Oils	All machinery shall be well maintained to ensure it is free from oil leaks and carry approved spill kits and operators trained in their use. All fuel and oils shall be stored within approved bunded/double skinned lockable containers on sites away from buffer areas. Spillage contingency plans will be put in place prior to the commencement of any operations.
Material Assets	
Scottish Water	Scottish Water has been contacted and Cambusmore is advised a pipeline crosses part of the Estate within the proposed Woodland Creation area but out with any area identified for planting. As a single water pipeline crosses the estate within the proposed Woodland Creation area but out with any proposed planting area there will be no necessity for any crossing points.
OHPL	The Woodland Creation area is crossed by two high voltage overhead powerlines owned and managed by SSE. The Woodland Creation Proposal includes provision for non-planting areas under and alongside the respective lines. It is recognised that SSE will require to undertake maintenance activities and whilst relations have been cordial with SSE the same cannot be said for certain of their contractors. It is understood that various major works are planned to one of the power lines in the next two years and SSE will be advised that such work can only be undertaken outside the hen harrier breeding season [redacted]
Roads	There is one road passing through the Woodland Creation area, which runs in the east from The Mound (A9) westwards along Strath Carnaig to Loch Buidhe and thence to Bonar Bridge. This is an unclassified road unsuitable for heavy vehicles. It is proposed that four deer grids be installed at locations where deer fences cross the road. In line with Highways requirements appropriate 'bypasses' will be constructed to permit passage of animals. The road carries little traffic though during the summer months there is an increase with sightseers who frequently avail themselves of the parking facility at the eastern end of Loch Buidhe which will be retained.
Biodiversity	
General	An early prerequisite of the proposal was the commissioning and preparation of an ornithological survey which is attached as Appendix F to this EIA Report As the Woodland Creation Proposal is a long term project it is proposed to undertake a number of works which in the longer term could be considered mitigatory but which are more specifically dealt with in the Habitat Management Plan for the Woodland Creation area including: • Ditch blocking on deep peat areas Enhancement of wetland around Loch Ruagaidh Reed clearance on Loch Tarvie Wetland creation to west of Achineal

Strath Carnaig & Strath Fleet Moors SPA	The Habitat Management Plan may be regarded as the long term plan to maintain and enhance biodiversity on Cambusmore Estate. A draft Habitat Management Plan is attached as Appendix B and which will be finalised with SNH on the conclusion of the EIA process. The proposed Woodland Creation area is largely situated within the Strath Carnaig and Strath Fleet Moors Special Protection Area so designated on account of its breeding hen harrier population. Mitigation measures to be taken will include those listed more particularly below and as detailed in the EIA Report
Torboll Woods **The Mound Alderwoods**	Both of these areas (each a SSSI and The Mound Alderwoods also a Special Conservation Area) lie outside the proposed Woodland Creation area but within the scope of the Habitat Management Plan. It is not intended that any works will be undertaken in these areas as a part of the Woodland Creation proposal. To protect these areas only native species will be planted within a 250 meter buffer zone to minimize the natural regeneration risk from species not currently within these areas. In general it is not proposed that any non-native species be planted within the Woodland creation area lying within the SPA
Hen harrier	Detailed mitigation measures for the hen harrier as regards planting design are contained within the EIA Report but in general buffers will be provided around known historic nest clusters. Where appropriate water courses will be buffered (to 50m) if there is block planting, This is unlikely to be necessary as the planting in the potentially suitable nesting areas will be low density and in clumps; and additional buffer areas will be created within known foraging territories. This will be kept under review from year to year and more fully addressed in the habitat management Plant to be agreed upon completion of the EIA process. As the hen harrier ranges widely to forage, operations (cultivation, planting or habitat management) will not take place in known foraging and nesting areas from March to mid-August so as to minimise the risk of disturbance. Prior to commencement of operations liaison will be undertaken with individuals undertaking hen harrier monitoring to establish whether hen harriers have moved into any new territories. The like will be undertaken on an annual basis during operations for woodland creation.
Breeding birds	Whilst it is recognized that the proposed Woodland Creation area will contain breeding birds of vulnerable species, the precise nesting locations will not be known until the breeding season. Appropriate buffer zones for these vulnerable species will be put in place for operational purposes. In general it is not proposed to

	conduct operations during the breeding season (March to mid-August) within 500m of known nesting areas of such vulnerable species based on data within the 2018 ATMOS Survey Report. Black grouse favour a mosaic of habitats often on the edge of improved grassland within a moorland environment. Known lekking areas and a 250m buffer around them will be subject to no operations being undertaken during the period March to May. It is anticipated that the Woodland Creation area will afford enhanced habitat for both lekking and nesting. More detailed proposals will be contained within the Habitat Management Plan to be completed, with SNH, upon completion of the EIA process.
European Protected Species	Cambusmore Estate does hold a number of notable wading species but the majority would appear to be concentrated towards the northwestern edge of the Estate and not within the Woodland Creation area. For those waders noted within the Woodland Creation area they appear to be concentrated in areas of proposed variable density planting which will continue to afford them the damp, wet areas they prefer which, taken together with the grazing areas and removal of livestock are likely to have a beneficial effect. Where any previously unknown nests are encountered operations will stop immediately and a continuing programme with appropriate buffer zones agreed with SNH. Prior to undertaking works a European Protected Species survey will be undertaken. Where any such species are identified then the guidance provided in FCS briefing notes 31, Forest Operations and Wildlife Protection, and 32, Forest Operations and Birds in Scottish Forests, will be implemented and appropriate buffers implemented.
Working practices	Working practices will be scheduled such that operations will take place well away from potential hen harrier breeding/nesting and foraging areas during the relevant periods; such works which may include fencing, track maintenance, planting and in the longer term maintenance/management activities.
Habitat Creation	As an objective of the Woodland Creation Proposal is to enhance hen harrier habitat it will be necessary to undertake heather and grassland management works. These will be undertaken outside the breeding season by the creation of limited areas of heather flailing (muirburn is not a realistic option – see full EIA Report) It is anticipated that with appropriate detailed design forest edges can deliver additional habitat for avian and mammalian prey species for the hen harrier – feathering edges with fruit and berry bearing shrubs; this will be incorporated within detailed design plans. It will be noted that significant areas of unimproved grassland have been retained for grazing purposes to minimize adverse impacts of livestock grazing on the 'open hill'. Sheep and cattle grazing on the open hill will be discontinued upon completion of stock fencing works which will be completed prior to

	commencement of planting. More detailed and specific plans to implement habitat enhancement and creation will be contained within the Habitat Management Plan to be completed with SNH upon completion of the EIA process.
Deer	It is recognized that there is a significant local deer population (red, sika and roe) and Cambusmore are actively involved with the South East Sutherland Deer Management Group in the preparation of a Working Plan. To maintain a target population density of 5 deer per km^2 Cambusmore Estate will work with neighbours and stakeholders as regards culling and or other deer control methods. Deer will be undertaken in accordance with the relevant Best practice guides and SNH publication, Code of Practice on Deer Management in line with the Deer Management Plan being developed for the South East Sutherland Deer Management Group. The intention is to keep deer out of the Woodland Creation area but in reality it is recognised that this is not likely to prove possible and that an ongoing cull will be necessary but once the woodland is established it may be feasible to consider a level of 5 deer per km^2. As a part of the ongoing Woodland Creation management plan regular deer fence inspections will be undertaken and any damage repaired where necessary.
Riparian areas	Given the extent of riparian areas it is proposed that there be little, if any, planting within a 20m buffer zone so as to afford protection to otters and other relevant species though, subject to advice limited works may be required to improve dappled shading for fish stocks. Where Cambusmore are advised that additional riparian planting would be beneficial for shading, water quality, water temperature, fish and other aquatic organisms efforts will be made to promote natural regeneration and where this is not practical limited hand planting, with no mechanical input will be undertaken within these buffer areas. Any such works will be undertaken in accordance with UKFS Forests and Water Requirements and Guidelines. Riparian areas and other non or lightly planted areas will afford a number of linked diverse habitat corridors. Where necessary, natural regeneration or limited planting will be undertaken to join up such areas.
Veteran trees	It has been noted by one of the Torboll Common Graziers that there are a number of very old pines just outside the grazing area. Measures will be taken where these fall within the proposed Woodland Creation area to ensure such trees are not adversely impacted. A buffer of 50 meters will be maintained around such trees subject to specialist advice and measures taken to encourage natural regeneration within such buffer zone.
Black grouse	The proposed Woodland Creation area contains a number of black grouse leks both current and historic. In accordance with current practice deer and stock fencing within the prescribed protection radius (currently 2km) will be appropriately marked. There is further anecdotal evidence of hawks hunting grouse flying into fences on the southern edge of the

	estate and it is proposed to extend fencing marking to this area also.
Native Woodland Remnants	As noted by SNH in their Scoping submissionTorboll Woods, situated towards the eastern end of Strath Carnaig and straddling the River Carnaig, lies within the SPA and whilst not included within the Woodland Creation area may be impacted. Two parts of the area adjoining Torboll Woods are designated as grazing land (Achineal and Dalnamain) and will not therefore be planted. Remaining areas within the Woodland Creation area designated for planting will be planted in such manner as to utilise the Designed Open Ground areas as a suitable buffer zone extending to some 250m from the boundary of the specific planting area.
RSPB Scoping Opinion Response	
RSPB Scoping Opinion Response	Comment is made in general terms about the SPA and the potential impact of the Woodland Creation Proposal. Since the time of the RSPB's response, 21st March 2018 the Woodland Creation Proposal has undergone significant changes both as to scale and manner of delivery. It is believed that many of the more general comments made have been dealt with in other parts of this EIA. In the Annex to their covering letter RSPB make a number of points to be addressed; Please refer to Appendix H of the EIA 'Scottish Forestry Scoping Opinion' and submissions dated 28th March 2018.
Impact on hen harrier	In general the Woodland Creation Proposal is being put forward to secure the long term future of the hen harrier within that part of the SPA occupied by Cambusmore. Please refer to EIA report for detailed mitigation proposals.
Loss of nesting habitat **Loss of foraging habitat**	Note is taken of RSPB's expressed concern which are dealt with in the EIA Report. Measures will be taken so as not to degrade hen harrier habitats and provide additional nesting and foraging opportunities.
Impact on other bird species	As will be noted elsewhere in this EIA consideration has been given to other species and Cambusmore is cognisant of it's statutory obligations to other bird species and these will be met. The bird survey conducted by ATMOS has identified a number of other key species breeding within Cambusmore and it is not believed that the Woodland Creation Proposal as submitted will disadvantage them. As regards negative edge impacts it is believed that the proposal more than adequately addresses this issue; the intent is to increase edges so as to afford additional foraging habitat and provide additional nesting opportunities for passerines and other bird species as well as providing additional ground habitat for prey species.
Cumulative and in-combination impacts	Comments about the proposed Garvary windfarm are noted as are those concerning the SSE OHL. As regards the former data has been shared and that data indicates no additional negative impacts to the

	hen harrier within the proposed Woodland Creation area. The OHL is not perceived as a threat since Cambusmore has two OHL traversing the estate and, if anything, they are beneficial since they afford hen harriers a good vantage point to observe nests and potential prey. Potentially, of more concern is the long term effect of the Loch Buidhe sub-station and habitat damage occasioned by OHL maintenance and inspection. Whilst the proposed Garvary windfarm may have a negative impact upon the hen harrier (though there is no historic evidence of nesting in this area – hence the non-contiguity of the SPA) the Woodland Creation Proposal could offset any negative effects by habitat enhancement. It is recognized that Cambusmore hold black grouse and the comments concerning appropriate habitat are noted. It is believed that with a combination of areas of variable density planting, the creation of uneven aged stands and limited grazing these concerns will be addressed.
Mitigation measures	It is recognized that various mitigation measures will be required and these are detailed with more particularity in the Hen Harrier Report comprising Chapter 5 of the Confidential EIA Report. See also Black grouse above This EIA is informed by recent survey work. It is to be noted that in the preparation of this EIA recent and historic data have been received from the Scottish Raptor Study Group which has informed the design of the Woodland Creation Proposal and preparation of this EIA.
Deep peat	As indicated elsewhere peat depths have been surveyed and mapped; all areas with peat depths in excess of 0.5m are excluded from planting, as are other peat areas of shallower depth determined to be unsuitable for planting.
Water Quality	It is believed that issues concerning water quality and potential diffuse pollution have been addressed elsewhere in this EIA; please also refer to Water above. As regards peatland management consideration is being given to the blocking of ditches/drains in areas to the north of Loch Buidhe for the benefit of wading birds and in peatland restoration. Longer term works and habitat management will be covered in a Habitat Management Plan to be prepared following completion of the EIA process. Please refer to attached draft Habitat Management Plan (Appendix B)
Scottish Natural Heritage Scoping Opinion Response	
The Mound Alderwoods SSSI	Comment is made in general terms about the Woodland Creation proposal in SNH's Screening Opinion response dated 20th March 2018 which is included within Appendix I. Since this time the Woodland Creation Proposal has undergone significant changes both as to scale and manner of delivery. It is believed that many

	of the more general comments made have been dealt with in other parts of this EIA. The Mound Alderwoods lie outside the proposed Woodland Creation area.
Deer control	The issue of deer control is being addressed through the establishment of the SE Sutherland Deer Management Group which is commissioning a management plan for the area which will incorporate the proposed Woodland Creation area. Please also refer to the EIA for more specific deer control measures within the proposed Woodland Creation area.
Long Term Forest Plan	This is presently being undertaken.
Torboll Woodlands SSSI	It is not proposed that any planting be undertaken within the Torboll Woodlands SSSI. Comments as to species diversity are noted and the issue of bracken is being addressed. Efforts have been made to undertake bracken control in this area in the last four years but have proved unsuccessful. Alternative control methods are being examined though it should be noted this is an extremely difficult area in which to work. Some bracken will be retained for the pearl bordered fritllary butterfly (*Boloria euphrosyne*).
European Protected Species	An evaluation was undertaken as to the possible impact upon otters. It is not proposed that there be planting within the area covered by the Woodland Creation area that would be likely to affect the otter. All operations, planting and management will be undertaken in accordance with FCS Guidance Note 35 Forest Operations and Otters in Scotland.
Peatland	It is not proposed that there be any planting within areas of deep peat. Please refer to the EIA for details of planting areas and peat depth maps.
Deer Management	Please refer to above comments concerning deer management.
Consideration of Alternatives	Please refer to the EIA for details of alternatives considered.
Common Grazing's	
Removal	For the sake of clarity all common grazing areas (3) under the management of Cambusmore Estate have been removed from within the proposed Woodland Creation area.
Land Use	
Current land use	The current land use of the proposed Woodland Creation area is primarily used for the grazing of sheep and during limited periods of summer and autumn for the grazing of cattle. Within the proposed Woodland Creation area there are historic areas of unimproved pasture with limited enclosures (primarily within the

	Dalnamain management area). The remainder of the Woodland Creation area is essentially open hill comprising heather acid grassland together with areas of deep peat (largely confined to the north west of the Woodland Creation area).There are four main lochs within the Woodland Creation area; Loch Tarvie at the eastern end, Loch Roagaidh to the north east, Loch Loaighe to the south and Loch Buidhe at the western end. Loch Loaighe and Buidhe are regularly fished by members of the Dornoch, Golspie and Kyle of Sutherland Angling clubs. There is a limited amount of stalking, averaging 15 red deer and 3 sika and over the last five years and some 12 roe. Very limited numbers of red grouse are taken annually with all birds shot being walked up and averaging three brace annually for the last five years and a fewer being taken by falconers. The River Carnaig, lying within the Woodland Creation area is regularly fished but numbers caught are not considered reliable as it is now catch and release; not all salmon caught are necessarily reported.

Appendix B. Draft Habitat Management Plan

Cambusmore Estate

Strath Carnaig
Woodland Creation
Draft Habitat Management Plan (DHMP)

This Draft Habitat Management Plan (DHMP) is in draft form only, at the time of submission of the Strath Carnaig Woodland Creation Proposal and offers a basis for future habitat management within the Woodland Creation Proposal area. A detailed Habitat Management Plan will not be finalised or agreed until further consultation with stakeholders has been carried out after the EIA process is concluded.

Preparation and agreement of a final Habitat Management Plan will be undertaken after consultation with the relevant stakeholders including Scottish Natural Heritage (SNH).

Cambusmore Estate

Strath Carnaig
Woodland Creation
Draft Habitat Management Plan

This DHMP seeks to set out in a flexible manner how both the areas that part of Cambusmore Estate lying to the west of the A9 trunk road within and out with the Strath Carnaig and Strath Fleet Moors Special Protection Area (SPA) will be managed.

This DHMP has been prepared as a constituent part of Cambusmore Estate's application to undertake a Woodland Creation Scheme in Strath Carnaig in accordance with the requirements of SNH and to afford a range of measures to mitigate any potential adverse impacts of the proposal.

Objectives
The underlying objectives of the DHMP are as indicated in the Site Management Statement but more specifically with the following additions to meet Scottish Forestry's Scoping Opinion dated 21st March 2018

- To prevent any further deterioration in the 'favourable – declining' status reported at the time of the last SNH assessment, 2013.
- Not to disadvantage the breeding and or foraging habitat for the hen harrier
- To secure and enhance the habitat for the hen harrier and its prey species
- To provide additional foraging and habitat opportunities for the hen harrier , and within the confines of the above to enhance the habitat generally for the benefit of the wide variety of species (both fauna and flora) occupying the area
- To enhance biodiversity on the Estate as a whole

Aims/Vision
- Arrest the 'favourable – declining' status of this part of the SPA
- Long term approach to enhancing overall biodiversity on the Estate
- Creation of variety and range of habitat mosaics
- Enhance existing habitats
- Encourage additional species to colonise the site
- Creation of uneven aged woodland stands
- Provide additional protection for wide variety of ground nesting birds

Background
This Draft Habitat Management Plan ('DHMP') relates to the part of Cambusmore Estate lying to the west of the A9. The majority of the area subject to this DHMP lies within the Strath Carnaig and Strath Fleet Moors SPA which was designated on account of its breeding hen harrier population. The SPA comprises two non-contiguous areas. Cambusmore Estate lies within the southern part of the SPA.

That part of the SPA falling within Cambusmore Estate comprises some 22% of the total and 33% of the southern portion of the SPA which is now classified as being in 'favourable – declining' condition following SNH's most recent condition report (July 2013).

In the period 2003 – 2018 (for which records are available) no more than two pairs of hen harriers are shown as having bred successfully within that part of the SPA occupied by Cambusmore Estate [redacted]

Cambusmore Estate

The area covered by this DHMP has not been managed as a grouse moor for many years and the primary use is for the grazing of sheep. With a re-evaluation the sheep enterprise the owner recognised that the very large part of the Cambusmore open hill could be better managed for the wildlife were the sheep to be concentrated on historic grazing areas.

Whilst muirburn has been a management option a combination of factors has rendered it impractical in recent years; a short window of opportunity in late March/early April, often frustrated by wind and rain.

The present scheme seeks to utilise those parts of the planting area which do not offer potential for the hen harrier for some limited and more variable density types of native woodland (Scots pine, downy birch).

The entire planting proposal is based around the use of species native to the area; with planting stock acquired in accordance with Scottish Forestry requirements.

Prior to the designation of the SPA the area now comprising the SPA was designated as a SSSI in consequence of which SNH issued a Site management Statement (undated but post 2004). The Site Management Statement offers an analysis of the site and a limited description of past and present management.

SNH stated objectives are classed under three headings:

1. To maintain the condition and extent of the upland habitats, including heather moorland, blanket bog and acid grassland
2. To avoid significant disturbance of the breeding hen harrier population, and
3. To maintain the population and distribution of the hen harrier population (including, inter alia, the 'Proposed expansion of woodland and scrub with suitable open habitats to support nesting and foraging hen harriers')

To which may be added

1. The maintenance of the existing black grouse population and associated lekking areas and their associated habitat and where appropriate enhancement of the such habitats
2. The maintenance and enhancement of habitat for those wader, raptors and other species previously identified as breeding or resident within the Woodland creation area
3. The encouragement and promotion of suitable habitats to encourage the recolonisation of the Woodland Creation area by species once present but no longer recorded (including for example but not limited to red squirrels, capercaillie and or wild cats)

Specific Management Measures

Deer

To meet Scottish Forestry requirements a deer fence is to be erected around Cambusmore Estate east of the A9. In line with the deer management plan being drawn up for the South-East Sutherland Deer Management Area the deer will either be driven out or culled. In reality it is likely to be a combination of both.

It is accepted that deer will, inevitably, gain access to the DHMP area and measures will be put in place to maintain a regular watch for deer and as necessary they will be culled to maintain as near zero population as possible.

By the removal of deer it is anticipated that the grazing pressure on the heather will be minimised permitting regrowth to afford nesting opportunities for the hen harrier and other ground nesting birds; especially in the north western part of the site.

In the longer term when trees and shrubs are beyond browsable height and sufficiently robust to resist trampling and being pushed over the objective is to remove the deer fencing and permit a limited population (at some 5 per km^2). It is anticipated that this is likely occur some 20-30 years after completion of planting.

The reasoning behind permitting deer access is that deer are naturally woodland beasts and the habitat being created will in the long term offer a more natural environment than the open hill.

Sheep
It is proposed that the sheep will be removed from the open hill completely. Within the DHMP area a number of historic grazing areas have been identified and these are to be isolated from the planting area with stock fencing. This will enable a more efficient and effective management of the sheep with controlled grazing.

The removal of the sheep will further afford heather regeneration opportunities and reduce opportunities for ground nest destruction by trampling and or eating of eggs/chicks (the like comments apply equally to minimising deer numbers).

It is considered that skylarks and lapwings will benefit from this management method particularly if the grazing is sympathetically managed with paddock grazing squares.

Predator Control
Given the range of potential predators within the planting area that may be a threat to the hen harrier there are only a limited number that may legally be controlled.

Foxes
Measures will continue to be taken to control foxes throughout the DHMP area; particularly during the breeding season. Whilst it is recognised that there are foxes on the site, numbers vary from year to year and where feasible these will be monitored to maintain a stable population. It is not proposed to eliminate all foxes as this is likely to have a 'vacuum effect' and draw yet more in. A relatively healthy stable population is probably more beneficial to the hen harrier.

Most fox control will be concentrated around the grazing areas as the sheep with lambs are considered to be more vulnerable and offer a better energy exchange for the fox.

Corvids
The planting area holds large numbers of corvids and measures will be taken prior to and during the breeding season to control carrion and hooded crows.

Other Predators
To the extent that the law permits other potential predators of the hen harrier will be controlled. However, if predation by other protected species becomes a significant issue it will be discussed with SNH and advice on suitable management/mitigation measures will be sought and implemented.

Humans
Within the confines of the Scottish Outdoor Access Code it is proposed that the exercise of such rights be discouraged during the period from March to August. It is

to be noted that generally there is little exercise of access rights to the area in which woodland creation will take place save for short distances off the road.

The Highland Council have identified a single core path within Cambusmore Estate which does not impact upon the Woodland Creation area and is situated at the eastern end of the Estate, close to the Mound Alderwoods.

As regards access to that part of Cambusmore Estate where woodland creation is being undertaken and which may contain potential hen harrier nesting and or foraging habitat discussion will take place on a regular basis with relevant parties including The Highland Council, SNH and other relevant bodies as to public access.

Drawing on observations from researcher's careful consideration has to be given to the granting of consent for ringing/tagging and or the mounting of nest cameras, where hen harrier nests are situated. There is considerable anecdotal evidence that nest visits can not only alert corvids but also provide a scent trail for foxes and thus potentially lead to higher predation rates.

Any such activities are to be agreed between Cambusmore, SNH and other relevant bodies.

Heather/Grass Management

The creation and maintenance of suitable heather/grass mosaics is of particular importance for ensuring sufficient hen harrier prey and it is anticipated that this will be an ongoing autumnal programme to be adapted annually to specific needs.

Creation and management of appropriate heather grass mosaics will be carried out by means of mechanical flailing. The work programme to be phased over a number of years (10 – 15) to allow for heather regeneration to be staggered and provide varying heights.

It is not considered practical to undertake heather/grass burning save in the very north western area but this would be severely limited due to the extent of deep peat.

The management of any natural woodland regeneration will also be important.

The proposed management could be incorporated into a work plan at a later stage.

Monitoring

It is proposed that monitoring of the area comprised within this DHMP be undertaken on a regular basis to note

Hen harrier activity and breeding success
Breeding birds
Passerine levels
Black grouse
Development of heather/acid grass mosaics

Subject of Survey	Frequency	Type of Survey
Hen harrier	Annual	Vantage point/observation
Raptors	Annual	Vantage point /observation
Breeding birds	3 yearly	Vantage point /observation
Passerine levels	3 yearly	Vantage point /observation
Black grouse	3 yearly	Vantage point /observation
Heather/grass	5 yearly	Aerial photography review

NVC changes	5 yearly	Aerial photography review
Deer fencing	6 monthly	Physical inspection
Deer levels	Per DMG Plan	To be determined

Monitoring will be undertaken by the Review Group and individuals having a knowledge of the site and subject to agreement with input from Atmos Consulting.

Additionally, monitoring will be undertaken by the owner and staff at Cambusmore Estate and subject to their ongoing agreement the Scottish Raptor Study Group.

The Review Group shall comprise the landowner and/or his representative(s), Scottish Forestry, SNH, and such other persons and or organisation that may from time to time be agreed upon.

Records will be maintained in a form to be agreed with SNH. Both hard copy and electronic records will be maintained together with a regular log of notable events occurring between programmed monitoring events.

In the longer term discussions are underway with certain academic bodies to undertake a long term study of the impact of the proposal on the area of the Cambusmore Estate comprised within the SPA.

Reviews

It is proposed that there be a series of regular reviews of the impact of the proposal as set out in the attached chart.

As it is anticipated that the woodland creation scheme will take three planting seasons to complete it is proposed that the first review be undertaken after three years from completion of planting and thereafter every five years.

It is considered that any new plantings will take two years to establish themselves by which time any disturbance effects are likely to have 'grown out'.

After five years the first plantings will be well established and start to form a pattern which can be observed and thereafter the areas will to, a limited extent, be of uneven ages though this effect is not likely to be significant after 10 – 15 years.

Reviews will record the data generated by the monitoring activities and look for trends against the base line (at the commencement of planting) and previous reviews.

Each review shall include the preparation of a report detailing findings, which will be circulated to members of the review group. A meeting shall subsequently be held at which decisions will be made regarding any alterations and or additions considered necessary to the management regime subject to securing all relevant and necessary consents.

Remedial Action

Where as a result of a review any adverse impacts or downward trends are observed then Cambusmore will, in consultation with SNH and other relevant regulatory bodies draw up a plan to mitigate and /or reverse those changes.

The complete absence of breeding hen harriers over a prolonged period would be catastrophic as regards the integrity of the SPA. It is, however, to be noted that prior to the 2018 successful breeding season there were a number of years 2013/14 and 2016 where there was no successful nesting. The reasons are not clear.

If over a five year period there were no nesting attempts then a close examination of observation records, meteorological data, raptor and other predator levels together with possible human impact would be undertaken. Previous management would be analysed along with the commissioning of a full study detailing of flora and fauna within the DHMP area.

Action to be taken in such an event would be dependent upon the results of the investigation and an action programme would be agreed with SNH.

Appendix C. Soils

Cambusmore Estate

Strath Carnaig Woodland Creation Proposal

Site Description

1 Geology and Soils

A The Majority of the estate comprises Moine Psammite with occasional minor intrusive dykes of Granite, Diorite and Amphibolite.

Two narrow bands of Lewisian Gneiss run North to South across Garskelly and Dalnamain.

This solid geology gives rise to soil parent material described by the James Hutton Institute (JHI) Soil survey of Scotland as

"Drifts derived from schists, gneisses, granulites and quartzites principally of the Moine Series".

and includes map units; 23, 25, 26 and 29 of the Arkaig soil association.

These soil map units provide in general, on flatter uplands, deep peats, podzolic peaty gleys with podzols. Ironpans may form on top of induration. Where steeper slopes improve drainage, peaty podzols, podzols and Brown earths are more likely. The terrain is likely to have frequent hollows and gullys where peat formation is more likely and mineral soils on the knolls and ridges. Soil parent material is generally; stony, sandy loams with low fertility due to the high quartz parent material.

B At the far eastern (coastal) end of the estate, Sandstone and conglomerate of the Middle Old Red Sandstone Barren group forms the hills of; Ben Tarvie, Cnoc Odhar, Craig an Amlaidh and The Mound.

These hills are mainly described by JHI as part of the Berridale soil association and are further described as map unit 65.

This tends to give peaty podzols and peaty rankers with some shallow peat, derived from colluvium on rocky hill slopes. Reddish sandy loams are most likely with a variable stony material comprising of schist, granulite and granite elements derived from the conglomerate and with some sandstone stones from the Old Red Sandstone.

2 Vegetation

Both the Arkaig and Berridale soil associations are generally peaty and podzolic. This results in the majority of the vegetation cover being wet heath and dry heath with occasional pockets of acid grassland on the lower ground where slope and aspect favours warmer and better drained conditions. These vegetation communities are documented in the NVC survey carried out by ATMOS in 2018 (See Figure 9).

3 Climate and Hydrology

The Forestry Commission Ecological site classification (ESC) categorises the climate of the estate as fairly variable. This ranges from; Cool, Wet and Highly Exposed in the high open hill ground in the vicinity of Meall Meadhonach and Meall na Tulchainn to Cool, Moist and Sheltered in the lower ground of Strath Carnaig.

At the Evelix Scottish Environmental Protection Agency (SEPA) gauging station, rainfall for 2018 was found to be approximately 640mm which suggests a sufficient amount of water for most tree species.

The Estate drains via four main water courses.

1. The river Fleet. Strath Carnaig. Loch Buidhe and east to the sea *via* Abhainn na Stratha Charnaig to the river Fleet. Including Allt Loch Tarvie and Allt Tigh Neill.
2. The River Evelix. Achvaich burn, Loch Laoigh and Loch Lannsaidh.
3. Skelbo burn. South of Ben Tarvie, Leathad na Seamraig.
4. Cambusavie burn. Local to the Lodge.

- The river Evelix and tributaries (Achvaich burn) has potential ecological constraints on levels of fertiliser inputs (Freshwater pearl impact) *FES East Sutherland Land Management plan (LMP)*

Appendix D. Woodland Creation Potential Report

CAMBUSMORE ESTATE

STRATH CARNAIG WOODLAND CREATION PROPOSAL

WOODLAND ESTABLISHMENT POTENTIAL

NOVEMBER 2018

Andy Kennedy

Contents

1 Introduction / Background

Cambusmore estate has sought to expand woodland cover in order to improve the habitat value for species diversity in general and birdlife in particular. The estate has historically supported a few pairs of Hen Harriers but at present, the population has dropped to two nests.

If HH population is to be maintained and enhanced, it would seem desirable to adapt management of the current open ground in order to maximise the habitat for species that HH prey on. In doing so, the expected increase in the population of small birds and rodents would consequently benefit other raptors across the estate.

2 Location and Estate Character

Cambusmore is approximately 5000 hectares of mixed moorland and grazing land located to the East of Achany, North of Achcormlarie and west of Loch Fleet.

See Appendix 1 for location map.

3 Objectives

3.1 Habitat

3.1.1 Open ground for HH

Hen Harriers favour open ground nesting sites where tall grasses or mature heather give cover from ground predators. Suitable areas should be identified that currently support tall heather and suitable grass species and would receive passive management to continue.

Hen Harriers require a large area of open ground or low scrub to quarter for prey. Most of the upland moor is currently open ground but is limited in habitat for passerines and likely sub-optimal for voles. Some areas of currently open ground would be useful to be planted with willow (wetter sites) and gorse (drier sites) to encourage chats and pipits etc.. Maintaining a grass sward where appropriate, would be useful to the vole population.

[redacted]

3.1.2 Scrub woodland

Nesting and foraging habitat for various passerines would be found in open canopy woodland of short rotation, light demanding and scrub species such as Gorse, Birch, Rowan, Juniper and Willows.

Variable density would allow a range of ecotones to develop. These would encourage a wide range of habitat for moorland and woodland bird species.

3.1.3 High Forest

On steeper low ground and in better sheltered areas, longer rotation high forest would be a more natural climax community and would create nesting and foraging habitat for several raptor species as well as Hen Harrier prey species such as; thrushes, wrens, finches, tits and wood mice.

3.2 Grazing

3.2.2 Stock

Some areas of the estate are to be retained as grazing for stock. These are mainly in the south and eastern end of the estate. See map, Appendix 2

3.2.3 Deer

Deer currently roam the estate and mainly are spill-over from sporting estates to the North.

4 Baseline data

4.1 Bird survey

Hen harrier studies have been carried out on the estate for some years and the trend is progressively lower breeding pairs.

4.2 Archaeology

Several sites across the estate have a range of Neolithic and other archaeological features. These include; chambered cairns, hut circles and field systems.

Areas identified as having any archaeological interest have been excluded from woodland establishment planning. See map. Appendix 3

4.3 Peat depth

A survey of the estate was carried out in 2018 to identify areas of peat over 50cm that would be excluded from woodland creation plans due to the negative impact on bog habitat conservation and potential carbon loss. See map. Appendix 4

The Survey produced polygons of peat depth class. Although broadly accurate, it is likely that these show a general trend and not exact demarcation between areas of deep peat and shallow peat.

Areas drawn as suitable for woodland have therefore avoided areas of likely deep peat but the exact boundaries will need to be confirmed on the ground at the site planning stage.

4.4 Vegetation

An NVC survey was also carried out by ATMOS in 2018 to identify any ground vegetation with a high conservation value that should be excluded from woodland design and to identify suitable woodland NVC types from the pre-cursor vegetation community.

Most of the Polygons mapped were intimate complexes of various NVC types. The dominant NVC community was used for the purposes of planning tree species suitability. See map. Appendix 5

The NVC habitat map was compared with the peat depth survey and polygons of Mires with peat deeper than 45cm were also removed from the remaining potential woodland areas.

5 Potential woodland cover

5.1 Suitability modelling

The NVC ground vegetation data was compared with the Forestry Commission Ecological Site Classification (ESC) Climate data and suitability of the woodland types were calculated in the ESC Decision support system (DSS) model V4.

The FC Native woodland ESC maps were used to estimate upper planting limits for likely NVC communities of Native NVC types. The majority of the potential plantable ground is *suitable* or *very suitable* with the most limited area being the upper slopes to the north of Loch Buidhe Such as Meall na Tulchainn

Most of the *Calluna* dry heath areas were found to be suitable for W18 woodland.

The Mires ranged in fertility quality from Soil Nutrient Regime (SNR) 3.0 for the M17 through slightly less impoverished M15 (SNR 4.5) to the relatively good M25 (SNR 7.0 – 7.5). The majority of the Mires were found to be suitable for W4 however, the range of moisture and nutrient levels indicate some variation in growth rate and species diversity.

The acid grassland (U4 & U20) were suitable for a wider range of species and woodland type due to the general higher nutrient status. W17, W18 and W19 would be likely natural climax woodland types.

5.2 Open ground and low density bog woodland

Although all the Mires might support a W4 woodland type, it would be realistic to match NVC sub-communities for the best woodland species match. E.g. the current M17 mire areas would naturally only support (slow growth) scrub type structure and favour species poor W4a/c Downy birch (*Betula pubescens*) with Willows (*Salix aurita, Salix cinera*) Rowan (*Sorbus aucuparia*) and occasional Alder (*Alnus glutinosa*)

Areas currently mapped as M6 would likely support a scrub cover of Willow and other low height scrub.

These communities are naturally patchy with sphagnum rich pockets of waterlogged ground and would suit a low density scrub objective. Small clumps of Willow or Birch would be planted on locally most favourable site conditions leaving an an open ground matrix of bog ground vegetation unmodified.

Prospects for natural regeneration of tree species and growth rates are limited due to the wet conditions and low nutrients.

Due to the target tree species all being adapted to wet soil conditions, no drainage would be envisaged and ground preparation should be minimal (e.g. hand screef/turf).

M25 *Molinia* swards would be expected to make suitable sites for W4 establishment but may also be very suitable for Vole habitat if left ungrazed.

Some hand fertilising (i.e. PK) may be required to establish the plants.

5.3 Native low density woodland

On the remaining Mire communities, more diverse Birch woodland is possible with the potential for natural regeneration of target tree species. Some drainage or raised planting position is likely desirable.

On M25 (*Molinia caerulea*) mires dense clumps of Downy birch stands would likely develop naturally from seedfall.

M15 has a limited range of fertility and moisture and may be suitable for W4, W18 Scots pine (*Pinus sylvestris*), or W19 Juniper (*Juniperus communis*) depending on the depth of mineral soil and local drainage.

M16 is a *Molinia caerula* and Calluna vulgaris dominated community and is suitable for W4 and W18

The H9 and H10 Calluna dominated dry heath is suitable for W17, W18 or W19 Juniper with associated minor species such as birch and rowan.

Some hand fertilising (i.e. PK) may be required to establish the plants.

5.4 Native woodland – high density

H9 is likely suitable for Scots pine, and birch high forest.

H10 is likely suitable for Scots pine, and birch high forest. Depending on the soil type.

U4 Would support a range of species likely to naturally make high forest canopy structure with benefits for native species. They would likely include; Sessile Oak, Scots pine, and Norway spruce.

Drainage is likely not required but some vegetation suppression is desirable.

Some hand fertilising (i.e. PK) may be required to establish the plants.

5.6 Summary of Potential woodland suitability

The main NVC communities were moorland mires and heaths. The mires were mainly M15, M16 M17 and M25 which comprised 66% of the net area (770 ha).

Approximately 26% of the area is drier *Calluna vulgaris* dominated H9 and H10.

Small areas (49ha) of mainly U4 (&U20) acid grassland were found making slightly more than 4% of the total area.

The Survey polygons are mainly expressed as complexes of different NVC communities and may require some further detailed mapping analysis for detailed woodland planning.

The summary of NVC ground vegetation areas remaining as "Suitable" for Woodland establishment are summarised below.

NVC Community	Area by Management zone				Likely Woodland Species	Total Area	Area %
	Achinael	Dalnamain	Loch Buidhe	Tarvie			
W4			0.7		W4/W17	0.7	0.1
W18				0.2	W18/W19	0.2	0.0
U4	8	28.1	3.4	7.7	BI/OK W17	47.2	4.1
U20		0.5		1	BI/OK W18	1.5	0.1
M6	5.7	2.7	16	3.7	Willow Scrub	28.1	2.4
M25	52.8	14.7	5.9	2.7	Birch and/or Voles	76.1	6.6
M23			0.9		Willow Scrub	0.9	0.1
M20	3.4		17.4	4.3	Willow Scrub	25.1	2.2
M19	25.7	5.1	36.6	7.3	DBI Scrub	74.7	6.4
M17	89.4	3.7			DBI & minor W4 spp.	93.1	8.0
M16	44.4	48.5	154	4.1	DBI & minor W4 spp.	251	21.6
M15a	3.5			10.1	DBI & minor W4 spp.	13.6	1.2
M15/M19	0.2				DBI & minor W4 spp.	0.2	0.0
M15	79.2	26.6	46.1	84.1	DBI & minor W4 spp.	236	20.3
H9/M20			14.2		SP/BI W18	14.2	1.2
H9	64.5	27.1	116.8	17.7	SP/BI W18	226.1	19.5
H10	5.4	34.1	28.4	4	SP/BI W18	71.9	6.2
Grand Total	**382.2**	**191.1**	**440.4**	**146.9**		**1160.6**	**100**

See map. Appendix 7.6

6 Other considerations

6.1 Power lines

Any woodland established under the powerlines would need to be minimal height and as such would be limited to scrub species. Or left as open ground.

6.2 Public access

It is probably to the benefit of the HH for public recreation to encouraged away from the core nesting sites.

6.3 Long-term management strategy

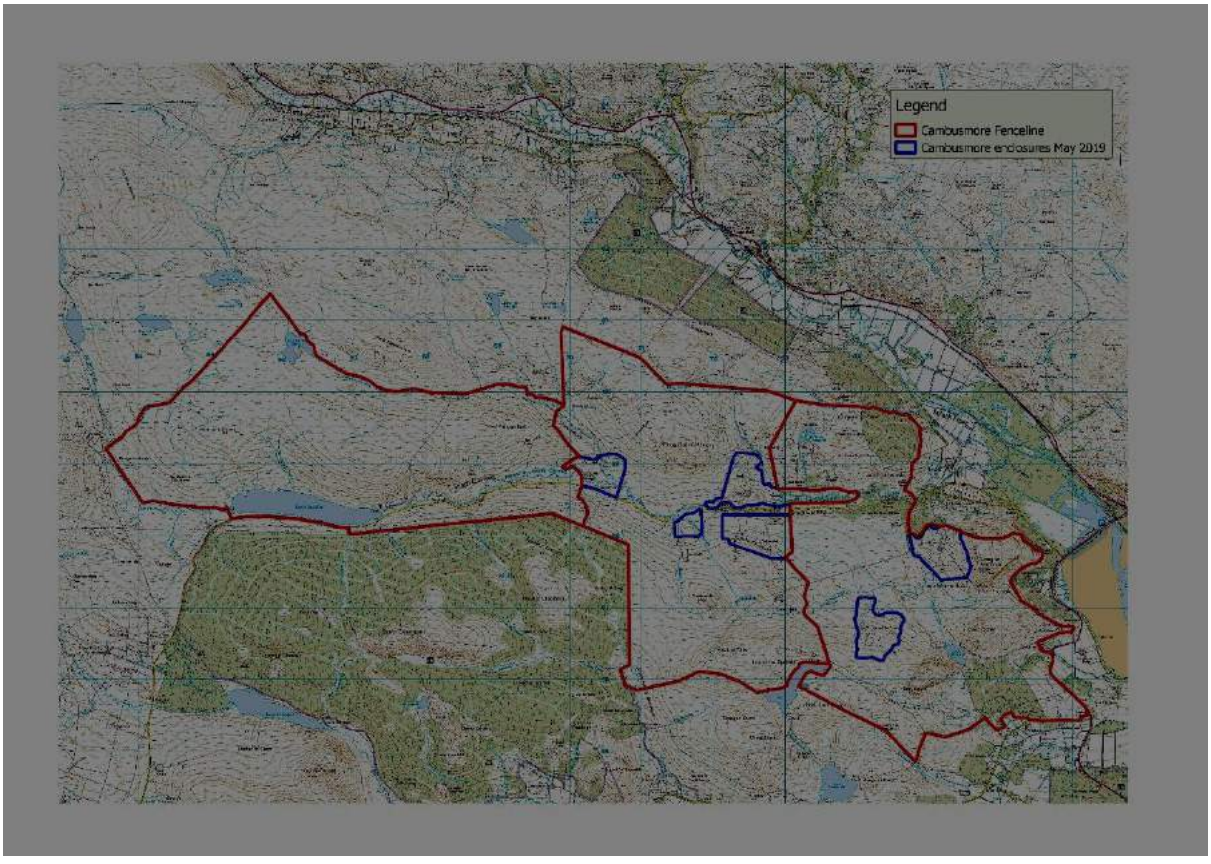
As the objectives for the area is to enhance habitat for HH and prey species, woodland density and structure should be managed in the long-term to develop and maintain a mixed land cover of open ungrazed rough pasture, patchy scrub and high forest.

An iterative management plan should be designed to clarify objectives for the estate as a whole and allow more detailed localised plans once the woodland creation element is established.

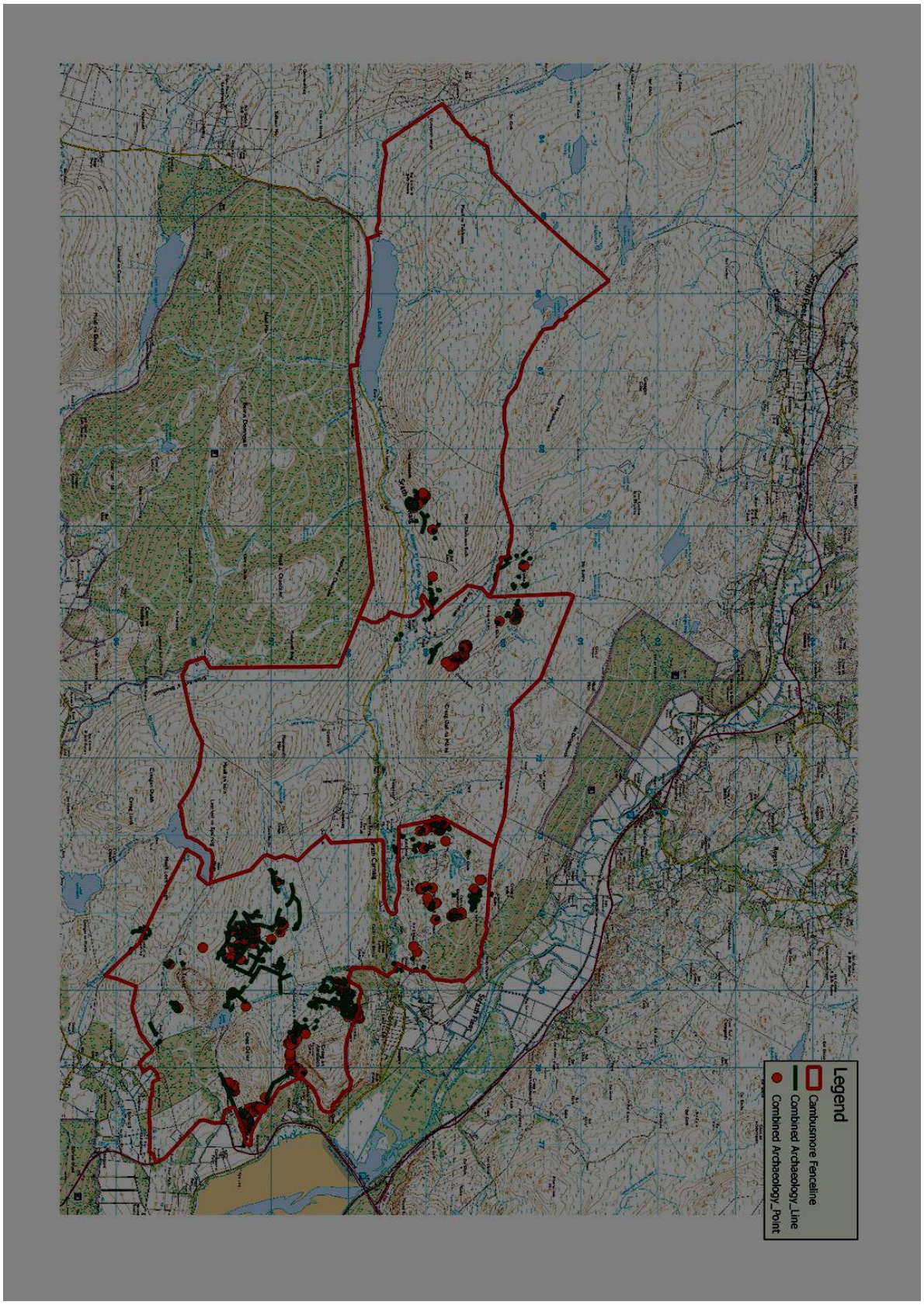
7 Appendices

7.1 Location map

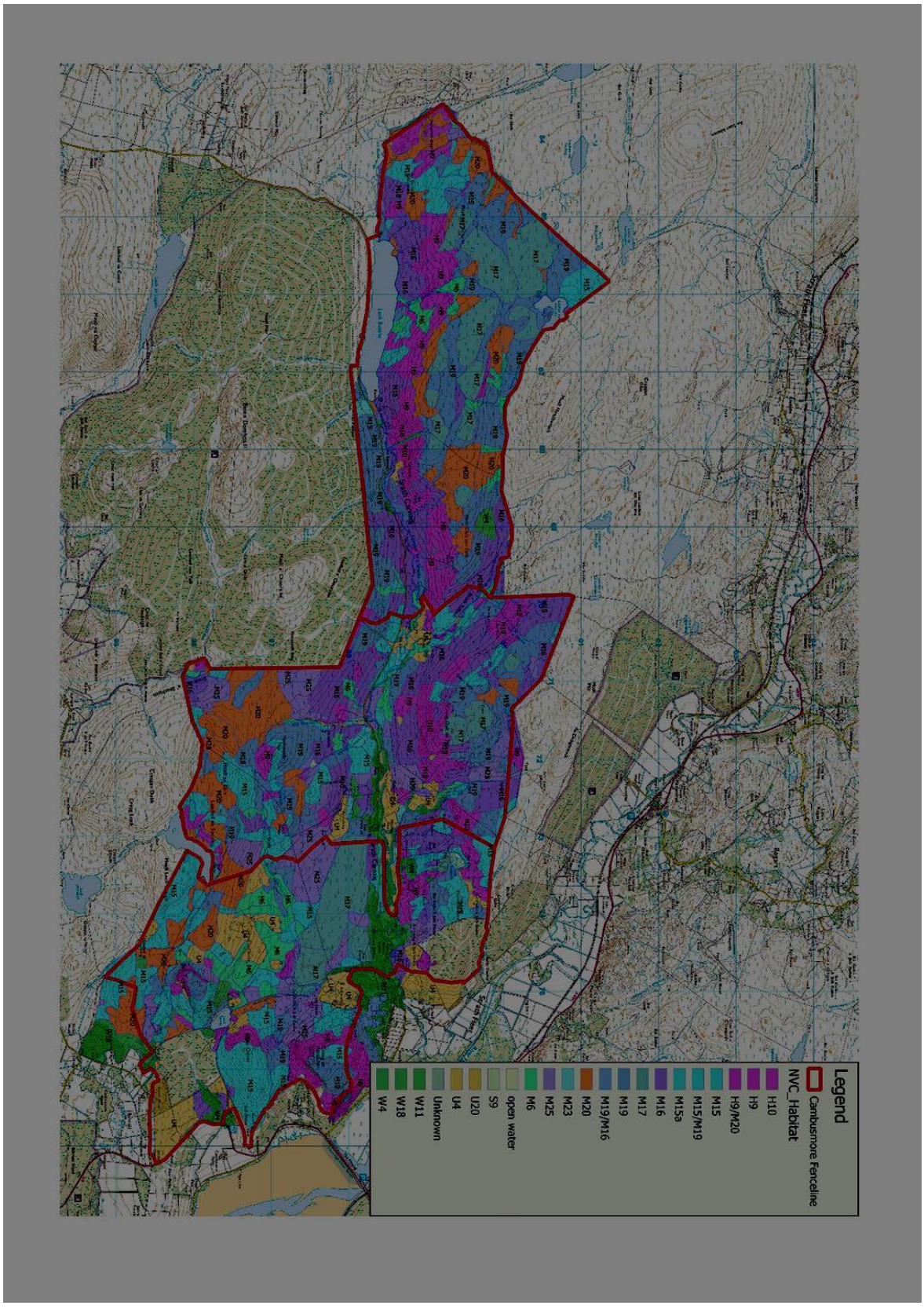
7.2 Grazing enclosures



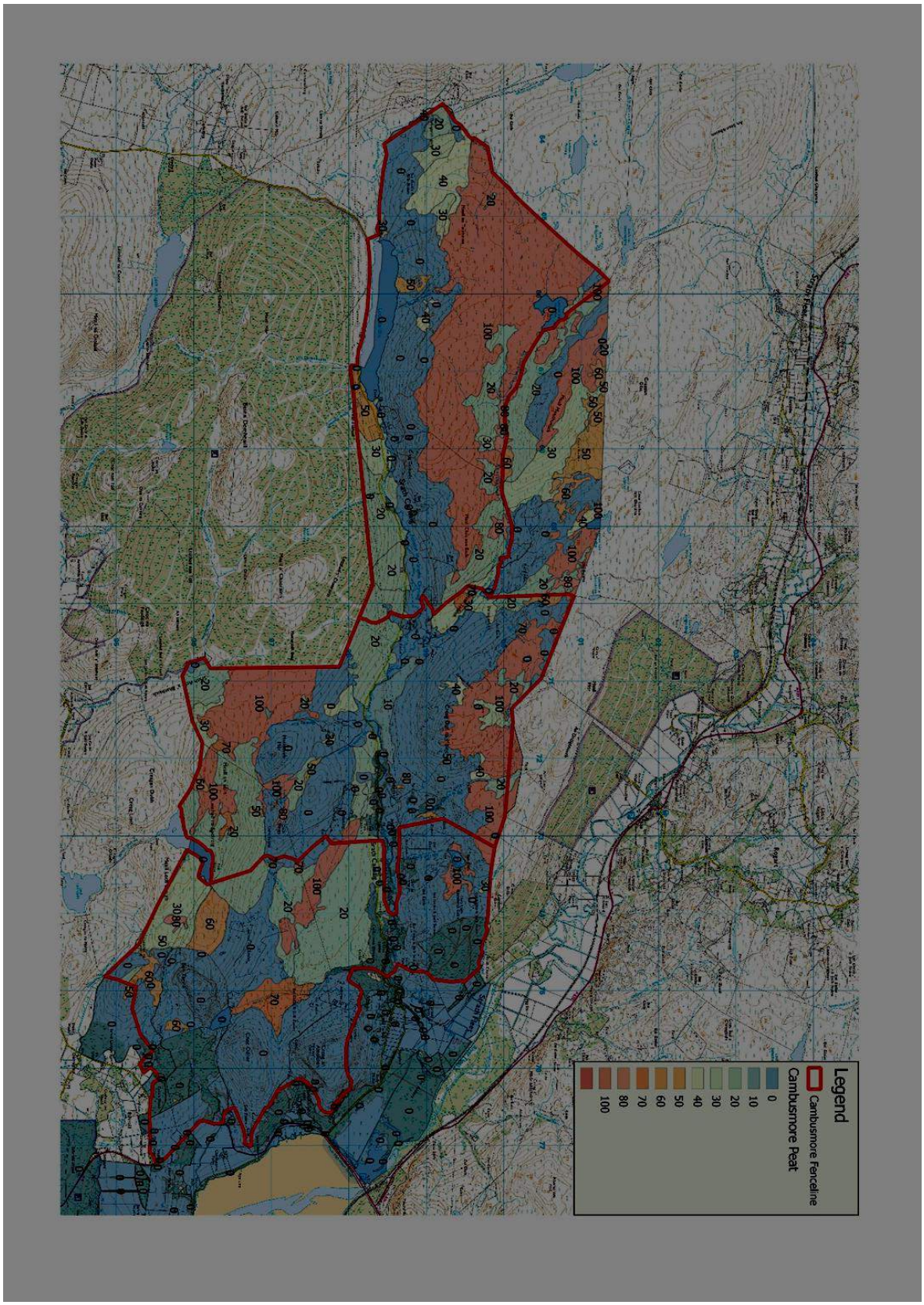
7.3 Archaeology sites



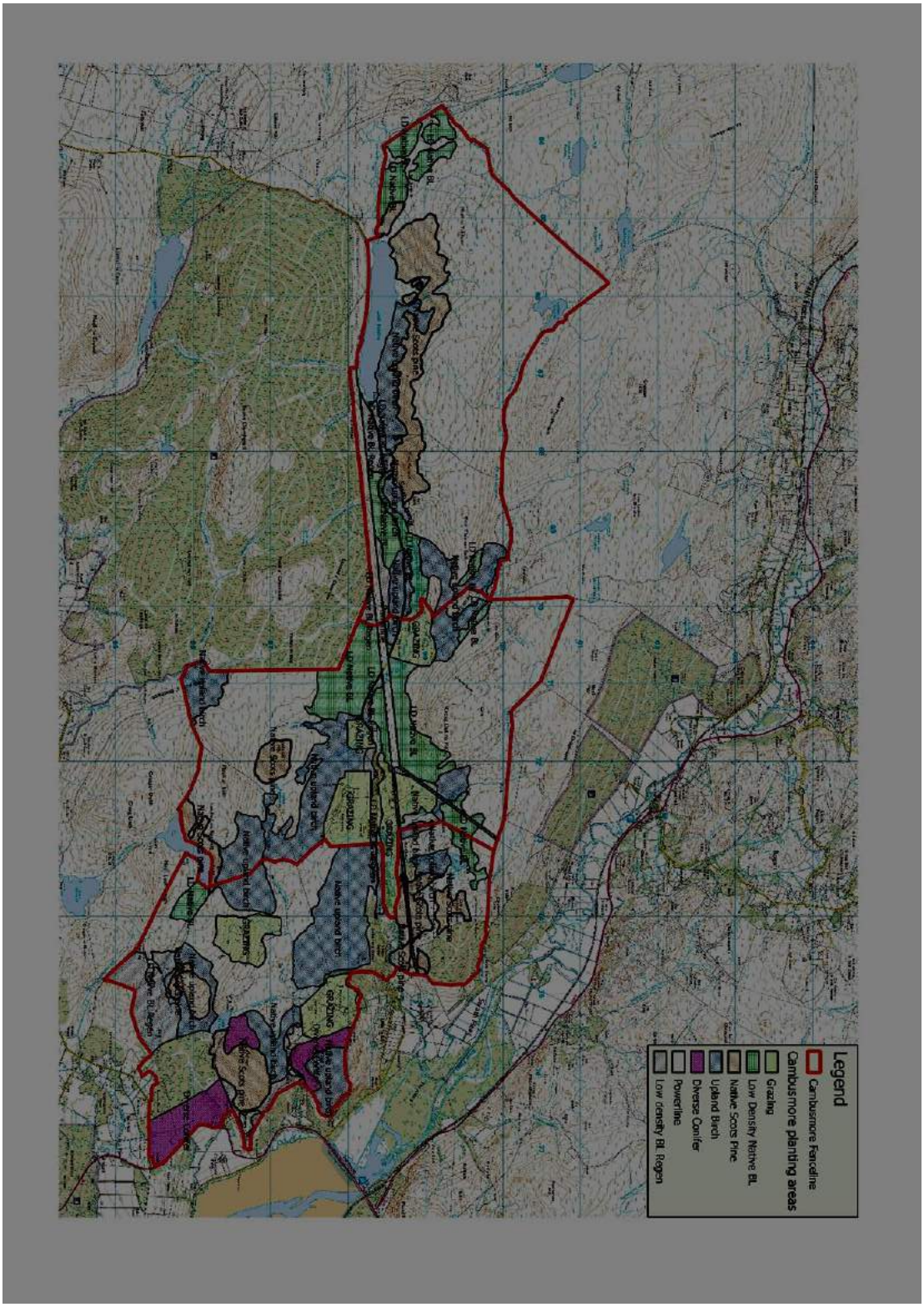
7.4.1 Vegetation (ATMOS NVC survey)



7.4.2 Peat depth survey



7.5 Potential woodland creation



Appendix E. Archaeology

Cambusmore Estate, Dornoch, The Highlands
Archaeological Assessment Report

AOC Project Number 70329

December 2018

AOC Archaeology Group

ARCHAEOLOGY | HERITAGE | CONSERVATION

Cambusmore Estate:

Archaeological Assessment Report

On Behalf of:	**Border Woodlands Ltd**
National Grid Reference (NGR):	**NH 7129 9845 (centre point)**
AOC Project No:	**70329**
Prepared by:	**Victoria Oleksy** **Lindsey Stirling**
Illustrations by:	**Lindsey Stirling** **Victoria Oleksy**
Date of Survey:	**September - November 2018**
Date of Report:	**December 2018**

This document has been prepared in accordance with AOC standard operating procedures.

Author: Vicky Oleksy & Lindsey Stirling	**Date: December 2018**
Approved by: Mary Peteranna	**Date: December 2018**
Draft/Final Report Stage: Draft	**Date: December 2018**

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List of illustrations

List of appendices

1.0 NON-TECHNICAL SUMMARY

1.1 AOC Archaeology Group was commissioned by Border Woodlands Ltd to undertake an Archaeological Assessment to inform a proposed woodland management and planting scheme and the planting approval and grant processes at Cambusmore Estate, near Dornoch in Sutherland. The Site lies within the local authority administrative area of Highland Council, who is advised on all archaeological and cultural heritage matters by the Highland Council Historic Environment Team. The Forestry Commission is advised on archaeological matters by their internal archaeological officer.

1.2 This report outlines the results of Archaeological Assessment as established through desk-based assessment, walkover survey and setting assessment site visits. The assessment has been made with reference to indicative proposals and all areas of potential planting have been surveyed.

1.3 Cambusmore Estate is currently occupied by a mix of open moorland and agricultural land, largely used for grazing, with a few small pockets of forestry in the northeast along the River Fleet and to the southeast near Ardshave. Agricultural land is mainly concentrated to the east and south of the estate, to the east of the A9 and is not included in the Site boundary for the planting proposal (see Figure 2). The area of the planting proposal within the Cambusmore Estate (hereafter the 'Site') is bound to the east by the A9. To the north and west, the surrounding area is primarily open moorland and hills with Strath Fleet located further to the north. The land to south is a combination of forestry and open moorland.

1.4 This assessment has identified 112 previously known heritage assets within the Site and a further 106 heritage assets were identified during the walkover survey. These assets range in date from the prehistoric to post-medieval period. Some are located within the areas where no planting is proposed and therefore would not be impacted by the planting proposal. Where assets have been identified within areas proposed for planting, mitigation measures, including buffering assets with planting exclusion zones, are proposed. Given the known heritage assets identified consideration is also given to the potential for hitherto unknown buried archaeological remains to survive.

1.5 Indirect impacts may include visual impacts upon the settings of designated assets such as Listed Buildings, Scheduled Monuments, Conservation Areas and Inventoried Historic Gardens and Designed Landscapes. Impacts upon setting are a material consideration in the planning process.

1.6 One Listed Building, the Category A Listed Mound Bridge (Site 88) is located within the Site at its northeastern corner. The bridge is located within an area where no planting is proposed and the nearest planting would be c. 1.5km to the southwest. As such no impacts upon its setting are predicted and it will not be considered further in this assessment. Six Scheduled Monuments have been identified within the Site. Three, Strath Carnaig, broch (Site 27), Creag an Amalaidh (Site 74) which comprises a hut circle and field system and Mound Junction (Site 26) comprising a hut circle, field system and lynchet are located in areas where no planting is proposed. However, there is potential for planting in the areas around these assets and as such the potential for impacts upon their setting will be consider herein. Similarly, the assessment will consider the potential for impacts upon the setting of the Scheduled Monuments at: Creag an Amalaidh (Site 76) which comprises a chambered long cairn, a hut circle and a field system; Torboll kerb cairn (Site 67) and Carn Liath (Site 43) which comprises two chambered cairns, hut circle and field system. All three of these Scheduled Monument are located within areas proposed for planting. Where impacts upon the setting of these assets are deemed possible, mitigation measures are proposed.

2.0 INTRODUCTION

2.1 Development site

2.1.1 The Site is located to the south of Strath Fleet, c. 10km to the north of Dornoch (**Figure 1**) and in the administrative area of Highland Council. It is centred on **NGR: NH 7129 9845.** The land is largely open moorland and bog, although there is a small area of agricultural land in the east of the Site near Torboll Farm and a few areas of forestry to the east and northeast near Ardshave and along the River Fleet respectively. The Site is bound by the A9 to the east and is largely surrounded by open moorland, with some forestry to the south around Beinn Domhnaill to the south.

2.2 Development proposal

2.2.1 Border Woodlands Ltd commissioned AOC Archaeology Group to undertake an Archaeological Assessment to inform the planting proposals, along with the approval and grant process, at Cambusmore Estate, Dornoch. The Site is proposed for commercial planting across the Cambusmore Estate to the west of the A9. A number of areas, as shown on **Figure 2**, will be excluded from planting. AOC understand that planted areas will be surrounded by deer fencing and that the intention is to use / upgrade existing access tracks for groundworks.

2.3 Government and local planning policies

2.3.1 National Planning Policy Guidelines

The statutory framework for heritage in Scotland is outlined in the Town and Country Planning (Scotland) Act 1997, as amended in the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997 and Ancient Monuments and Archaeological Areas Act 1979; both of which are modified by the Historic Environment (Amendment) (Scotland) Act 2011.

2.3.2 The implications of the acts noted above with regard to local government planning policy are described within Scottish Planning Policy 2014 (SPP), Historic Environment Scotland Policy Statement 2016 (HESPS) and Planning Advice Note 2/2011 (PAN 2). SPP and HESPS deal specifically with planning policy in relation to heritage. SPP expresses the following policy principles:

"*The planning system should: promote the care and protection of the designated and non-designated historic environment (including individual assets, related settings and the wider cultural landscape) and its contribution to sense of place, cultural identity, social well-being, economic growth, civic participation and lifelong learning; and enable positive change in the historic environment which is informed by a clear understanding of the importance of the heritage assets affected and ensure their future use. Change should be sensitively managed to avoid or minimise adverse impacts on the fabric and setting of the asset, and ensure that its special characteristics are protected, conserved or enhanced*" (2014, para 137).

2.3.3 HESPS (Historic Environment Scotland 2016) sets out the Scottish Government's policy for the sustainable management of the historic environment. Key principles of the policy note that '*there should be a presumption in favour of preservation of individual historic assets and also the pattern of the wider historic environment; no historic asset should be lost or radically changed without adequate consideration of its significance and of all the means available to manage and conserve it*' (ibid, 1.9.b).

2.3.4 HES have recently (3rd December 2018) closed the consultation on the draft of their new Historic Environment Policy (HEP) which is scheduled to replace HESPS in the spring of 2019. The new policy will be considerably shorter than HESPS and will be underpinned by a more detailed series of 'Managing Change' guidance documents than is available at present.

2.3.5 *Local Planning Policy*

The Highland Wide Local Development Plan (HwLDP) was adopted in 2012 (Highland Council 2012). Policy 57 Natural, Built and Cultural Heritage (ibid.) states:

"All development proposals will be assessed taking into account the level of importance and type of heritage features, the form and scale of the development and any impact on the feature and its setting, in the context of the policy framework detailed in Appendix 2. The following criteria will also apply:

1. *For features of local/regional importance we will allow developments if it can be satisfactorily demonstrated that they will not have an unacceptable impact on the natural environment, amenity and heritage resource.*
2. *For features of national importance, we will allow developments that can be shown not to compromise the natural environment, amenity and heritage resource. Where there may be any significant adverse effects, these must be clearly outweighed by social or economic benefits of national importance. It must also be shown that the development will support communities in fragile areas who are having difficulties in keeping their population and services.*
3. *For features of international importance developments likely to have a significant effect on a site, either alone or in combination with other plans or projects, and which are not directly connected with or necessary to the management of the site for nature conservation will be subject to an appropriate assessment. Where we are unable to ascertain that a proposal will not adversely affect the integrity of a site, we will only allow development if there is no alternative solution and there are imperative reasons of overriding public interest, including those of a social or economic nature. Where a priority habitat or species (as defined in Annex 1 of the Habitats Directive) would be affected, development in such circumstances will only be allowed if the reasons for overriding public interest relate to human health, public safety, beneficial consequences of primary importance for the environment, or other reasons subject to the opinion of the European Commission (via Scottish Ministers). Where we are unable to ascertain that a proposal will not adversely affect the integrity of a site, the proposal will not be in accordance with the development plan within the meaning of Section 25(1) of the Town and Country Planning (Scotland) Act 1997."*

2.3.6 Forestry Commission Guidance

The Forestry Commission Scotland has published several guidance documents on the identification and protection of the historic environment within forestry and woodland. *Forests & historic environment: information and advice* was published in 2016 and states that:

"Following the UKFS Forests and Historic Environment guidelines, historic environment features and sites of special cultural significance should be identified and appropriate measures taken to protect them. Where relevant, a professional archaeological walkover survey may be required to inform decisions and provide baseline evidence (particularly in advance of a new woodland creation). Issues raised during this process should be considered and evidenced within a forest management plan" (2016, 2).

2.3.7 The UK Forestry Standard (2017) provides a number of guiding principles in relation to the management and development of woodland and forestry. A number of these guidance points are relevant to the mitigation impacts upon heritage assets and will be discussed in Section 7 as relevant. The following overarching guidelines are particularly relevant to this assessment.

It is important that all significant heritage features, and not just designated ones, are protected and that consideration is given to the preservation and enhancement of cultural and historic landscapes (2017, 80).

Scheduled Monuments must not be damaged and consent must be obtained from the relevant historic environment authority for any works that have the potential to damage the monument. (ibid, 83)

The settings of features, in addition to the features themselves, may be relevant and will need to be considered in the forest management plan. (ibid, 88)."

2.3.8 Other Planning Considerations Pertaining to the Site

Supplementary Planning Guidance (SPG) was adopted by Highland Council in January 2013. This supplementary guidance is intended to compliment Policy 57 of the adopted Highland Wide Local Development Plan (Highland Council 2012). As stated in the Highland Wide Local Development Plan (ibid.), the main principles of the SPG will be to ensure that:

- *"Future developments take account of the historic environment and that they are of a design and quality to enhance the historic environment bringing both economic and social benefits;*
- *It sets a proactive, consistent approach to the protection of the historic environment."*

2.3.9 On 31st August 2018, the Caithness and Sutherland Local Development Plan (CaSPlan) was formally adopted by Highland Council and it forms part of the Development Plan. It states that:

"*CaSPlan is home to a diverse range of renowned and celebrated built and cultural assets. The Plan balances the need to capitalise on these assets for social, economic, environmental and other needs, whilst safeguarding their unique character and qualities."*

2.3.10 It goes on to state that:

"[t]he natural and historic environment is rich, containing: internationally and nationally recognised sites…locally valued sites and landscapes…and a diverse cultural heritage. HwLDP policies provide safeguards for these features."

2.3.11 The Local Planning Authority is advised on all archaeological matters by the Highland Council Historic Environment Team. Any requirement for archaeological work either preceding or during the development will be determined by the Highland Council Historic Environment Team acting as the Highland Council's advisor on archaeological matters.

2.3.12 There are six Scheduled Monuments and one Listed Building within the Site. The Scheduled Skelbo Castle and Listed Skelbo farmstead are located with Cambusmore Estates landholding but outwith the Site. Skelbo Wood, broch (Site 100) and long cairn (Site 101) are both Scheduled and located c. 360m to the south of the estate boundary at its eastern extent. There are no Inventory Gardens and Designed Landscapes, Inventory Battlefields or Conservation Areas within the Site or in proximity to it.

2.3.13 The setting of Listed Buildings is a competent planning matter; Section 14.2 of the Planning (Listed Buildings and Conservation Areas) Act 1997 states that when determining applications for development which could impact upon the setting of a Listed Building:

"*…the planning authority or the Secretary of State, as the case may be, shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses.*"

2.3.14 Paragraph 141 of Scottish Planning Policy (Scottish Government 2014) notes the importance of preserving the settings of Listed Buildings, stating that:

"*The layout, design, materials, scale, siting and use of any development which will affect a listed building, or its setting should be appropriate to the character and appearance of the building and setting. Listed buildings should be protected from demolition or other work that would adversely affect it or its setting.*"

2.3.15 A new development must not impact upon the area of a Scheduled Monument without the prior formal consent of Scottish Ministers via Historic Environment Scotland. A development may not have a direct, i.e. physical, impact upon a Scheduled Monument without Scheduled Monument Consent. The setting of Scheduled Monuments is also a key consideration when determining planning applications. This principle is outlined in Scottish Planning Policy Paragraph 145 (ibid.):

"*Where there is potential for a proposed development to have an adverse effect on a scheduled monument or on the integrity of its setting, permission should only be granted where there are exceptional circumstances. Where a proposal would have a direct impact on a scheduled monument, the written consent of Scottish Ministers via a separate process is required in addition to any other consents required for the development*."

2.4 Limitations of Scope

2.4.1 This Archaeological Assessment, comprising a desk-based study, walkover survey and setting assessment, is based upon data obtained from publicly accessible archives as described in the *Data Sources* in Section 4.2 and a walkover survey. National Record of the Historic Environment (NRHE) data, Historic Environment Scotland designation data and Highland Council HER data was downloaded or received in September 2018.

3.0 AIMS AND OBJECTIVES

3.1 The aim of this Archaeological Assessment is to identify heritage assets, and the value thereof, within or in proximity to Site proposed for planting. This was done by examining a variety of evidence for upstanding and buried remains of archaeological and architectural heritage interest within the Site and estate (**Figures 1 & 2**). The assessment identifies likely impacts upon archaeological and cultural heritage assets resulting from the prposed planing scheme. Where necessary, this assesment identifies the need for further works that may be necessary to clarify and mitigate these impacts.

4.0 METHODOLOGY

4.0.1 The methodology adopted in this assessment has involved the following key stages:

- Determine baselines via desk-based assessment and walkover survey;
- Identify potential impacts;
- Identify mitigation requirements as appropriate;

4.1 Standards

4.1.1 The scope of this assessment meets the requirements of current planning regulations set out in Scottish Planning Policy (SPP) (Scottish Government 2014), HESPS (Historic Environment Scotland 2016) and *PAN2/2011* (Scottish Government 2011). Historic Environment Scotland's guidance on setting (2016b) included in their *Managing Change in the Historic Environment* series has also been considered. *Managing Change*. The assessment also meets the criteria set out in the UKFS (2017) and by the Forestry Commission Scotland (2016)

4.1.2 AOC Archaeology Group conforms to the standards of professional conduct outlined in the Chartered Institute for Archaeologists' (CIfA) Code of Conduct (CIfA 2014a), the CIfA Standard and Guidance for Historic Environment Desk Based Assessment (CIfA 2017), the CIfA Standard and Guidance for Commissioning Work or Providing Consultancy Advice on the Historic Environment (CIfA 2014b) and the CIfA Standard and Guidance for the Archaeological Investigation and Recording of Standing Buildings or Structures (CIfA 2014c).

4.1.3 AOC Archaeology Group is a *Registered Archaeological Organisation* of the CIfA. This status ensures that there is regular monitoring and approval by external peers of our internal systems, standards and skills development.

4.1.4 AOC is ISO 9001:2015 accredited in recognition of the Company's Quality Management System.

4.2 Baseline Deterimation

Data sources

4.2.1 The following data sources were consulted during preparation of this Heritage Assessment:

- Historic Environment Scotland (Bernard Terrace & Longmore House, Edinburgh):
  For NRHE data, archaeological and architectural photographs, online aerial photographs as made available by NCAP, various archaeological and historical publications, and unpublished archaeological reports, and designated asset data;
- National Map Library online resources:
  For old Ordnance Survey maps (1st & 2nd Edition, small- and large-scale) and pre-Ordnance Survey historical maps;
- Highland Council Historic Environment Record:
  For historic environment record data;
- Ordnance Survey Name Books:
  For historical descriptions of the local area
- ESRI World Imagery Layer:
  For basemap aerial imagery provided through ESRI's ArcGIS platform

Walkover Survey

4.2.2 A walkover survey of the proposed planting areas was undertaken to examine assets identified during the desk-based assessment in the field and to record their current condition, extent and significance. The walkover survey also aimed to identify any previously unrecorded heritage assets and to identify any areas of disturbance which may have previously impacted buried archaeological remains and thus might negate the need for mitigation.

4.2.3 Setting assessment site visits were undertaken to designated heritage assets within the Site to relate the existing landscape to research findings and to assess the potential impacts of the proposed development on the settings of designated heritage assets and non-designated assets which were deemed to be of national importance. The remaining assets were visited, and notes made on their nature, setting and condition. All sites visited are listed in the Gazetteer at **Appendix 1**.

Technical Appendices & Figures

4.2.4 Each heritage asset referred to in the text is listed in the Gazetteer in Appendix 1. Each has been assigned a 'Site No.' unique to this assessment, and the Gazetteer includes information regarding the type, period, grid reference, HER number, statutory protective designation, and other descriptive information, as derived from the consulted sources.

4.2.5 The extent of Cambusmore Estate is shown in **Figure 1**; **Figure 2** depicts the proposed planting area along with surveyed areas in green and areas which will be excluded from planting in grey. Each heritage asset referred to in the text is plotted on the location maps. Previously known heritage assets, as identified from the data sources listed above in Section 4.2 are depicted on **Figures 3a & 3b**. Survey assets are shown on, **Figures 4a & 4b** and their extents are depicted in detail in **Appendix** 4 on Figures 31 to 56. The assigned Site Nos are shown on these figures.

4.2.6 All known heritage assets located within the Site have been included in the assessment. The aim of this is to identify heritages which could be directly impacted upon by the planting proposal and to help predict whether any similar hitherto unknown archaeological remains are likely to survive on the Site and therefore be impacted by the proposed planting. Designated assets including Listed Buildings and Scheduled Monuments have also been identified with a further aim of assessing potential impacts upon the setting of these monuments.

4.2.7 All sources consulted during the assessment, including publications and archived records are listed in the Bibliography at the end of this report. Excerpts of historic maps and their references are included in Appendix 3 which provides Figures 5 to 30.

4.2.8 A list of all photographs taken during the walkover survey is provided in **Appendix 5**. A selection of these photographs is reproduced in **Appendix 6**.

4.3 Impact assessment methodology

Assessing Cultural Value (Significance) & Importance

4.3.1 The definition of cultural significance is readily accepted by heritage professionals both in the UK and internationally and was first fully outlined in the Burra Charter, which states in article one that ‘cultural significance’ or ‘cultural heritage value’ means aesthetic, historic, scientific, social or spiritual value for past, present or future generations (ICOMOS 1999, Article 1.2). This definition has since been adopted by heritage organisations around the world, including HES. In the HESPS, HES note that to have cultural significance an asset must have a particular “artistic; archaeological; architectural; historic; traditional (factors listed in the 1979 Act); aesthetic; scientific; [and/or] social [significance] – for past, present or future generations (HES 2016a, 48). Heritage assets/features also have value in the sense that they “...create a sense of place, identity and physical and social wellbeing, and benefit the economy, civic participation, tourism and lifelong learning” (Scottish Government 2014). For clarity and to avoid confusion with the EIA term ‘significant’, the term ‘cultural value’ will be used throughout this assessment though, as outlined above, it is acknowledged that this is the same as ‘cultural significance’ as defined in HESPS.

4.3.2 All heritage assets have some value; however some assets are judged to be more important than others. The level of that importance is determined by establishing the asset’s capacity to inform present or future generations about the past. In the case of many heritage assets their importance has already been established through the designation (i.e. scheduling, listing and inventory) processes applied by HES.

4.3.3 The criteria used to establish importance in this assessment are presented in Table 1 and are drawn from Appendices 1-6 of HESPS which outline the criteria for establishing National Importance:

TABLE 1

CRITERIA FOR ESTABLISHING RELATIVE IMPORTANCE OF HERITAGE ASSETS

Asset Importance	Criteria
International and National	World Heritage Sites; Scheduled Monuments (as protected by the Ancient Monuments and Archaeological Areas Act 1979); Category A Listed Buildings (as protected by the Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997); Inventory Gardens and Designed Landscapes (as protected by the 1979 Act, as amended by the Historic Environment (Amendment) (Scotland) Act 2011) Inventory Battlefields (as protected by the 1979 Act, as amended by the 2011 Act); Non-Designated Assets considered to be of National Importance including, fine, little-altered examples of some particular period, style or type (as protected by SPP, 2014).
Regional	Category B Listed Buildings (as protected by the 1997 Act); Conservation Areas (as protected by the 1997 Act); Major examples of some period, style or type, which may have been altered (as protected by SPP, 2014); Non-Designated assets of a type which would normally be considered of national importance that have been partially damaged (such that their ability to inform has been reduced) (as protected by Paragraph 137 of SPP, 2014);
Local	Category C Listed Buildings (as protected by the 1997 Act); Lesser examples of any period, style or type, as originally constructed or altered, and simple, traditional sites, which group well with other significant remains, or are part of a planned group such as an estate or an industrial complex (as protected by SPP, 2014); Cropmarks of indeterminate origin (as protected by SPP, 2014); Non-Designated assets of a type which would normally be considered of regional importance that have been partially damaged or asset types which would normally be considered of national importance that have been largely damaged (such that their ability to inform has been reduced) (as protected by SPP, 2014).
Negligible	Relatively numerous types of remains; Findspots of artefacts that have no definite archaeological remains known in their context; Non-Designated assets of a type which would normally be considered of local importance that have been largely damaged (such that their ability to inform has been reduced). (as protected by Paragraph 137 of SPP, 2014).

Relative Sensitivity to setting Impacts

4.3.4 While determining the relative cultural value of a heritage asset is essential for establishing its importance, it is widely recognised (see Lambrick 2008 & Historic England 2017) that the importance of an asset is not the same as its sensitivity to changes to its setting. Thus, in determining impacts upon the setting of assets by the proposed development, both importance and sensitivity to changes to setting are considered.

4.3.5 Setting is a key issue in the case of some, but by no means all assets. A nationally important asset does not necessarily have high sensitivity to changes to its setting (relative sensitivity) and the capacity of an asset to accommodate change to its setting can also depend on the location of the asset. An asset's sensitivity refers to its capacity to retain its ability to inform this and future generations in the face of changes to its setting. The ability of the setting to contribute to an understanding, appreciation and experience of the asset and its value also has a bearing on the sensitivity of that asset to changes to its setting. Assets with high sensitivity will be vulnerable to changes which affect their settings and even slight changes may reduce their information content or the ability of their settings to contribute to the understanding, appreciation and experience of that asset. Less sensitive assets will be able to accommodate greater changes to their settings without significant reduction in their ability to inform and in spite of such changes the relationship between the asset and its setting will still be legible. This requires the implications of development affecting the setting of heritage assets to be considered on a case-by-case basis.

4.3.6 The criteria for establishing an asset's relative sensitivity are outlined in Table 2:

TABLE 2: CRITERIA FOR ESTABLISHING RELATIVE SENSITIVITY

Relative Sensitivity	Criteria
High	An asset whose setting contributes significantly to an observer's understanding, appreciation and experience of it should be thought of as having High Sensitivity to changes to its setting. This is particularly relevant for assets whose setting, or elements thereof, contribute directly to their significance (e.g. form part of their Key or Contextual Characteristics (HES 2016a)). For example, an asset which retains an overtly intended relationship with its setting and the surrounding landscape. These may in particular be, but are not limited to, assets such as ritual monuments which have constructed sightlines to and/or from them or structures intended to be visually dominant within a wide landscape area e.g. castles, tower houses, prominent forts etc. Setting is the way in which the surroundings of a historic asset or place contribute to how it is experienced, understood and appreciated (HES 2016). Therefore, an asset, which relies heavily on its modern surroundings for its understanding, appreciation and experience, is of high sensitivity. In particular an asset whose setting is an important factor in its protection and in retention of its cultural value (as per SPP (2014, 5) definition of setting).
Medium	An asset whose setting contributes moderately to an observer's understanding, appreciation and experience of it should be thought of as having Medium Sensitivity to changes to its setting. This could be an asset for which setting makes a contribution to value but whereby its value is derived mainly from its other qualities (HES 2016a). This could for example

	include assets which had an overtly intended relationship with their setting and the surrounding landscape but where that relationship (and therefore the ability of the assets' surroundings to contribute to an understanding, appreciation and experience of them) has been moderately compromised either by previous modern intrusion in their setting or the landscape or where the asset itself is in such a state of disrepair that the relationship cannot be fully understood. An asset, the current understanding, appreciation and experience of which, relies partially on its modern aesthetic setting regardless of whether or not this was intended by the original constructors or users of the asset. An asset whose setting is a contributing factor to its protection and the retention of its cultural value.
Low	An asset whose setting makes some contribution to an observer's understanding, appreciation and experience of it should generally be thought of as having Low Sensitivity to changes to its setting. This may be an asset for which an understanding of it is mainly derived from its other characteristics and whereby changes to its setting will not materially diminish our understanding, appreciation and experience of it. This could for example include assets which had an overtly intended relationship with their setting and the surrounding landscape but where that relationship (and therefore the ability of the assets' surroundings to contribute to an understanding, appreciation and experience of them) has been significantly compromised either by previous modern intrusion to its setting or the landscape or where the asset itself is in such a state of disrepair that the relationship cannot be determined
Negligible	An asset whose setting makes minimal contribution to an observer's understanding, appreciation and experience of it should generally be thought of as having Marginal Sensitivity to changes to its setting. This may include assets for which the fundamental relationship with their surroundings has been lost, possibly having been compromised by previous modern intrusion, but which still retain cultural value in their intrinsic and possibly wider contextual characteristics

4.3.7 The determination of an asset's sensitivity is first and foremost reliant upon the determination of its setting. The criteria set out in Table 2 is intended as a guide. Assessment of individual assets is informed by knowledge of the asset itself; of the asset type if applicable and by site visits to establish the current setting of the assets. This allows for the use of professional judgement and each asset is assessed on an individual basis. It should be noted that individual assets may fall into a number of the sensitivity categories presented above, e.g. a country house may have a high sensitivity to alterations within its own landscaped park or garden, but its level of sensitivity to changes may be less when considered within the wider landscape context.

4.3.8 In establishing the relative sensitivity of an asset to changes to its setting, the setting of the asset must first be established. **Appendix 2** outlines the range of factors considered when establishing the setting of the asset. These have been used as a guide in assessing each asset from known records and in the field.

Development impacts

4.3.9 A direct impact by the Proposed Development can potentially result in an irreversible loss of information content. The potential magnitude of the physical impact upon heritage assets caused by the proposed development is rated using the classifications and criteria outlined in Table 3.

TABLE 3
CRITERIA FOR CLASSIFYING MAGNITUDE OF DIRECT PHYSICAL IMPACT

Physical impact	Criteria
High	Major loss of information content resulting from total or large-scale removal of deposits from a site. Major alteration of a monument's baseline condition
Medium	Moderate loss of information content resulting from material alteration of the baseline conditions by removal of part of a site. Moderate alteration of a monument's baseline condition.
Low	Minor detectable impacts leading to the loss of information content. Minor alterations to the baseline condition of a monument.
Negligible	Very slight or barely measurable loss of information content. Loss of a small percentage of the area of a site's peripheral deposits. Very slight and reversible alterations to a monument.
None	No physical impact anticipated.

4.3.10 The magnitude of indirect impact by the proposed development is an assessment of the magnitude of change to the setting of any given asset, in particular those elements of the setting that inform its cultural value. Table 4 outlines the main factors affecting magnitude of impact:

TABLE 4: FACTORS AFFECTING MAGNITUDE OF SETTING IMPACT

Site Details	Importance of Detail for assessing magnitude of setting impact
Proximity to proposed development	Increasing distance of an asset from the proposed development will, in most cases, diminish the effects on its setting.
Visibility of proposed development (based on ZTV	The proportion of built form of the development that will be intervisible with the asset will directly affect the magnitude of

Site Details	Importance of Detail for assessing magnitude of setting impact
model and wireframes where appropriate)	impact on its setting. The proportion of the view from each asset which will feature the proposed development will also affect the magnitude of impact. The existence of features (e.g. tree belts, forestry, landscaping or built features) that could partially or wholly obscure the development from view will also affect the magnitude of impact.
Complexity of landscape	The more visually complex a landscape is, the less prominent the new development may appear within it. This is because where a landscape is visually complex the eye can be distracted by other features and will not focus exclusively on the new development. Visual complexity describes the presence, extent, character and scale of the existing built environment (HES 2016) and the extent to which there are various land types, land uses, and built features producing variety in the landscape and how the proposed development compares to and fits in with this.
Design of Development	This refers to the existence of features (e.g. tree belts, forestry, landscaping or built features) that could partially or wholly obscure the development from view. The form of mapping called ZTV always presents a worst-case scenario for visibility precisely because the readily accessible digital mapping does not take cognisance of vegetation, structures and local micro-topography. Ground truthing is always necessary for a real appraisal of the magnitude of impacts.

4.3.11 It is acknowledged that Table 4 primarily deals with visual factors affecting magnitude of impact. While the importance of visual elements of settings, e.g. views, intervisibility, prominence etc., are clear, it is also acknowledged that there are other, non-visual factors which could potentially result in setting impacts. Such factors could be other sensory factors, e.g. noise or smell, or could be associative. Where applicable these are considered in coming to a conclusion about magnitude of impact.

4.3.12 Once the above has been considered, the prediction of magnitude of impact upon setting will be based upon the criteria set out in Table 5.

TABLE 5: CRITERIA FOR CLASSIFYING MAGNITUDE OF SETTING IMPACT

Magnitude of setting impact	Criteria
High	Direct and substantial visual impact on a key sightline to or from a ritual monument or prominent fort; Direct and substantial visual impact on a key 'designed-in' view or vista from a Designed Landscape or Listed Building; Direct severance of the relationship between an asset and its setting; An impact that changes the setting of an asset such that it threatens the protection of the asset (SPP 2014) and materially affects an observer's ability to understand, appreciate and

	experience the asset.
Medium	Oblique visual impact on an axis adjacent to a key sightline to or from a ritual monument or prominent fort but where the key sightline of the monument is not obscured; Oblique visual impact on a key 'designed-in' view or vista from a Designed Landscape or Listed Building; Partial severance of the relationship between an asset and its setting; Notable alteration to the setting of an asset beyond those elements of the setting which directly contribute to the understanding of the cultural value of the asset; An impact that changes the setting of an asset such that an observer's ability to understand, appreciate and experience the asset and its cultural value is marginally diminished.
Low	Peripheral visual impact on a key sightline to or from a ritual monument, prominent fort, designed landscape or building; Slight alteration to the setting of an asset beyond those elements of the setting which directly contribute to the understanding of the cultural value of the asset; An impact that changes the setting of an asset, but where those changes do not materially affect an observer's ability to understand, appreciate and experience the asset.
Marginal	All other setting impacts
None	No setting impacts

4.3.13 The assessment of the level of effect by the development is based upon plans supplied by the client to AOC Archaeology Group and site visits.

5.0 ARCHAEOLOGICAL AND HISTORICAL BASELINE AND SURVEY RESULTS

5.1 Introduction

5.1.1 Cambusmore Estate covers an area of approximately 52sqkm or 5200ha (**Figure 1**) with over 100 previously known heritage assets present within the estate. The assets date from the prehistoric to post-medieval period (**Figures 3a-b**). A gazetteer of all previously known sites, combined with the new survey data is included in **Appendix 1.** The forestry planting proposal covers land along the Srath Carnaig valley from Garvary in the west to Torboll in the east, including the areas of Strath Tollaidh and Loch Ruagaidh (**Figure 2**). The planting proposal also includes land to the south of Srath Carnaig encompassing the areas of Garskelly, Leathad na Cloiche, Ben Tarvie, Cnoc Odhar, Creag an Amalaidh and Achinael. The majority of the land is currently either grazing land or open moorland. The forestry planting proposal did not include any land to the east of the A9 trunk road and as such Sites 80-89 and 95-112, which are included in the estate boundary but not the Site, and were not included in the survey.

5.1.2 Cambusmore appears on historic maps from as early as Robert Gordon's *Map of Scotland* (1636-52) and Blaeu's *Atlas of Scotland* (1654). William Roy's *Military Survey of Scotland* (1747-55), names a number of small settlements in the area, such as *Camusmor, Little Torbo, Meikle Torbo, Dalmain*, and *Achaduaig*. Many of these villages survive to be seen on the Ordnance Survey (OS) 1st and 2nd edition maps (surveyed 1873-4, with the 2nd edition revised 1903-4), although it should be noted that by the time of the 1st edition map many appear to be ruinous or abandoned. A full list of the historic maps consulted can be found in **Appendix 3,** along with select extracts.

5.1.3 The walkover survey was undertaken between September and November 2018. Weather conditions were mixed but overall visibility was good. Areas of survey were targetted based on the planting proposal, generally avoiding areas where no planting is proposed. Other areas were not walked because of poor ground conditions, for example very steep slopes or very boggy ground. These areas were inspected via aerial imagery (ESRI) and from the periphery through binoculars whilst surveying. In total 220 heritage assets were recorded (112 of these were previously known and recorded on the NRHE and/or Highland Council HER, the rest were identified during the walkover survey), however many heritage assets were composed of multiple elements including structures, dykes, enclosures and cairns (**Figures 4a-b**). If each feature was numbered individually there would be closer to 1,000 heritage assets.

5.1.4 Discussion of the archaeological and historical background is detailed below, along with the survey results. The full descriptions of each surveyed asset can also be found in the Gazetteer in **Appendix 1.** The summary of the results has been split into seven sections by area: Garvary and Loch Buidhe; Srath Carnaig and Brae Cottage; Strath Tollaidh; Dalnamain and Garskelly; Loch Ruagaidh and Torboll; Leathad na Cloiche and Ben Tarvie; and Achinael, Creag an Amalaidh and Cnoc Odhar.

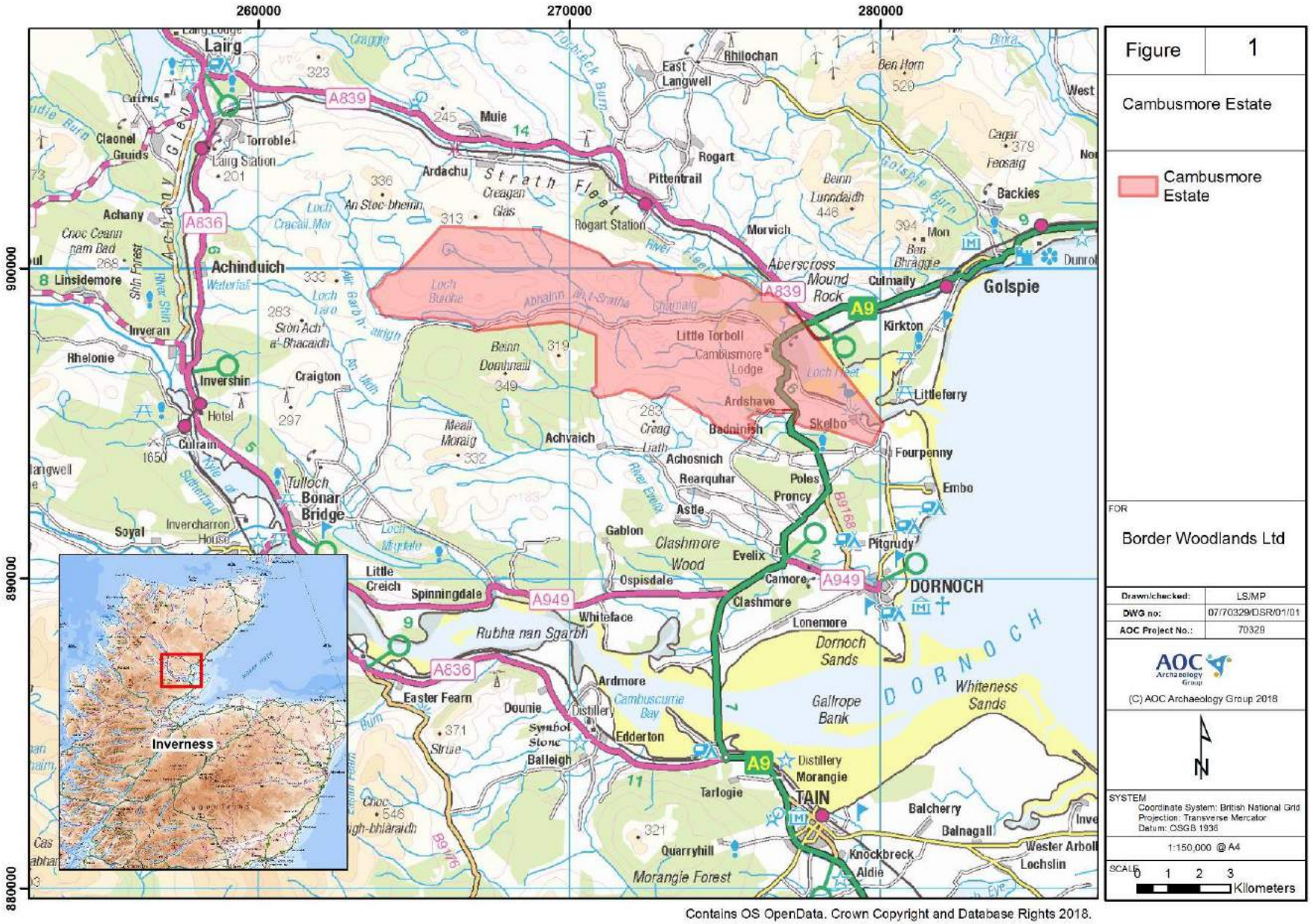


Figure 1: The location of Cambusmore Estate

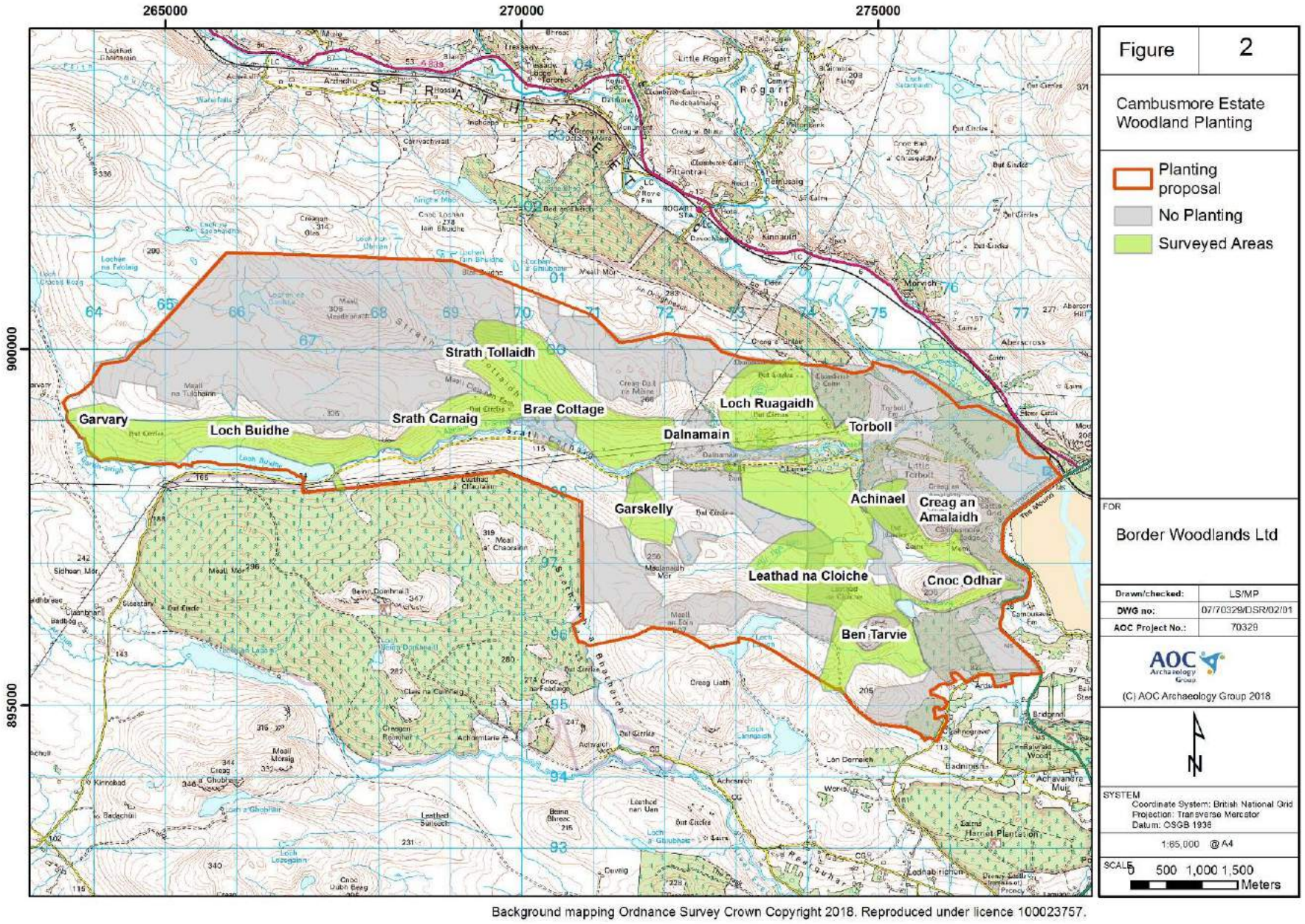
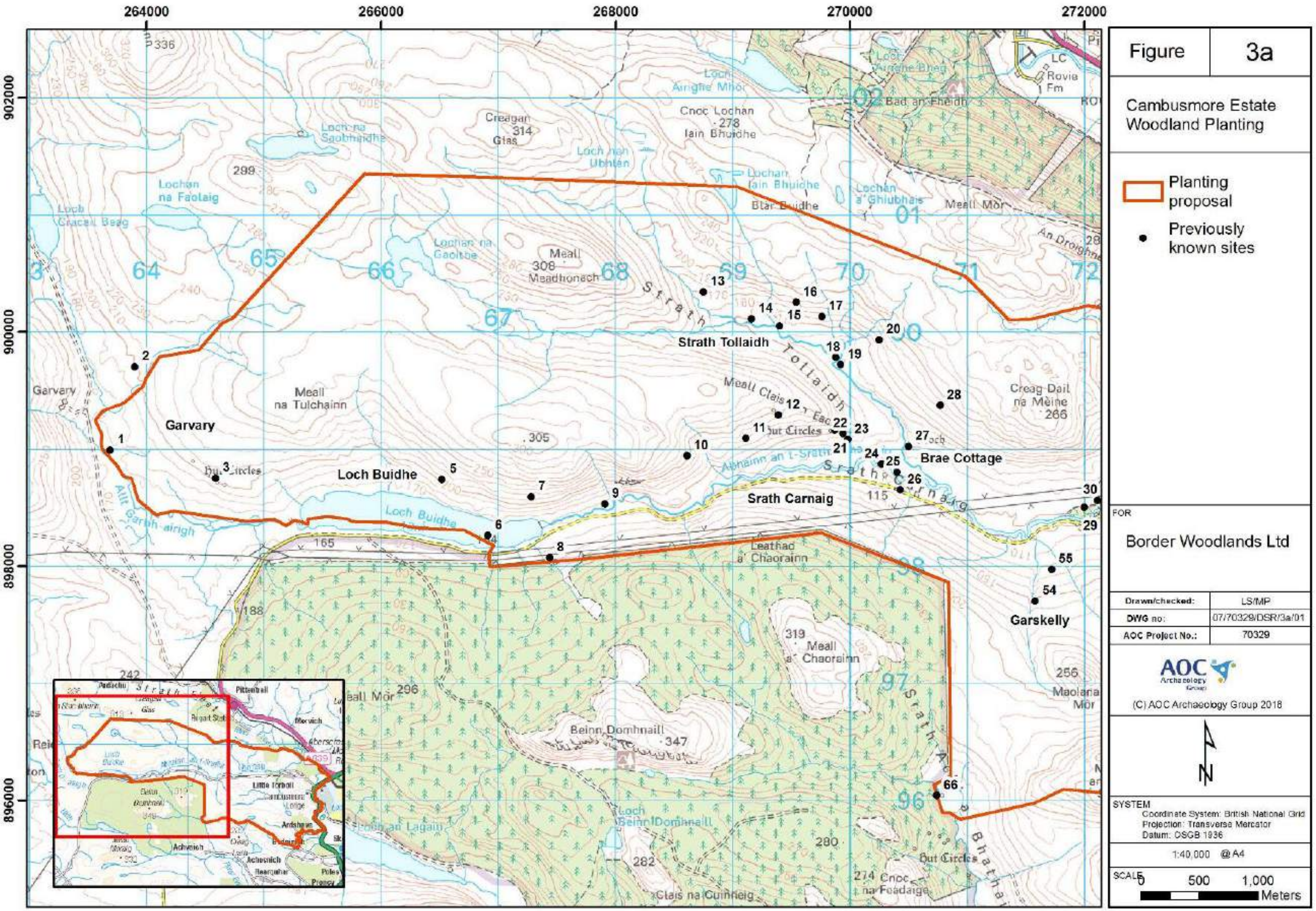


Figure 2: The woodland planting proposal and survey areas



Background mapping Ordnance Survey Crown Copyright 2018. Reproduced under licence 100023757.

Figure 3a: Previously known assets within Cambusmore Estate

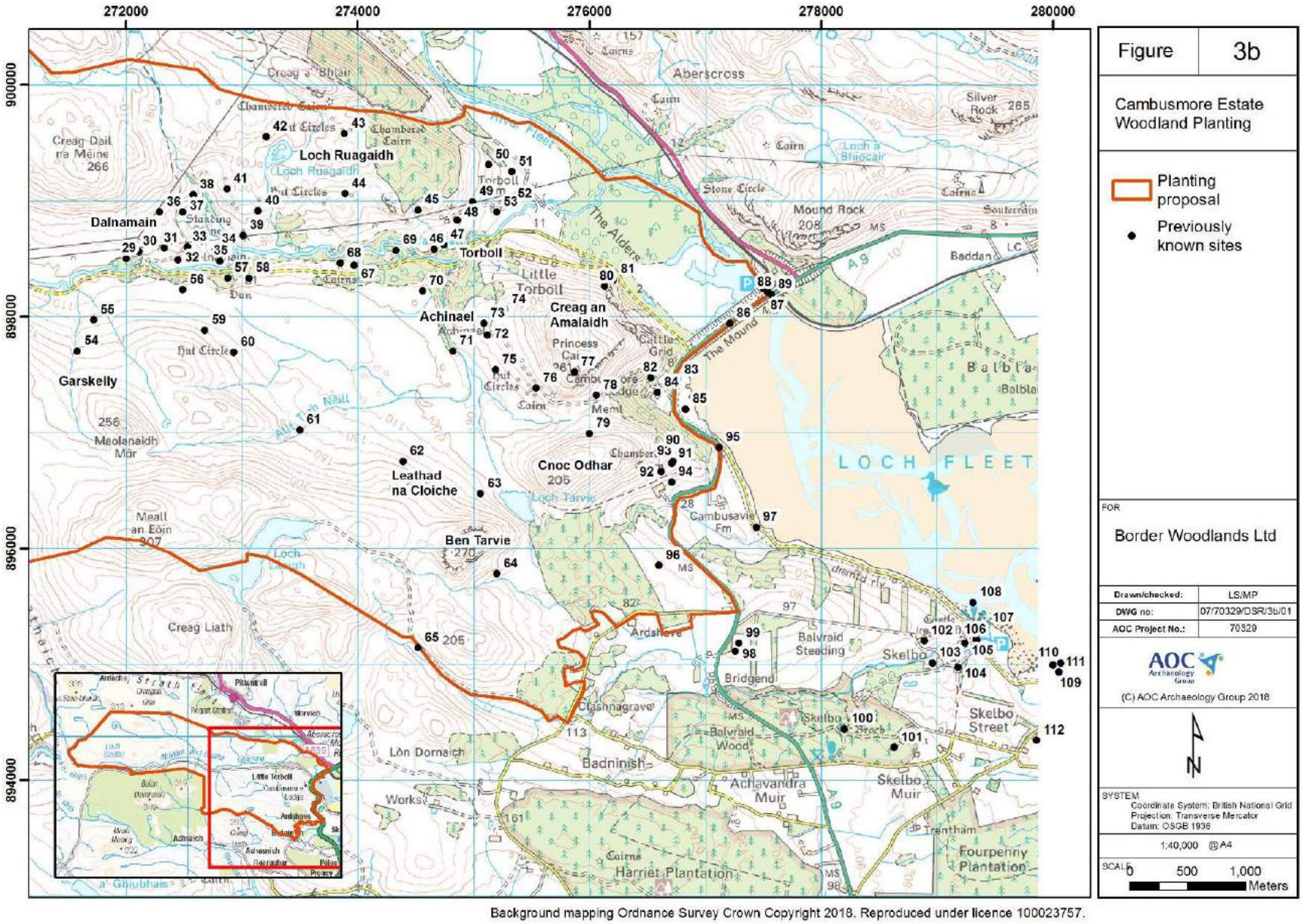


Figure 3b: Previously known assets within Cambusmore Estate

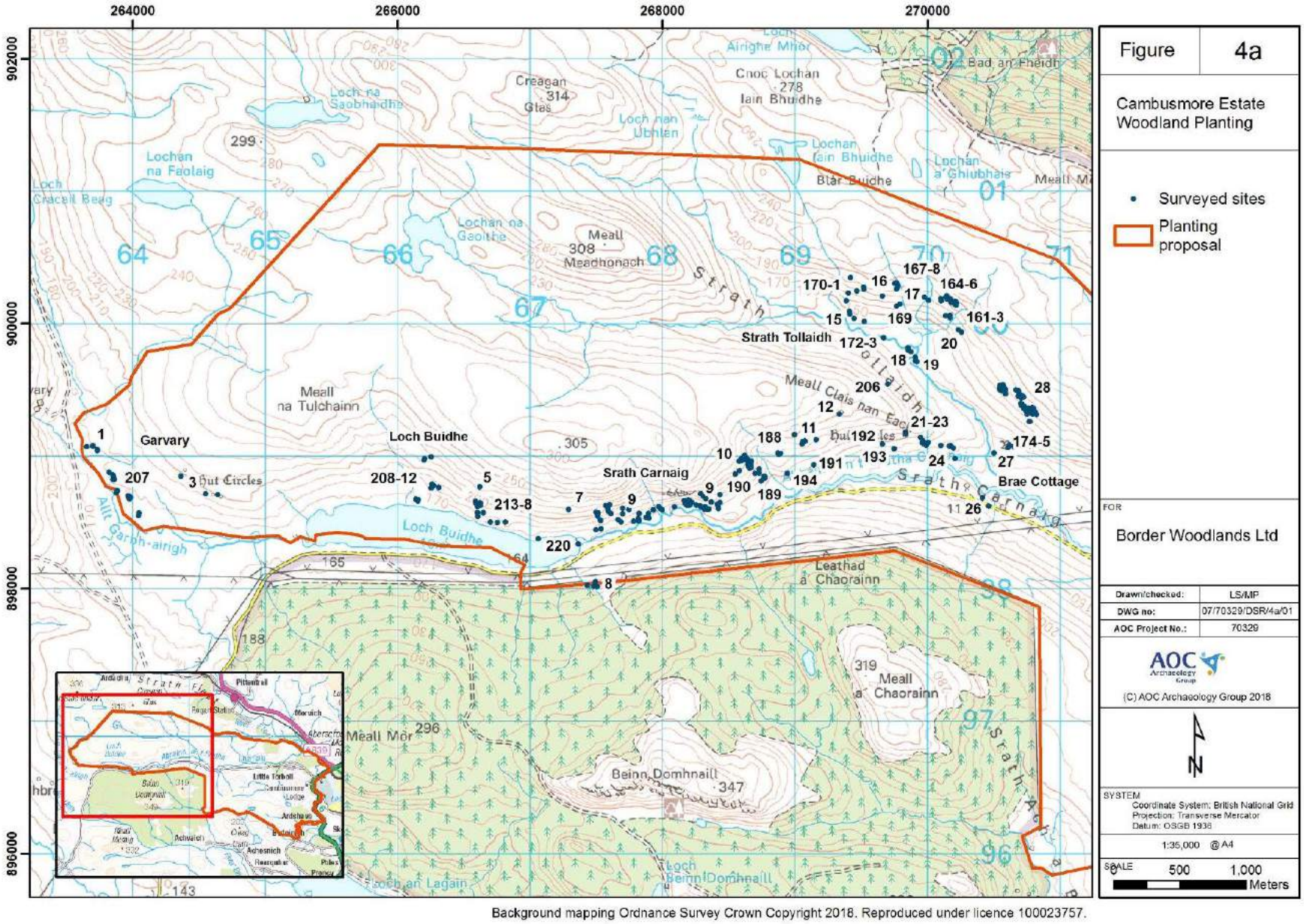


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Figure 4a: Surveyed assets in the western half of the Site

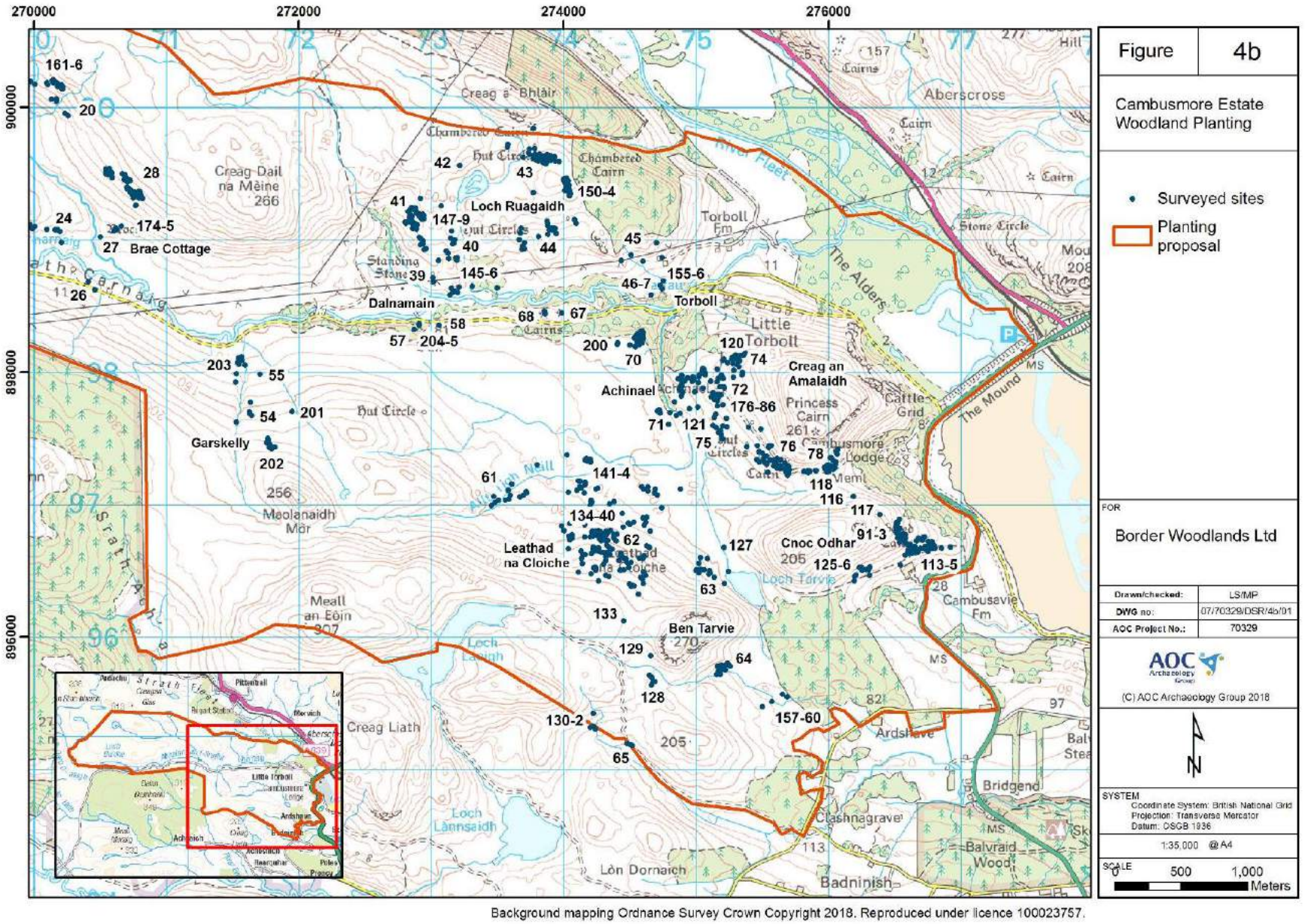

Figure 4b: Surveyed assets in the eastern half of the Site

5.2 Garvary and Loch Buidhe (Sites 1-8 and 207-220)

5.2.1 Garvary and Loch Buidhe are located at the western end of the esate within the survey area and on south-facing slopes to the north of the Allt Garbh-airigh and Loch Buidhe. There were eight previously known assets in this area, including two post-medieval farmsteads near Garvary (Sites 1-2), three areas containing prehistoric hut circles, some with associated field systems (Sites 3, 5, 7), the remains of a possible crannog in Loch Buidhe (Site 6) and a post-medieval settlement at Alltan-riabhach (Site 8). The post-medieval settlement at Dun-garbh-airidh and Alltan-riabhach are both visible on Ordnance Survey 1st edition map (**Figures 9-10** in Appendix 3), with the current house at Alltan-riabhach appearing on the OS 2nd edition map (**Figure 21** in Appendix 3). The 2nd edition map also shows a small structure on the north shore of the loch near its east end. Ordnance Survey Name Books (Sutherland vol. 30) indicate that Dun-garbh-airidh was a shepherd's house.

5.2.2 This area was surveyed on 21st November 2018 in wet and windy conditions. The ground was predominantly heather covered open moorland with some steep slopes above Loch Buidhe. Site 2 was not visited because it lay outside the estate boundary. A degraded rectangular structure and fragmented enclosures (Site 1) were surveyed at Dun-garbh-airidh and these appear to match with the historical mapping (**Figure 31** in Appendix 4). Along the stream course to the southeast of this settlement, at least seven other very degraded turf buildings were identified along with some sections of enclosure dykes (Site 207). These probably represent a seasonal shieling settlement.

5.2.3 The remains of other previously unknown shieling and enclosure sites were identified along the northern shore of Loch Buidhe (Sites 208-210, 215; **Figure 33** in Appendix 4). These survived as very degraded footings of sub-rectangular or circular structures under thick grass or heather. There was a possible boulder shelter next to the shieling at Site 208, while both Site 209 and Site 210 had associated circular, stone-built enclosures.

5.2.4 A cluster of boulder built enclosures and possible structures or shielings were recorded at Site 213. The very degraded and roughly built nature of these could suggest that they were used temporarily or seasonally and are of unknown date although are thought most likely relate to the shieling settlements. It is also possible that some of the shieling structures (most notably Sites 209-210) may be built overlying or close to prehistoric hut circle sites. These possible hut circle sites (Sites 211 & 212) generally survive only as a circular area bounded by low turf banks, sometimes with stone edging or facing visible.

5.2.5 Several hut circles were recorded during the survey, including previously known Sites 3, 5 and 7 and a previously unknown hut circle at Site 217 (**Figures 32-3** in Appendix 4). All of these monuments were very degraded and difficult to identify under thick heather and one of the previously noted hut circles, at Site 5, could not be identified.

5.2.6 Finally several more recent structures were recorded near the east end of Loch Buidhe, including a boathouse (218), jetty (220) and the house at Alltan-riabhach (8). The boathouse matches with the structure seen on OS 2nd edition maps. At Alltan-riabhach, a carved stone on the abandoned house reads 1875, which corresponds with its appearance on the 2nd edition OS map. The other ruinous structure to the south of this corresponds with the 1st edition map, along with the enclosure dyke recorded.

5.3 Srath Carnaig and Brae Cottage (Sites 9-12, 21-27, 174-175 and 188-194)

5.3.1 From the east end of Loch Buidhe, the survey area continues east through heather-covered moorland towards Brae Cottage on both sides of the Abhainn an t-Sratha Charnaig. Eleven previously known assets are located in this area, including the post-medieval settlements of An Sgoltadh (Site 9) and Brae

Cottage (Site 24), several prehistoric hut circle sites (Sites 10-12 & 21-23) and a possible battle site (Site 25). There are also two Scheduled Monuments present in the area, these include two hut circles (SM1830; Site 26) and a broch (SM1840; Site 27). The OS 1st edition maps show a few scattered enclosures and structures in the area of An Sgoltadh (**Figure 10** in Appendix 3). At Brae Cottage an area of enclosures and improved ground is marked around the cottage, with a Pictish Tower noted to the southwest of the cottage (**Figure 11** in Appendix 3). By the time of the 2nd edition map several of the enclosure walls around Brae Cottage appear to have gone out of use (**Figure 22** in Appendix 3). A new house, which corresponds to a currently inhabited cottage, can be seen on the south side of the river on this map.

5.3.2 This area was surveyed on 25th October and 20th November 2018 in mixed weather conditions. The north-facing slopes to the south of the river were not walked, however thorough examination of aerial imagery and visual inspection from the road and through binoculars did not reveal any heritage assets. The Brae Cottage area (Site 24) was also not surveyed in detail because it has been identified by the client as an area where no planting will take place.

5.3.3 Whilst walking through the Brae Cottage area several heritage assets could be seen on the ground and there are most likely more assets present than marked on the historic mapping (**Figure 37** in Appendix 4). The house at Brae was visited (Site 175) and the remains of a substantial stone structure and associated enclosures or kaleyards were recorded (**Figure 38** in Appendix 4).

5.3.4 At the settlement of An Sgoltadh (Site 9), 43 individual features were recorded, comprising several enclosures, dykes and very degraded structures (**Figures 34-5** in Appendix 4). The majority of the features were constructed with turf and stone banks, but were obscured under thick bracken, grass and heather. Some of the features were better preserved than others, with more substantial stone walls. Only enclosures 9d, 9j, 9y, 9jj and 9oo and structures 9k and 9aa appear to match those marked on the 1st edition mapping. Several phases of settlement may be present at this location, with earlier medieval buildings and enclosures falling out of use before the area was mapped.

5.3.5 Along the northern side of the river, between An Sgoltadh and Brae Cottage, several new assets, which may be of a similar, potentially medieval, date, were identified (**Figure 36** in Appendix 4). These were grass-covered footings of small sub-rectangular structures, and may represent the remains of shielings (Sites 188-190). Site 189 was also enclosed by a large boundary dyke.

5.3.6 Prehistoric settlement was also present in this area, with hut circle sites identified at Sites 10-12, along with cairnfields of small heather covered stony mounds (**Figure 36** in Appendix 4). Further hut circles were recorded at Sites 21-23, although these were much harder to identify under thick heather. The HER record for Site 21 indicated at least three hut circles were present, but during the survey only one definite hut circle was found. Site 22 was described as a mound, but was in fact more like a small circular structure. Other similar structures were seen in the midst of hut circle settlements (such as Sites 11 and 28).

5.3.7 The two Scheduled Monuments in the area were both visited. The two hut circles (SM 1830; Site 26) (**Figure 37**) were located in grazing land near the road, with 26b almost trucated on the south side by the road. Both measured approximately 8m-9m in diameter internally, with large turf and stone banks spread up to 2m wide and possible entrances on their east sides. The broch (SM1840; Site 27) (**Figure 38**) sits on a raised mound, enclosed by a later post-medieval enclosure. It is mostly under grass with only the tops of the thick outer walls visible and the interior mostly filled with rubble. A later twinning pen has been constructed against the interior wall of the broch with a small cairn sitting on the wall top above it.

5.4 Strath Tollaidh (Sites 13-20, 28, 161-173 and 206)

5.4.1 Strath Tollaidh is the valley to the north of Brae Cottage. Nine previously known sites are located in this area including post-medieval settlements and farmsteads (Sites 13, 15 and 19), two possible dun mounds (Sites 14 and 18) and prehistoric hut circles and field systems (Sites 16, 17, 20, 28). OS 1st edition mapping shows four structures and associated enclosures towards the northern end of the valley (**Figure 12** in Appendix 3).

5.4.2 Strath Tollaidh was surveyed on 23rd October and 20th November 2018 in windy conditions. Ground conditions consisted of open heather moorland with the river flowing in a steep gully. Sites 13 and 14 were not visited because they lie in an area where no planting is due to take place.

5.4.3 Post-medieval settlement was concentrated in the base of the valley, near the river. The farmstead at Site 15 appears to correlate to a structure on the historic mapping (**Figure 39** in Appendix 4). Other settlement was identified at Daileag an Loin (Sites 19), where several stone structures were built up against the base of a natural mound (**Figure 40** in Appendix 4). In the same location, the possible dun (Site 18) was a large mound with a central depression or small circular structure on the top. It also had a stone structure built at the base of the mound, which was probably contemporary with the structures at Site 19 across the river.

5.4.4 On the south facing slopes above the river a number of previously unknown shieling settlements (Sites 161-168; **Figures 39-40** in Appendix 4) were discovered. These structures were very degraded sub-rectangular or circular turf and stone structures, most of which were under thick grass or bracken. They tended to be found in small groups of two or three structures, however Site 164 comprised a cluster of at least eight structures. These may have been seasonal dwellings for those living in Strath Tollaidh and Brae Cottage and may be medieval or post-medieval in date.

5.4.5 Along the same contours as these shieling settlements were several hut circles (Sites 16, 17, 20, 28 and 166; **Figures 39-40** in Appendix 4) surviving mostly as low turf and stone banks, often obscured under thick heather. Site 28 (**Figure 38**) also comprised a field system of small heather covered clearance cairns. Previous survey of Site 28 had not identified any structures, however there appears to be at least one degraded hut circle and two smaller circular mound structures or shielings (similar to that in Site 11) spread amidst the cairnfield.

5.5 Dalnamain and Garskelly (Sites 29-38, 54-60 and 201-205)

5.5.1 Dalnamain lies to the east of Brae Cottage, north of the Abhainn an t-Srath Charnaig, with Garskelly to the south of the river. Ten assets were previously known at Dalnamain, with a further seven known assets to the south of this. Most of the assets within Dalnamain are part of a post-medieval settlement including several structures, enclosures, corn-drying kilns and a metal-working site investigated by Tain Archaeological Group in 1995 (Sites 29-33 and 35-38). There is also a standing stone known locally as 'The Swedish Man's Grave' (Site 34). At Garskelly there is a farmstead (Site 54) and a sheepfold (Site 55). East of Garskelly there is a post-medieval settlement at Achtaduaig (Sites 56 and 59), with a hut circle (Site 60) located at the edge of this. Near the road are the remains of a possible dun at Torri Falaig (Site 57) and a circular enclosure (Site 58).

5.5.2 On the OS 1st edition map Dalnameine is shown as an area of improved land with a sheepfold, three structures and attached enclosures (**Figure 14** in Appendix 3). A standing stone is marked nearby and another structure and enclosure are present to the north at Innis Aonar. Torr Falaich is named, but there is no mention of the dun. At Garskelly an enclosure and structure is present, as well as another structure

further north along the stream (**Figure 13** in Appendix 3). The enclosure (Site 55) is not marked on the historic mapping. Eighteen small structures or enclosures are shown at Achtaduach within a large boundary wall (**Figure 13** in Appendix 3). The OS Name Books (Sutherland vol. 30) indicate that both Garskelly and Achtaduach were ruinous by the time the maps were surveyed. The only notable changes on the 2nd edition map are the addition of a new enclosure around the standing stone at Dalnameine and the disappearance of the structure by the stream to the north of Garskelly (**Figures 24-5** in Appendix 3).

5.5.3 The main areas of settlement at Dalnamain and Achtaduach are in areas that will not be planted under the current proposal and were not surveyed. The land to the west of Dalnamain, below Creag Dail na Meine, was walked on 23rd October 2018 and no assets were identified. Garskelly was surveyed on 20th November 2018 along with the dun and enclosure sites at Torri Falaig.

5.5.4 At Garskelly a large enclosure was recorded with the remains of a degraded structure and kaleyard in the centre (Site 54; **Figure 41** in Appendix 4). A round boulder built enclosure was also seen at Site 55. To the south of this part of a stone and turf dyke (Site 201) was discovered, which may relate to a boundary wall marked on the historic mapping. A possible small cairnfield was also noted, although the cairns were very degraded with any stone well-buried beneath the heather.

5.5.5 To the north of the farmstead at Garskelly several structures and enclosures (Site 203) were discovered along both sides of the Garskelly Burn (**Figure 41** in Appendix 4). These were heavily degraded, under thick bracken and grass, but at least four long rectangular buildings (Sites 203c-d, g-h), constructed with stone and turf walls, and one small circular structure (Site 203e) were present. A larger enclosure (Site 203b) was attached to a boundary dyke (Site 203a) to the south of these structures. Since they were not even depicted as ruins on the historic mapping these may be medieval in date.

5.5.6 The possible dun at Torri Falaig (Site 57) survives as a stone bank surrounding the top of a natural knoll (**Figure 42** in Appendix 4). The knoll is covered with thick bracken and trees and any structural remains are difficult to discern. However, in places there is some stone facing visible. Sections of two stone banks (Sites 204-205) were visible at the base of the knoll and may surround it as related enclosure banks. However, survey alone could not clarify their function and date. A short way to the east, were the remains of a very degraded circular enclosure (Site 58) of unknown date.

5.6 Loch Ruagaidh and Torboll (Sites 39-53, 67-70, 145-156 and 200)

5.6.1 Loch Ruagaidh is located to the northeast of Dalnamain in the centre of a roughly flat area of high moorland above the Srath Carnaig valley. Torboll is located to the southeast of this, at the east end of Srath Carnaig. Six previously known assets are located in the area of Loch Ruagaidh, all of which are the remains of prehistoric settlement, hut circles, field systems and chambered cairns (Sites 39-44). The two chambered cairns and associated substantial hut circles form the Carn Liath Scheduled Monument (SM1772; Site 43). At Torboll there are nine previously known assets, including further prehistoric hut circles (Site 45), a broch (Site 49), a possible henge (Site 51) and several post-medieval structures and enclosures (Sites 46-48, 50 and 52), some of which are now part of Torboll Farm. To the south of the Abhainn an t-Srath Charnaig there is a hut circle site (Site 68) alongside a Scheduled kerbed cairn (Site 67; SM1819) and a post-medieval fish ladder (Site 69). On higher ground to the south of these is another prehistoric settlement with hut circles and a field system (Site 70).

5.6.2 Many of the known assets are also depicted on OS 1st and 2nd edition mapping. At Coill an Uinnseinn (or Coill an Iarsaidh on the 2nd edition map) to the south of Loch Ruagaidh, a hut circle and tumuli are depicted (**Figures 14 and 25** in Appendix 3). Further tumuli and hut circles are marked alongside two chambered cairns at Carn Liath to the east of Loch Ruagaidh (**Figures 15 and 26** in Appendix 3).

According to the map a 'stone cup with perforated handle' was found at Carn Liath in 1860. At Torroboll several structures are depicted along with a mill lade, dam and sluice in the location of the present day farm buildings (**Figures 16 and 27** in Appendix 3). A fish weir/salmon ladder is shown on the river at Torroboll Fall. To the south of Torroboll Fall is another area of tumuli and a hut circle.

5.6.3 The Loch Ruagaidh area was surveyed on 18th and 22nd October 2018 along with parts of Torboll. Sites 48-53 around Torboll Farm were not visited, since they will not be in an area of planting. Sites 67-70 were visited at a later date, with the exception of the fish ladder (Site 69) which will not be directly impacted by planting.

5.6.4 The majority of assets around Loch Ruagaidh were prehistoric settlement. Between Sites 39-42, the remains of at least 12 hut circles were identified (**Figures 42 & 43** in Appendix 4). The hut circles survive as low stone and turf banks and measure on average 7m-8m diameter internally. These structures sit within a wider landscape of clearance cairns (Sites 40j, 41h) and short sections of turf and stone dykes (Sites 40d, 40i, 41g), which are most likely part of an old field system. Other features in this area include more substantial stone cairns (Sites 40g, 41c and 149). Some of these may be larger clearance cairns, but some have more structural elements suggesting they may be burial cairns, for example Site 41c has a stone lined hollow or chamber in the centre. In the area of Site 41 there are also two irregular shaped stone structures (Sites 147-148) next to the substantial cairns (Site 149). The date and function of these structures is not clear and they could be related to the prehistoric settlement or form later additions to the area.

5.6.5 To the east of Loch Ruagaidh is the Scheduled Monument of Carn Liath (SM1772; Site 43; **Figure 44** in Appendix 4). Two chambered cairns sit at opposite ends of this area, although it was only possible to visit the northern of the two. The southern most chambered cairn, which is named Carn Liath on the historic mapping, was inaccessible due to heavy windfall in the area of forestry in which it now sits. The northern chambered cairn (Site 43a) survives as a large stony mound about 17m diameter; while several hollows or pockets are visible within the mound, there is no definite structural evidence of a chamber or passage. This cairn bears similarites to the cairn below Creag an Amalaidh in both structure and position in the landscape.

5.6.6 In the area between the two chambered cairns there are four definite hut circles (Sites 43b, 43d, 43h, 43l) and a possible hut circle or enclosure (Site 43i) which is attached to Site 43h. These are all substantially built and well preserved, with the largest having an internal diameter of 11m. The walls are built with large stones on the inner and outer faces, with smaller rubble and turf infill and some upright orthostats. The hut circle at Site 43d and the possible double hut circle/enclosure at Sites 43h-i are both surrounded by a ring of small stony mounds which may be clearance cairns. Of the cairns (Site 43e) around the hut circle at Site 43d, at least two have structural elements suggesting possible built chambers, possibly for burial cairns. One of the cairns (Site 43k) around the hut circle at Sites 43h-i also appears to have a capstone.

5.6.7 Several stone and turf banks (Sites 43c, 43f) were also identified under thick heather around the hut circles. Although incomplete and highly degraded, these appear to be forming boudaries between three of the hut circles and their associated rings of cairns.

5.6.8 On the open moorland close to the inaccessible chambered cairn the footings of two possible sub-rectangular and circular turf and stone structures (Sites 150 & 153) and possible associated clearance cairns (Site 151), an enclosure (Site 152) and a dyke (Site 154) were identified. It was not clear whether these were part of the prehistoric settlement or part of a later medieval or post-medieval shieling site, although the latter is mostly likely.

5.6.9 A further eight hut circle sites were identified at Sites 44 and 45, some of which were very degraded and very difficult to discern under thick heather (**Figures 45-6** in Appendix 4). Some of the previously identified hut circles at Site 45 were not identifiable in the thick bracken and they may not survive.

5.6.10 Likely Medieval and post-medieval sites in this area appear to be confined mostly to areas nearer the river. Two previously unrecorded sub-rectangular stone structures with associated enclosures and dykes (Sites 145-146; **Figure 42** in Appendix 4) were discovered near Dalnamain. Two large stone enclosures, one which could be a large hut circle (Site 46-47), were surveyed near Torboll Fall along with a low stone dyke (Site 155) and a shieling (Site 156) (**Figure 46** in Appendix 4). To the east of these assets, other medieval or post-medieval settlement remains were visible, but not surveyed in detail because they are outside the planting area.

5.6.11 To the south of the river further prehistoric settlement was present (**Figure 47** in Appendix 4). In an area of hut circle and tumuli marked on the historic maps, three hut circles (Sites 70a, c, d) were identified in an area of clearance cairns (Site 70i). Amidst this several sub-rectangular structures were also recorded (Sites 70a, b, e, g, h), more similar in constuction to medieval or post-medieval buildings. One (Site 70a) was built against the edge of the hut circle and may have reused the structure as an enclosure or kaleyard. The nearby dyke (Site 70f) is shown on the historic mapping, however the only structure shown is a hut circle, suggesting that settlement in this area was already abandoned by the mid 1800s.

5.6.12 Finally between the road and the river are the remains of a hut circle and cairn (Site 68) and the Scheduled kerb cairn (SM1819; Site 67). The hut circle and cairn were very degraded and while the kerb cairn survived in much better condition, birch wood has been allowed to grow over it and it is now heavily obscured by vegetation. The kerb cairn survives as a raised mound 15m-16m diameter with a slight central depression on the top and a single line of large stones set as a kerb around the base.

5.7 Leathad na Cloiche and Ben Tarvie (Sites 61-65, 128-144 and 157-160)

5.7.1 The southern part of the estate in the areas of Leathad na Cloiche and Ben Tarvie comprises mostly open moorland with some gentle slopes and several stream courses. Only five previously known sites were identified in these areas, all comprising post-medieval settlements including small farmsteads and a network of boundary dykes (Sites 61-65). On the OS 1st and 2nd edition maps, settlement is visible at Allt Tigh Neill (Site 61), Leathad na Cloiche (Site 62), Loch an Tairbh (Site 63), on the south slopes of Ben Tairbh (Site 64) and a house called Londuie at Leathad an Seamraig (Site 65) (**Figures 18 and 29** in Appendix 3). An individual structure can also be seen on the west edge of Dukes Wood. Many of these structures are shown as unroofed. There is little change between the 1st and 2nd edition maps, except that the structure on the west of Dukes Wood has become unroofed and a second house has been built at Londuie.

5.7.2 The areas of Leathad na Cloiche and Ben Tarvie were surveyed on 20th September and 9th October 2018. All of the areas of previously known post-medieval settlement were identified and recorded and it is possible to correlate several structures and enclosures to those shown on the historic maps (Sites 61e-g, 61i, 62n-m, 62dd, 62jj, 63a-c, 64b, 64f-h, 65a-d, 141, 157). The survey results have revealed that a significantly larger number of structures, enclosures and dykes are present than those shown on the historic mapping, indicating that a large amount of the settlement was abandoned before the mid-1800s.

5.7.3 The majority of settlement remains were found at Leathad na Cloiche (Site 62), where the survey revealed at least twenty-two structures or farmsteads, nine enclosures, six structures built into multi-celled enclosures and six kiln-barns (corn drying kilns) (**Figures 48-50** in Appendix 4). Compared to the two farmsteads and five enclosures on the historic maps, this is reflective of the major population that

would have taken place on the land. Post-medieval farmsteads were also recorded at Allt Tigh Neill (Site 61; **Figure 48** in Appendix 4), Loch Tarvie (Site 63; **Figure 51**), the southeast and southwest slopes of Ben Tarvie (Site 64, 128; **Figures 52-3** in Appendix 4), the west edge of Dukes Wood (Sites 157-160), Leathad na Seamraig (Sites 130-132) and the houses at Londuie (Site 65). While some of these survive as substantial stone ruins (Site 65), others are very degraded and can only be seen as low turf and stone banks (Site 128). Some of these assets probably have origins in the medieval period, as there were clearly multiple periods of settlement evident, particularly within Leathad na Cloiche.

5.7.4 Interestingly, within the medieval and post-medieval settlement at Leathad na Cloiche, four possible hut circles (Sites 134, 136, 137, 140) were also identified. These were all very degraded, surviving only as low turf banks with diameters of 10m-12m. There may also be prehistoric clearance cairns (Sites 135, 138) in the area, comprising heather covered stony mounds 3m-4m in diameter. These are generally distinguishable from their medieval/post-medieval counterparts by the fact that the stone is buried much deeper under the turf. They are very similar to the cairnfields seen around Loch Ruagaidh.

5.8 Achinael, Creag an Amalaidh and Cnoc Odhar (Sites 71-79, 90-94, 113-127 and 176-187)

5.8.1 The eastern most part of the Site sits on high ground above Cambusmore Lodge, between the prominent hills of Cnoc Odhar and Creag an Amalaidh. On the west side of Creag an Amalaidh is the settlement of Achinael. There are thirteen previously known assets in this area. The five assets at Achinael include post-medieval settlement (Sites 72-73), prehistoric hut circles (Sites 71, 75) and a Scheduled prehistoric settlement (SM1851; Site 74). A second Scheduled Monument including a chambered cairn and several hut circles (SM1782; Site 76) is found on the southern slopes of Creag Amalaidh, along with the remains of the prehistoric field system (Site 78). The Princess Cairn (Site 77) is located on the summit of Creag an Amalaidh. At the east end of Cnoc Odhar there are three more hut circles (Sites 90, 92, 93), a chambered cairn (Site 91) and the remains of a shell midden (Site 94).

5.8.2 The 1st edition OS map shows a house and sheepfold at Achinael (**Figure 17** in Appendix 3). The Princess Cairn with the date 1868 is shown at the summit of Creag Amaill, with two areas of tumuli and a cairn marked on its southern slopes. Cambusmore House is shown near the shore of Loch Fleet with extensive gardens containing a summer house, ice house and well. At the east end of Cnoc Odhar the chambered cairn, hut circle and tumuli are shown with a note saying that human remains were found here in 1868 (**Figure 19** in Appendix 3). Between the 1st and 2nd edition OS maps there is little change in the post-medieval settlement, however, the 2nd edition map depicts hut circles and tumuli at Achinael which were not previously indicated, along with several previously unidentified hut circles marked along the southern edge of Creag an Amalaidh (**Figures 28 and 30** in Appendix 3).

5.8.3 Achinael, Creag an Amalaidh and Cnoc Odhar were surveyed on the 18th September and 24th October 2018. Post-medieval settlement was present at Achinael, surrounding a recently abandoned house (Site 182). Similar to Leathad na Cloiche, there were a significantly larger number of structures and enclosures than shown on the historic mapping. At Achinael there were at least nineteen structures recorded and at least fifteen enclosures (within Sites 72, 75 121,179, 186, 187; **Figure 54** in Appendix 4).

5.8.4 Prehistoric settlement was present at the edges of the medieval/post-medieval settlement at Achinael. The Scheduled Monument to the north (SM1851; Site 74; **Figure 54** in Appendix 4) comprised three hut circles (Sites 74a, 74b, 74e) and another possible hut circle or enclosure (Site 74f), each built with substantial turf and stone banks. In the area there were also fragments of dyke (Sites 120, 74d) and scattered clearance cairns (Site 74c). To the west of Achinael, on both sides of the Allt Loch an Tairbh were three further hut circles (Site 71). Previous surveys identified Site 75 as a hut circle, however it was

shown to be a long rectangular structure with three attached enclosures. Two of these enclosures were circular and it may be that they were hut circles that were later reused.

5.8.5 The Scheduled Monument on the south side of Creag an Amalaidh (SM1782; Site 76; **Figure 55** in Appendix 4) comprised a chambered cairn (Site 76m), seven hut circles (Sites 76b, c, f, i, j, l, n), two sub-oval structures (Sites 76e, h) and various sections of stone and turf dykes and clearance cairns. The chambered cairn survived as a large stony mound 16m by 25m with two large central hollows. There is a possible entrance passage on the southwest side. It is similar in structure and location to the cairn at Carn Liath (Site 43). The hut circles in this area were also similar to those at Carn Liath, except for Sites 76f, 76i, and 76n. These three, which were located in a line along the same countour overlooking the river, each had substantially more stone than those seen in other parts of the estate. The walls of these hut circles were formed by raised stony banks up to 1.5m-2m wide, with the central areas also filled with tumbled stone. These structures may have had a different function or construction to other hut circles, or there may have less robbing of the stone in following years.

5.8.6 A further cluster of clearance cairns was recorded around the slopes of Creag an Amalaidh (Site 78). At Cnoc Odhar there is another large cairnfield (Site 92c), spread across the slopes, with similar small heather covered stony mounds (**Figure 56** in Appendix 4). In the midst of the cairnfield is a chambered cairn (Site 91) which survives as a large mounded bank surrounding a small chamber delineated by large upright orthostats. The cairn is very overgrown with trees growing in the centre. Next to the cairn are two hut circles (Sites 93, 115). Site 93 is better preserved with a large turf and stone bank constructed with upright boulders on the outer face. Site 115 may be the hut circle mentioned by previous surveyors as being part of Site 92. The hut circle an Site 90 was not identifiable.

5.8.7 On the southern slopes of Cnoc Odhar a track leads towards Loch Tarvie. Parallel to this is a large post-medieval boundary dyke (site 114). An stone built enclosure (site 125) with several small clearance mounds (site 126) were also discovered on the slope above the track. These may be post-medieval in date.

5.8.8 One final monument surveyed above Cambusmore Lodge at the base of Creag an Amalaidh, was the Wignall Memorial (Site 118), a carved stone cross with an inscription to Frederick William Wignall, his wife Edith Marguerite and son Frederick Edwin.

6.0 ARCHAEOLOGICAL AND CULTURAL HERITAGE VALUE

6.1 The Cultural Heritage Value of the heritage assets known within the Site which will potentially be planted has been classified according to the method shown in Table 1 and the results are shown in Table **6** below. This will help inform the mitigation response around each assets.

Table 6 Importance of Heritage Assets Within the Site

Site No.	Site Name	Status	Description	Importance
1	Dun-Garbh-Airigh	Undesignated	Farmstead	Local
3	Dun-Garbh-Airigh	Undesignated	Hut circles and field system	Local
5	Loch Buidhe	Undesignated	Hut circle	Local
7	Loch Buidhe	Undesignated	Hut circle	Local

8	Alltan-Riabhach	Undesignated	Farmstead; field system; corn drying kiln; sheep fold	Local
9	An Sgoltadh	Undesignated	Township; Corn drying kiln	Local
10	Creag Caolsaidh	Undesignated	Hut circle	Local
11	Meall Clais Nan Each	Undesignated	Hut circle	Local
12	Meall Clais Nan Each	Undesignated	Hut circle	Local
15	Building, Strath Tollie	Undesignated	Farmstead	Local
18	Dun, Daileag an Loin, Strath Tollie	Undesignated	Dun	Regional
19	Settlement, Daileag an Loin, Strath Tollie	Undesignated	Township	Local
20	Daileag an Loin	Undesignated	Hut circle	Local
21	Meall Clais Nan Each	Undesignated	Hut circle	Local
22	Meall Clais Nan Each	Undesignated	Mound	Local
23	Meall Clais Nan Each	Undesignated	Hut circle	Local
28	Creag Dail Na Meine	Undesignated	Hut circle	Local
39	Dalnamain	Undesignated	Hut circle	Local
40	Coil'an Iarsaidh	Undesignated	Hut circle; field system	Local
41	Loch Ruagaidh	Undesignated	Hut circle; field system	Local
42	Loch Ruagaidh	Undesignated	Hut circle	Local
43	Carn Liath	Scheduled monument SM1772	Chambered cairn; hut circle; field system	National
44	Carn Liath	Undesignated	Hut circle; field system	Local
45	Torboll Fall	Undesignated	Hut circle settlement; field system	Local
46	Torboll	Undesignated	Enclosure	Local

47	Enclosure, Torboll	Undesignated	Oval enclosure	Local
54	Garskelly	Undesignated	Farmstead	Local
55	Garskelly	Undesignated	Sheep fold	Negligible
57	Dun, Torri Falaig	Undesignated	Dun	Regional
58	Torri Falaig	Undesignated	Enclosure	Local
61	Allt Tigh Neill	Undesignated	Settlement	Local
63	Loch Tarvie	Undesignated	Township	Local
64	Loch Tarvie	Undesignated	Farmstead	Local
65	Leathad Na Seamraig	Undesignated	Farmstead	Local
67	Kerb cairn, Torboll	Scheduled monument SM1819	Kerb cairn; kerb cairn?; clearance cairn?	National
68	Coill an Iarsaidh	Undesignated	Hut circle	Local
69	Torboll Fish Ladder	Undesignated	Fish ladder; sluice; dam	Local
70	Coille Innis Bhreac	Undesignated	Hut circle; clearance cairn	Local
71	Leathad Na Cloiche	Undesignated	Hut circle settlement	Regional
76	Creag an Amalaidh	Scheduled monument SM1782	Chambered long cairn; hut circle; field system	National
78	Creag an Amalaidh	Undesignated	Cairn (clearnce?)	Local
79	BA Axe, Quarry, Cambusmore	Undesignated	Findspot	None
90	Cambusavie	Undesignated	Hut circle	Local
91	Chambered cairn, Cnoc Odhar	Undesignated	Chambered cairn	Regional
92	Cambusavie	Undesignated	Hut circle; field system	Local
94	Midden, Cambusavie Hospital	Undesignated	Shell midden	Local/Regional
114	Cambusavie	Undesiganted	Dyke	Negligible/Local
115	Cnoc Odhar	Undesignated	Hut circle(?)	Local
116	Cnoc Odhar	Undesignated	Field bank	Neglible

117	Cnoc Odhar	Undesignated	Standing stone	Local/Regional
118	Wignall Memorial	Undesignated	Memorial	Local
125	Cnoc Odhar	Undesignated	Enclosure	Local
126	Cnoc Odhar	Undesignated	Clearance cairns	Local
128	Ben Travie	Undesignated	Settlement	Local
129	Ben Tarvie	Undesignated	Dyke	Negligible
130	Leathad na Seamraig	Undesignated	Dyke	Negligible
131	Leathad na Seamraig	Undesignated	Enclosure	Local
132	Leathad na Seamraig	Undesignated	Structure(?)	Local
136	Leathad na Cloiche	Undesignated	Hut circle(?)	Local
145a	Dalnamain	Undesignated	Dyke	Negligible
145f	Dalnamain	Undesignated	Sturcture/Dyke(?)	Neligible/Local
146	Dalnamain	Undesignated	Dyke	Negligible
147	Loch Ruagaidh	Undesignated	Structure	Local
148	Loch Ruagaidh	Undesignated	Structure	Local
149	Loch Ruagaidh	Undesignated	Cairns (possibly burial)	Local/Regional
150	Carn Liath	Lies within Scheduled monument SM1772	Structure(?)	Local
151	Carn Liath	Undesignated (though the four northern most clearance cairns lie within the Scheduled Area of Carn Liath)	Clearance cairns	Local/Regional
152	Carn Liath	Undesignated	Enclosure(?)	Local
153	Carn Liath	Undesignated	Structure	Local
154	Carn Liath	Undesignated (northern portiona lies within Scheduled monument SM1772)	Dyke	Negligible/Local

155	Torboll	Undesignated	Dyke	Negligible
156	Torboll	Undesignated	Sheiling	Local
157	Ben Tarvie	Undesignated	Structure	Local
158	Ben Tarvie	Undesignated	Dyke	Negligible
159	Ben Tarvie	Undesignated	Structure	Local
160	Ben Tarvie	Undesignated	Dyke	Negligible
161	Strath Tollaidh	Undesignated	Structure	Local
162	Strath Tollaidh	Undesignated	Structure	Local
163	Strath Tollaidh	Undesignated	Structure	Local
164	Strath Tollaidh	Undesignated	Sheiling Settlement	Local
165	Strath Tollaidh	Undesignated	Pen(?)/Structure(?)	Negligible
166	Strath Tollaidh	Undesignated	Hut circle(?)/Enclosure(?)	Local
167	Strath Tollaidh	Undesignated	Structure	Local
172	Strath Tollaidh	Undesignated	Dyke	Negligible
173	Strath Tollaidh	Undesignated	Dyke	Negligible
174	Brae Cottage	Undesignated	Dyke	Negligible
182	Achinael	Undesignated	Dyke	Negligible
188	Creag Caolsaidh	Undesignated	Sheilings	Local
189	Creag Caolsaidh	Undesignated	Sheiling	Local
190	Creag Caolsaidh	Undesignated	Structure	Local
191	Creag Caolsaidh	Undesignated	Dyke	Negligible
192	Meall Clais nan Each	Undesignated	Clearance cairn	Local
193	Meall Clais nan Each	Undesignated	Enclosure	Local
194	Creeag Caolsaidh	Undesignated	Structure	Local
200	Coile Innis Bhreac	Undesignated	Dyke(?)/Structure(?)	Negligible/Local
201	Garskelly	Undesignated	Dyke	Negligible
202	Garskelly	Undesignated	Cairn field	Local
203a & 203b	Garskelly	Undesignated	Dyke/Enclosure	Local/Negligible
204	Torri Falaig	Undesignated	Bank	Negligible
205	Torri Falaig	Undesignated	Bank	Negligible
206	Strath Tollaidh	Undesignated	Bank	Negligible

207	Dun Garbh Airigh	Undesignated	Sheiling settlement	Local
208	Loch Buidhe	Undesignated	Sheilings	Local
209	Loch Buidhe	Undesignated	Enclosure/Hut circle	Local
210	Loch Buidhe	Undesignated	Sheiling/enclosure	Local
211	Loch Buidhe	Undesignated	Hut circle(?)	Local
212	Loch Buidhe	Undesignated	Hut circle(?)/Enclosure(?)	Local
213	Loch Buidhe	Undesignated	Enclosure/Structures	Local
215	Loch Buidhe	Undesignated	Sheiling	Local
216	Loch Buidhe	Undesiganted	Clearance cairn & Dyke	Negligibel/Local
217	Loch Buidhe	Undesignated	Hut circle	Local
218	Loch Buidhe	Undesignated	Boat house	Local
220	Loch Buidhe	Undesignated	Jetty/breakwater	Local

7.0 CONCLUSION: DEVELOPMENT IMPACT AND MITIGATION

7.1 Direct impacts & Proposed Mitigation

7.1.1 Potential impacts on known or unknown buried archaeological remains in the case of this proposed development relate to the possibility of disturbing, removing or destroying in situ remains and artefacts during ground-breaking works, including excavation, planting and other works associated with the development, on this Site. AOC understand that the developer intends to utilise existing access tracks so that impacts would be limited to ground preparation for planting, planting itself and the insertion of deer fencing around planted areas. Tracking of machines for planting and harvesting could also potentially result in impacts upon heritage assets.

7.1.2 AOC further understands that the developer intends to avoid direct impacts upon known archaeological remains by excluding these areas from planting and buffering them to avoid accidental damage by plant movement or impacts upon buried remains which may extend beyond the visible, upstanding remains. To achieve this it is suggested that the Scheduled Monuments within the Site are buffered by 20m as per UKFS which states that '*as a guide, a margin of at least 20 m should be identified and maintained around scheduled Monuments or other identified features of importance*' (2017, 88). Given the potential for associated buried remains around the identified prehistoric assets, a 20m buffer around these assets should also be excluded from the areas of planting. Ten metre buffers around medieval/post-medieval assets are also suggested. The buffer for these has been reduced from 20m as the assets are more likely to be limited to their upstanding remains and any buried remains are less likely to be of high cultural value. A 5m exclusion zone around linear features such as dykes and other field boundaries is judged to be suitable and will ensure that such features are not accidentally damage during planting or cropping activities.

7.1.3 Given the substantial number of heritage assets identified on the Site, the vegetation cover, which often included thick bracken and heather, and the inability to survey some locations due to boggy conditions there is high potential for encountering further archaeological remains on the Site. To mitigate against

potential impacts upon hitherto unidentified assets it is recommended that a toolbox talk on the identifying archaeological remains is prepared and delivered to the relevant site staff prior to the commencement of any planting works. As part of this toolbox talk a protocol should be developed, whereby on-site staff can contact the developer's archaeological consultant in the case that archaeological remains are encountered. In such cases the developer's archaeological consultant should visit Site to inspect the remains and determine their type, extent, date and significance. Where significant remains are encountered, the local authority's archaeological advisor and FCS's archaeological advisor should be contacted to agree a more detailed mitigation strategy. This may comprise preserving the identified remains in situ, and this should be the preferred option. Where preservation in situ is not feasible there may be a requirement to excavate and record the remains prior to their removal. This should be followed as appropriate by post-excavation analysis and an appropriate level of reporting.

7.1.4 It is advisable that monitoring visits should be made during ground preparation works to be undertaken in proximity to Sites 57, 71, 91, 94, 117, 149 & 151 given that these assets are deemed to be of more than Local importance (See Table 6 above) and the potential for associated buried remains. Similarly, works in proximity to the Scheduled Monument (Sites 43, 67 & 76) should be subject to monitoring visits during ground preparations. The frequency and scope of these visits should be agreed with the local authority archaeologist and the developer and will be dependent upon final planting areas and programme of works.

7.2 Indirect Impacts & Proposed Mitigation

7.2.1 In cultural heritage terms, an indirect impact refers to any change in the baseline condition of a designated heritage asset resulting from a development beyond the boundaries of the asset. Indirect impacts can be positive as well as adverse.

7.2.2 The type of indirect impact considered in relation to the planting proposal is limited to:

- The potential for a visual impact affecting the settings of Scheduled Monuments or Listed Buildings, and other designated assets or non-designated heritage assets which were deemed to be equal in quality to the designated assets and the settings of which might be adversely affected by the proposal.

7.2.3 UKFS indicates that '*the settings of features, in addition to the features themselves, may be relevant and will need to be considered in the forest management plan. Where groups of features occur adjacent to each other, a larger area of open space is preferable to a series of smaller spaces. Where features are prominent in the landscape, or have sight lines associated with their function, then the area to be excluded from planting will need to be larger to accommodate these visual qualities*' (2017, 88). The assessment of potential impacts upon setting and mitigation measures proposed below are undertaken with this principle in mind.

7.2.4 One Listed Building is located within the Site but lies within an area where no planting is proposed, the nearest are of potential planting is located c. 1.5km to the southwest. The Listed Building comprises the Category A Listed Mound Bridge (Site 88) and its setting relates to the River Fleet and Loch Fleet. Woodland already lies to its north and a tree belt lies to its south along the eastern side of the minor road to Torboll. As such no material change to the bridge's setting is expected and no mitigation is deemed necessary.

7.2.5 There are six Scheduled Monuments within the Site. Three, Creag An Amalaidh, hut circle and field system (Site 74), Srath Carnaig, broch (Site 27) and Mound Junction (Site 26) lie in areas where no planting is proposed. The hut circle and field system at Creag An Amalaidh (Site 74) lies more than 500m

to the north and east of the nearest potential planting areas. No planting is proposed to the north or east of the asset. The assets sits on a west facing slope above minor water courses which run roughly north to the south from Abhainn an t-Srath Carnaig and Loch Tarvie. Proposed planting areas lie beyond this and as such will not obscure the relationship between the water course and the asset. As such impacts are deemed to be low at most and no mitigation is deemed necessary.

7.2.6 Srath Carnaig, broch (Site 27) and Mound Junction (Site 26) lie in close proximity to each other, with planting proposed to their north and south. These areas of potential planting are located c. 88m to the north of Strath Carnaig and immediately south of Mound Junction. The Scheduled Monument at Mound Junction comprises the remains of two hut circles, one of which (Site 26b) has nearly been truncated by the minor road running along Srath Carnaig. The hut circles are located on flat ground above the Abhainn an t-Srath Carnaig. The survey identified a possible entrance to both hut circles to the east. The most important elements of hut circle's setting is their relationship to one another and to the adjacent water course. The proposed planting areas will not obscure the relationship of the hut circles to one another; nor will it obscure the relationship with Abhainn an t-Srath Carnaig. As such impacts upon setting are judged to be low and no mitigation is deemed necessary.

7.2.7 The broch (Site 27) at Srath Carnaig is located within Srath Carnaig, above a tributary which enters Abhainn an t-Srath Carnaig from the northwest where it descends along Strath Tollaidh. The principle views are to the southeast and the confluence of the two water courses. Proposed planting to the south will be beyond the water courses and will not obscure the relationships between the broch and this lower lying ground which it was likely intended to dominate. As such setting impacts will be low and no mitigation is deemed necessary.

7.2.8 The other three Scheduled Monuments within the Site include: Creag an Amalaidh (Site 76) which comprises a chambered long cairn, a hut circle and a field system; Torboll kerb cairn (Site 67) and Carn Liath (Site 43) which comprises a chambered cairn, hut circle and field system. All three of these Scheduled Monuments are located within areas proposed for planting.

7.2.9 The Scheduled Monument on the south side of Creag an Amalaidh (SM1782; Site 76; Figure 55) comprised a chambered cairn (Site 76m), seven hut circles (Sites 76b, c, f, i, j, l, n), two sub-oval structures (Sites 76e, h) and various sections of stone and turf dykes and clearance cairns. The survey identified a possible entrance passage on the southwest side of the chambered cairn indicating that views in this direction were particularly significant. These views take in lower lying ground through which a number of small water courses run. These watercourses are roughly aligned north to south and run between Abhainn an t-Srath Carnaig to the north and Loch Tarvie to the south-southeast. While planting is not proposed around these small watercourses the plans supplied to AOC indicate that planting could take place between the Scheduled area and the watercourse. This could potentially obscure views to the southwest which are deemed to be significant and could also obscure the relationship between the asset and the water courses to the west. This could potentially result in a medium or high impact upon the setting of the asset. As such it is advised that the area of no planting c. 285m to the west of the Scheduled Monument be extended up to its boundary to preserve these views.

7.2.10 Torboll Kerb Cairn (Site 67) survives in reasonable condition on a low northeast facing slope above Abhainn an t-Srath Carnaig. Birch wood has been allowed to grow over it and it is now heavily obscured by vegetation and a number of trees are located in the area around the cairn and between it and the water course. The kerb cairn survives as a raised mound 15m-16m diameter with a slight central depression on the top and a single line of large stones set as a kerb around the base, no particularly sensitive alignments associated with the cairn were identified. Given the current setting of the cairn, further planting in its vicinity is unlikely to material alter this or the ability to understand or appreciate the

asset. A marginal impact upon its setting is predicted and no mitigation is deemed necessary. However, if possible, it is recommended that any forthcoming forestry management plan should aim to improve the setting of the cairn by removing the existing planting and re-establishing the relationship between the cairn and the water course to the north.

7.2.11 Carn Liath (Site 43) comprises two chambered cairns, hut circles and a field system and sits to the immediate southeast of the summit of Creag A' Bhlair with the southernmost cairn below a further unnamed summit to the south. Forestry currently lies to the east and northeast of the asset, on lower slopes between it and the River Fleet. Loch Ruagaidh is located to the west along with a minor water course which runs into it. The main elements of setting which currently contribute to the understanding of the asset are the relationship and views between to the two cairns and the other assets located within the Scheduled Area. Views towards the Loch Ruagaidh and view up to the cairns with their respective summits behind them also contribute to an understanding of the deliberate placement of these monuments within the landscape. Planting between Loch Ruagaidh and the Scheduled area could therefore potential impact upon the setting of the asset and could result in a medium impact. As such it is suggest that area between Loch Ruagaidh and the Scheduled Monument be excluded from planting.

8.0 REFERENCES

8.1 Bibliographic references

CIfA 2014a *Code of Conduct*

CIfA 2014b *Standard and Guidance for Commissioning Work or Providing Consultancy Advice on the Historic Environment*

CIfA 2014c *Standard and Guidance for the Archaeological Investigation and Recording of Standing Buildings or Structures*

CIfA 2017 *Standard and Guidance for Historic Environment Desk-based Assessment*

European Landscape Convention (ELC) 2000

Forestry Commission 2017 *The UK Forestry Standard The governments' approach to sustainable forestry*

Forestry Commission Scotland 2016 *Forests & historic environment: information and advice*

Fowler 2003 'Cultural Landscapes: The Challenges of Conservation' in *World Heritage Papers 7*

Historic Scotland 2016a. *Historic Environment Scotland Policy Statement*

Historic Scotland 2016b *Managing Change in the Historic Environment: Setting.*

HMSO 1979 *Ancient Monuments and Archaeological Areas Act 1979*.

ICOMOS 1999 *Burra Charter* (AUS ICOMOS, 1999) http://www.icomos.org/australia/burra.html

ICOMOS, 2005 *Xi'an Declaration on the Conservation of the Setting of Heritage Structures, Sites and Areas* Adopted Xi'an, China by the 15th General Assembly of ICOMOS on 21 October 2005 http://www.international.icomos.org/charters/xian-declaration.pdf

Scottish Government 2011 *PAN2/2011 Planning and Archaeology*.

Scottish Government 2014 *Scottish Planning Policy*.

UNESCO 2003 *Convention for the Safeguarding of the Intangible Cultural Heritage*.

UNESCO – ICOMOS 2009 *World Heritage Cultural Landscapes*.

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Appendix F. CONFIDENTIAL Hen Harrier Report

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Appendix F

Cambusmore 2018 Hen Harrier Study

Volume 1; Appendix F
Confidential

Ken Greenland Farming

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Abstract

Hen harrier *Circus cyaneus* surveys were carried out within Cambusmore Estate and a 2km buffer during the 2018 breeding season. The main purpose of the study was to assess the current population of hen harriers at Cambusmore, in order to inform an assessment of the potential impacts of a proposed large scale woodland planting scheme. Cambusmore is part of the Strath Fleet Special Protection Area (SPA), designated for its population of breeding hen harriers. Two confirmed breeding territories and six chicks fledged successfully. Two territories represents a low in the population within recent history.

Habitat monitoring, also undertaken within Cambusmore, found that the most diverse composition and structure of vegetation was found within the two hen harrier breeding territories. Positive links were found between certain habitats and prey abundance, this included dry heath, wet grassland and flushes. As positive links were also found between prey density and the presence of small/immature trees in both this and other studies, it is strongly recommended that the proposed woodland planting scheme takes place in suitable areas across the estate. It is consider very likely that this will aid recovery of hen harriers within Cambusmore at a critical point. To achieve this however, it is essential that a holistic Conservation Management Plant (CMP) is created and uses the results of this study, along with continued monitoring, to retain and optimise open habitats. This should aim to increase current levels of suitable habitat for nesting and foraging harriers, in addition to considering the requirements of other species.

1 Introduction

Atmos Consulting was approached by Cambusmore Estate in January 2018, to carry out an independent study of the status of the hen harrier *Circus cyaneus* population within the estate. In addition, the study would also aim to assess the condition of habitats present for hen harriers and the level of prey populations currently supported. The purpose of this study is to inform an assessment of the potential impacts of a proposed 3030ha woodland planting proposal within the estate.

Cambusmore is part of the Strath Carnaig and Strath Fleet Special Protection Area (SPA) and Site of Special Scientific Interest (SSSI), designated for a population of breeding hen harriers. The SPA is currently considered to be in favourable condition but the population of harriers is known to be declining. The protected areas were last surveyed in 2013, when 12 pairs were located, but only three of these were within the Cambusmore Estate and only one confirmed nest was found.

Breeding hen harrier surveys were carried out at Cambusmore and within a 2km buffer during the 2018 season. Habitat classification and condition surveys were also undertaken, alongside vole and passerine monitoring.

Female hen harrier feeding chicks at nest in Territory 1 (See Table 1) 19/06, image taken from nest camera (provided by B. Etheridge, Highland Raptor Study Group)

2 Methods

2.1 Hen Harrier Surveys

Hen harrier surveys were undertaken throughout the 2018 breeding season in order to identify territories and nesting locations. Standard survey guidelines (Hardey *et al.* 2013) were followed. Four survey visits were carried out during the breeding season and each visit consisted of eight to ten days in the field which covered the entire survey area each month. The first visit was carried out in April, to allow for detection of possible territories during the display and courtship period. The second visit was carried out in May and the main focus of this visit was to find nests during the incubation period. The third visit, which took place in June, focussed on monitoring any nests found. The fourth visit in July focussed primarily on recording fledged juveniles. In addition to breeding hen harrier surveys, foraging watches were carried out throughout the season. These watches covered the entire survey area, with survey effort spread evenly across the site, even in areas where hen harriers had not been seen during previous watches.

The main foraging range for hen harriers during the breeding season is 2km (SNH, 2016) Therefore any hen harriers nesting within this distance may use the proposed planting area for foraging. The survey area consisted of a 2km buffer around the boundary of the proposed planting area, except areas which would be beyond this distance from the Strath Carnaig and Strath Fleet Moors SPA. The only exception to this was the forest plantation south of Loch Buidhe where no land access was granted. Figure 8 shows a map of the survey area.

2.2 Habitat Surveys

Botanical survey to National Vegetation Classification (NVC) system standard was carried out within the entire proposed planting area, following standard methodology. This involved mapping polygons, recording the extent of each NVC community. In many cases a polygon would consist of a mosaic of different NVC communities - in such cases the estimated percentage of each type within the polygon was recorded. When the ratio of communities changed in any given area, a new polygon would be mapped. The NVC survey was carried out in April 2018, this is because the results of the NVC survey were required in order to carry out further habitat monitoring in May 2018.

Using the results of the NVC survey, Common Standards Monitoring (CSM) points were selected randomly across the site. As per guidance (JNCC, 2006), at least 25 survey quadrats of 2x2m were selected in each CSM habitat classification. At each survey point the percentage cover of each plant and moss species was recorded, vegetation heights were measured and the full range of CSM criteria assessed. This then allowed the condition of each habitat type present at Cambusmore to be measured.

The condition of habitat in accordance to CSM does not always directly correlate to habitat preferences of hen harriers. However, much of the information recorded during CSM, including percentage cover of certain plant species and the average height of vegetation, is relevant when assessing the potential for hen harrier nesting and foraging habitat. The method also allows the current processes and pressures on the habitats to be identified, which will help to inform a future habitat management plan. CSM also provides a repeatable method to be carried out again in the future.

2.3 Vole Surveys

Small vole species, such as field vole *Microtus agrestis*, provide an important prey source for hen harriers throughout the breeding season. A vole presence/absence survey was carried out across the survey area. As per survey guidance (Graham & Redpath, 1995), 25 survey points were randomly selected in each basic habitat type, giving 150 survey points in total. At each survey point, a 2x2m quadrat was examined for the presence of vole signs, in the form of either fresh vole faeces or fresh grass/rush clippings. Care was taken, by an experienced surveyor, to ensure the signs were not those of water vole *Arvicola amphibious*. A score was given to each quadrat, 0 for no vole signs, 1 for the presence of either faeces or clippings and 2 when both types of field signs were present.

This survey method did not allow for an estimate of vole population or density to be made. It did however, allow for a comparison of vole presence across different habitats and different parts of the site. Vole surveys were carried out in May, this was to coincide with the main hen harrier incubation period when small voles are usually the main prey item.

2.4 Meadow Pipit Transects

Meadow pipits *Anthus pratensis* are another important prey species for hen harriers. Forty meadow pipit transects (10km in total) of random orientation were selected across the site. Using GIS software, the random selection of transects was manipulated to achieve an even spread of basic habitat types across the site. Each transect was 250m in length and meadow pipits were recorded to a 25m distance from the transect. This was due to an expected pipit detection rate of 100% within 25m of the transect (Calladine *et al,* 2004). All transects were undertaken between 6am and 9am. Surveys were undertaken in June and early July, this coincided with the period when meadow pipits are the primary prey source for harriers.

As hen harriers predate both adult pipits and fledged juveniles, all individual meadow pipits were recorded. This provided data for the overall level of food resource available to hen harriers and not just the number of breeding adult meadow pipits. Other passerine species which are also important prey for hen harriers, such as skylarks *Alauda arvensis*, were also recorded during the transects.

Data from the NVC survey was used to estimate habitat coverage within each 250x50m transect, which allowed a comparison to be made of densities within each habitat type.

Although the surveys allowed an estimated pipit density to be calculated in each kilometre square, a sample-based methodology is always open to some bias. For example, recently fledged meadow pipits often flock together. Therefore, if a transect fell within such an area, the estimated density of pipits is likely to be on overestimate of the population. To get a more accurate population density a much higher number of transects would need to be undertaken in the future. However, the survey effort did provide enough data for a general comparison of meadow pipit numbers across the site and within different habitats to be made.

3 Results

3.1 Hen Harrier Surveys

Two confirmed hen harrier breeding territories were identified, [redacted] (Table 1 and Figure 8).

Table 1: Hen Harrier Confirmed Breeding Territories

#	Nest G.R	No. of eggs (visit date)	No. of chicks	No. of Fledglings
1	[redacted]	5 (16th of May)	5	4
2	[redacted]	6 (1st of June)	3+	2

A pair was observed displaying [redacted] during the April visit. During this visit, an additional male was also seen hunting directly to the south of Territory 1, [redacted]. By the next visit in mid-May, the female of the first pair had laid five eggs and the male was regularly bringing food to the nest. A separate pair were again observed [redacted], but the behaviour did not yet suggest a nest was present. An additional visit was made at the start of June in order to check on the progress of Territory 2. This time, the male was observed to bring food to the female and a nest with six eggs was found. Despite the nests being just 1km apart, each female was certainly being fed by a different male, as they were observed hunting simultaneously. Polygamy is common in hen harriers and males can support at least two nesting females (Madders, 2000).

Foraging watches (flight path) were undertaken throughout the breeding season (Figure 7). The foraging range for Territory 1 stretched to around 2km to the north-west of the nest and around 1km to the east, which likely reflected the suitable hunting habitat available. [redacted] Hunting by the breeding pair of Territory 2 was mainly along [redacted] around 1km to the west of the nest location. The pair were also using the area directly to the south, again to around 1km from the nest.

An additional pair were observed displaying [redacted] in April, but despite numerous additional watches, hen harriers were not observed in this location again. It is therefore presumed that they bred [redacted]. The additional watches did confirm, [redacted] Another pair were almost certainly breeding outside of the study area, [redacted]. This pair were regularly foraging in the survey buffer [redacted] Occasional sightings of foraging birds elsewhere along Strath Carnaig, were attributed to birds on migration or non-breeding individuals.

Incidental records of other bird species

Table 2 shows all incidental records of Schedule 1 species during the hen harrier surveys of 2018. Other, non-schedule 1 species confirmed to be breeding on site included lapwing *Vanellus vanellus*, golden plover *Pluvialis apricaria*, curlew *Numenius arquata* and dunlin *Calidris alpina*. Figure 16 shows all breeding territories for scarce or rare species located within the study area.

Table 2: Additional Records of Schedule 1 Species

Species	Gender	Age	No.	G.R	Date	Comments
Black grouse *Lyrurus tetrix*	Male	Adult	2	[redacted]	18/04	Lek location
Black grouse	Male	Adult	3	[redacted]	18/04	Lek location
Red-throated diver *Gavia stellata*	Pair	Adult	2	[redacted]	May-July	[redacted]
Red-throated diver	Pair	Adult	2	[redacted]	18/06	[redacted]. That pair then exhibited territorial behaviour towards the intruders, which returned tp lochan originally flushes from
Black-throated diver *Gavia arctica*	Pair	Adult	2	NH 648 982	April	Pair hunting on Loch Buidhe throughout month
Black-throated diver	Pair	Adult	2	[redacted]	April-July	Nest [redacted] two chicks observed in July
White-tailed eagle *Haliaeetus albicilla*	-	3CY	1	NH 723 965	05/04	Flew SE over Loch Laogh
White-tailed eagle	-	Imm	1	NC 632 014	05/06	Flew N over Loch Cracail Beag
White-tailed eagle	Pair	Adult	2	NH 628 987	13/07	Soaring together over Garvary
Golden eagle *Aquila chrysaetos*	Male	Adult	1	NH 717 986	18/04	Flew N over Creag Daile na Méine
Golden eagle	Male	4CY	1	NH 671 995	18/04	Hunting N of Loch Buidhe
Golden eagle	Male	3CY	1	NH 705 999	14/05	Flew N over Creag Daile na Méine
Golden eagle	Male	Adult	1	NH 708 943	17/05	S over Creag Ach a' Bháthaich
Golden eagle	Pair	Adult	2	[redacted]	June-July	Pair seen hunting on several [redacted]
Goshawk *Accipiter gentilis*	Male	Adult	1	[redacted]	11/04	[redacted]
Osprey *Pandion haliaetus*	Pair	Adult	2	[redacted]	April-July	[redacted]
Osprey	-	Adult	1	[redacted]	17/05	Flew [redacted] with fish towards [redacted]

Species	Gender	Age	No.	G.R	Date	Comments
Osprey	-	Adult	1	[redacted]	April-July	Carrying fish [redacted]
Osprey	-	Adult	1	NH 738 945	22/06	Fishing at Loch Lannsaidh then flew W (without fish)
Greenshank *Tringa nebularia*	-	Adult	1	[redacted]	April-July	Pair alarm calling with chicks in June
Greenshank	-	Adult	1	[redacted]	April-July	Pair alarm calling with chicks in June
Greenshank	-	Adult	1	[redacted]	April-July	Pair alarm calling with chicks in June
Greenshank	-	Adult	1	[redacted]	April-July	Pair alarm calling with chicks in June
Peregrine *Falco peregrinus*	Male	Adult	1	NH 761 981	06/04	Flew SE towards Loch Fleet
Peregrine	Male	Adult	1	NH 623 998	05/06	Flew S over Garvary
Merlin *Falco columbarius*	Pair	Adult	2	[redacted]	18/04	Pair displaying [redacted], not observed again
Merlin	Pair	Adult	2	[redacted]	14/05	Pair observed hunting/displaying [redacted] possibly same pair as above record. Not observed again

3.2 Habitat Surveys

Tables 3 and 4 show the results of vegetation survey quadrats undertaken across Cambusmore and the subsequent CSM analysis (as shown on Figure 13).

Table 3: Habitat Composition in Different Habitat Types (CSM Classifications)

Vegetation Structure/Composition	Habitat Type				
	Acid Grassland	Dry Heath	Blanket Bog	Wet Heath	Wet Grassland/Flush
Average height of dwarf shrubs	1.62	30.79	16.26	16.24	5.64
Average height of graminoids	11.28	9.98	15.70	14.20	30.78
Average heather cover	1.6	90.0	24.4	38.2	2.0
Average purple moor grass cover	0.6	9.1	0.8	23.4	23.9
Average soft rush cover	1.4	2.5	0	1.36	60.1
Average cover of large branched *Sphagnum* Mosses	0	0	3.57	1.27	2.6

Table 4: Common Standards Monitoring Results

Habitat Type	CSM Pass %
Blanket bog	53.6
Dry heath	48.0
Wet heath	39.5
Wet grassland	4.0
Acid grassland	0

The reason for failure to meet the CSM pass criteria for many dry heath, wet heath and wet grassland quadrats was due to over dominance by certain species and a lack of floral diversity as a consequence. Many wet heath quadrats in deer grass *Trichophorum germanicum* dominated areas (NVC code M15) had a low diversity of species mainly due to recent or historic muirburn. Mature stands of heather *Calluna vulgaris* and purple moor grass *Molinia caerulea* wet heath (NVC code M16), were generally more diverse and were found to be in good condition.

Although blanket bog habitats met CSM criteria most often, signs of drying were found and the overall percentage of large branched bog mosses, associated with pool systems, was very low. An additional general CSM assessment within blanket bog habitats, outside of survey quadrats, concluded that active drainage was a major contributory factor to suboptimal levels of surface water. Signs of drying were also noted in wet grassland and particularly flush habitats, this was a cause of failure for a number of these quadrats. Grazing of mature plants was found to be low in most habitats, however signs of grazing of pioneer and building phase plants was noted. Grazing levels were the likely cause of failure of all acid grassland quadrats, as this is causing low vegetation height and a lack of species diversity.

The condition of habitats found by CSM does not necessarily relate to their potential value for foraging and nesting hen harriers. For example, the over dominance of heather in dry heaths, may be beneficial by providing a plethora of suitable nest sites. Likewise, the predominance of soft rush *Juncus effusus* and purple moor grass in wetlands, provides an optimal food source for field voles, an important harrier prey species. However, a balance may need to be found in some habitats, for example, an increase in diversity of plant species may increase the diversity of insects, which in turn would increase food availability for meadow pipits and other passerine prey species. Additionally, continued drying of some wetlands may decrease cover of vole foraging plants and reduce the density of insect prey for passerines.

No invasive species were found in any of the quadrats, but non-native spruce regeneration was found growing in some habitats near to mature plantations (Figure 9).

The distribution of NVC community types at Cambusmore can be seen on Figure 9, whilst summarised dominant habitat polygons are shown in Figure 14. Figures 11 and 12 show the average height of dwarf shrubs and graminoid species across Cambusmore. These figures show that the widest band of diverse habitats with tall vegetation, are found in central parts of Strath Carnaig, [redacted].

3.3 Vole Presence/Absence Surveys

The distribution of small voles across the site is shown on Figure 15. This distribution appears to be dependent on both habitat type and vegetation height and Table 5 below appears to suggests a strong association with habitats dominated by soft rush.

Table 5: Vole Presence/Absence Survey

Habitat Type	Quadrats with Presence (Droppings or Clippings) %	Quadrat Score (Dropping & Clippings) %
Blanket bog	3.6	1.8
Dry heath	12	6
Rush dominated flush	41	27
Purple moor grass heath/grassland	18	10
Deer grass dominated we heath	4	2
Acid grassland	0	0

Voles were also found in purple moor grass habitats but not to the same extent. However, many of the survey quadrats within this habitat, were located in southern parts of Cambusmore. These areas are still recovering from a large-scale recent fire. It is possible, that despite some of these areas having recovered to an optimum vegetation height, they are yet to be recolonised. Many of these habitats are now isolated and between large areas of shorter vegetation, which is potentially slowing any recolonisation. Most acid grassland and deer grass wet heath appear to be too short and lack the correct vegetation to support voles.

3.4 Meadow Pipit Density Surveys

Estimated meadow pipit density across the site can be seen on Figure 10. This figure shows that the highest densities are in the central parts of Cambusmore, [redacted]. The highest pipit densities appear to be associated with a mosaic of habitats and generally tall vegetation. A comparison of the habitat coverage of each meadow pipit transect and how this affects the number of pipits recorded, can be found in Appendix B. These graphs suggest that transects with the least meadow pipits counted consisted of the smallest variety in vegetation types and structure. In general, transects with the least number of meadow pipits counted, contained large tracts of low vegetation blanket bogs, acid grasslands or wet heaths, whilst dry heaths and taller stands of wet heath were rare. Whereas, transects with the highest densities of meadow pipits generally contained a high proportion of heather, alongside more open wetter habitats. A small percentage of acid grassland also often featured in these transects. The variety of passerines was generally highest in Strath Carnaig itself where there was the greatest variety in habitats. The presence of willow trees *Salix spp.*, soft rush and some acid grassland appears to lead to the greatest variety. Other passerine species recorded during the transects included, skylark, willow warbler *Phylloscopus trochilus*, grasshopper warbler Locustella naevia , sedge warbler *Acrocephalus schoenobaenus*, whinchat *Saxicola rubetra*, wheatear *Oenanthe oenanthe*, lesser redpoll *Acanthis cabaret* and reed bunting *Emberiza schoeniclus*

4 Discussion

4.1 Hen Harriers at Cambusmore 2018

Two confirmed hen harrier breeding territories were located during survey work [redacted] Despite the low number of territories, six young were fledged in total.

A further hen harrier pair were located [redacted]s. The breeding outcome of this pair is unknown, however it is presumed they attempted to breed [redacted], with no further records in later survey visits.

A fourth pair were observed foraging [redacted]. The male harrier was observed carrying food [redacted] which suggests this pair were probably breeding [redacted]. Unfortunately, due to time and land access restrictions the nest location remains unknown.

Results from foraging watches showed that the breeding adult hen harriers hunted across a mosaic of habitats with vegetation cover dominated by heather, purple moor grass and soft rush. In addition, the birds were seen to flush passerines such as meadow pipits from small willow trees.

The foraging survey results (Figure 8), [redacted] An adult hen harrier always commences foraging on departing the nest (Redpath, 1998), which at Cambusmore [redacted], and therefore this may also have influenced the foraging results. However, it should also be noted, that the pair observed [redacted] also appeared to have a preference for foraging on slopes.

The foraging range of Territory 1 was up to 2km, whereas the adults within Territory 2 tended to range only around 1km from the nest. This range for Territory 2, stretched south [redacted], prey availability is clearly limited and the adults therefore don't appear to be using it for foraging.

Other than the two breeding pairs discussed, no other breeding pairs of hen harriers were observed to be regularly foraging within the proposed planting area.

4.2 Comparison to historic data

The most recent full programme of surveys covering Cambusmore were carried out in 2013. The data from that year would suggest the population has remained relatively stable since then. The data collected in 2013 suggests three territories within the 2018 survey area. One of these was in the same location [redacted]

[redacted], with another around [redacted]. A further territory was located [redacted].

The Scottish Raptor Study Group (pers com B. Etheridge), suggests a number of additional historical territories at Cambusmore to those found in 2018, [redacted] This therefore appears to represent a long-term decline of the species at Cambusmore, with the period of 2013-2018 representing a low in the population within recent history.

The situation at Cambusmore may be a reflection of the decline in the national hen harrier population. There was a 20% decline within Scotland between 2004 and 2010 (Hayhow *et al*, 2010), followed by a further 9% decline between 2010 and 2016 (RSPB). Anecdotal evidence and results from surveys carried out by Atmos Consulting within East Sutherland suggest serious declines on other Estates local to Cambusmore.

Potential causes for this national decline are likely to be a complex combination of factors including overgrazing by deer, muirburn, predation of nests and possible persecution of hen harriers on some land managed for driven red grouse shooting. Weather conditions such as high spring rainfall can also impact on hen harrier breeding success (Amar, 2011), but there has been no significant increase in this in recent times (MetOffice, 2018).

At Cambusmore, habitat condition is likely to be a major contributing factor in the decline of the local hen harrier population. Although without historical habitat data it is not possible to compare the current condition to historical habitat condition. The 2018 data can be used to assess the current condition of the habitat and identify signs of land management pressures

4.3 Potential limitations on the hen harrier population

4.3.1 Nest sites

Both of the nests located at Cambusmore in 2018 were in expansive patches of tall mature heather, which were widespread throughout both territories. Hen harriers usually choose to breed in mature or degenerate heather if it is present (Grant & Pearce-Higgins, 2012), although they will nest in other dwarf shrubs (Redpath, 1998). Hen harriers have a strong preference to nest in heather which is 40-50cm in height and rarely nest in shrubs less that 30cm (Redpath, 1998). They also demonstrate a preference for nesting in large expansive stands of tall heather, possibly because this increases security against predators.

Figure 9 and Figure 12 show that there is also suitable nesting habitat [redacted], directly to the west along the north of Starth Carnaig to the western end of Loch Buidhe. The fact that there is apparently suitable nesting habitat unoccupied suggests there are other factors limiting the hen harrier population in these areas, which are discussed in more detail throughout section 4.

[redacted] tall heather is generally sparser. There is evidence of burning in these locations, with the vegetation now characteristic of the NVC community M15b or d (Figure 5). Muirburn also is the likely cause of lower heather

heights. An additional restriction of heather growth may be grazing by deer or livestock and signs found in acid grassland, blanket bog and some dry heath habitats suggested young heather growth was limited, although signs of grazing of mature heather was low.

The majority of the large expanses of blanket bog above Strath Carnaig consist of naturally low growing heather, due to the waterlogged peat and weather conditions. Consequently, the heather in these areas will always remain unsuitable for nesting hen harriers. A large accidental fire south of Strath Carnaig, has had a significant impact on the heather, resulting in it currently being unsuitable for nesting. At current levels of grazing, it is unlikely that the heather or other dwarf shrubs will become mature in this part of Cambusmore for many years.

4.3.2 Vole density

Field voles are a very important prey item for hen harrier, especially immediately prior to nesting and during the incubation period (Amar & Redpath, 2011). Availability of field voles is therefore highly significant in determining the condition of the adult birds prior to and during the laying period. The ability of the birds to lay large clutches of 5 and 6 eggs laid at the [redacted] nests this year, may suggest a peak in the vole population cycle.

The upland habitats preferred by field voles include soft rush dominated habitats (Bown *et al*, 2006) and grasslands where purple moor grass is common (Averis *et al,* 2004) (Wheeler, 2008). Heather tends to support only low densities of voles and it is important that a high percentage of graminoids are present (Wheeler, 2008). Blanket bog is also typically poor habitat for field voles especially when dominated by heather and hare's tail cotton grass *Eriphorium vaginatum* (NVC code M19 & M20).

In addition to the presence of graminoid species, the vegetation needs to be tall enough to provide both a high level of food and cover. A reduction in the levels of grazing of grasslands by sheep in Orkney by 20%, led to a significant increase in the number of voles and subsequently a recovery in the hen harrier population (Amar *et al*, 2011). Research on Mull has highlighted that the presence of intensively grazed grasslands limited occupation by hen harriers when forming over 20% of the habitat composition (Haworth, 2008). Muirburn also has a negative impact on vole populations by restricting vegetation height (Madders, 2000). Retaining a certain level of grazing is however important to prevent natural habitat succession towards a closed canopy. This results in shading of the ground and a reduction in the lower plants important for feeding on by field voles (Madders, 2000). Low to medium intensity grazing, particularly by cattle, typically leads to the highest densities of palatable species for voles and consequently a higher overall field vole population (Bown *et al*, 2006).

Much of the acid grassland at Cambusmore is heavily grazed by sheep and is therefore unsuitable for voles, with an average vegetation height of 10cm across much of the area. This habitat is extensive at the eastern edge of Cambusmore and also between Loch Buidhe [redacted] The prevalence of grazed grasslands is likely to be limiting the vole population and therefore hen harriers in these areas. In these same locations and elsewhere, soft rush was present but was grazed very low to the ground.

Data from the vole survey at Cambusmore would suggest the soft rush dominated habitats favoured by small voles appear to be limited by grazing pressure. There was

also evidence that some of these habitats were drying out with soft rush replaced with species less palatable to voles. There has been some recovery of rushes and grass species south of Strath Carnaig since the large-scale fire, although significant areas remain much shorter and therefore unsuitable for voles. Evidence from the vole survey even suggests many areas which have recovered have yet to be recolonised. There is evidence of historic muirburn elsewhere along Strath Carnaig and at the north end of Cambusmore, which may also be limiting vole numbers. Muirburn also reduces heather cover, which is often replaced at Cambusmore with species unpalatable to voles, such as hare's tail cotton grass, deer grass and heath rush.

4.3.3 Meadow pipit density

There is a strong positive correlation between meadow pipit density and hen harrier breeding success (Redpath *et al,* 2002). Up to 35% of all meadow pipits within a hen harrier territory are predated during the breeding season (Peace-Higgins & Grant, 2010). Hen harriers tend to have a preference for areas with around 50% heather cover (Pearce-Higgins & Grant, 2012) and 40-60% graminoid cover, which correlates strongly with meadow pipit habitat preference (Pearce-Higgins & Grant, 2006).

Meadow pipits generally require vegetation of at least 15cm tall to provide nest sites, cover and insect prey (Pearce-Higgins & Grant, 2006). Low intensity cattle or sheep grazing is however beneficial as it maintains some open areas for foraging and a varied composition and structure of vegetation to increase the diversity of insect prey (Evans *et al*, 2006). Maintaining heterogeneity within the habitat appears to be key, with a mixture of wet habitats, such as blanket bog or flush, and dry habitats, such as heath and grassland. This combination maintains a variety of different insect prey, which are available at different points in the breeding season (Pearce-Higgins & Grant, 2012).

Much of the data collected at Cambusmore reflects that found in previous studies. The meadow pipit density (Figure 10) and habitat data (Appendix B) suggests that a mosaic of mature heather, wet grassland and flush support the highest densities of meadow pipits. The data also suggests the presence of a low percentage cover of grazed acid grassland, such as a fenced enclosure for livestock, may also be important.

Lower densities of meadow pipits were found in areas which were dominated by one habitat type, particularly deer grass wet heath, acid grassland and blanket bog. Deer grass dominated wet heath (NVC code M15d) was usually present in areas which had been subject to muirburn and contained limited vegetation cover. Blanket bog habitats were only associated with high densities of meadow pipits when forming part of a habitat mosaic. Whilst expansive blanket bogs with pool systems provide a higher density of insects than blanket bogs without pools, at Cambusmore these also contained the shortest heather and only supported a low density of meadow pipits similar to other blanket bog habitats.

4.3.4 Other prey species

During the breeding season, hen harriers can feed on numerous different prey items. Although meadow pipits are the predominant passerine species predated, other passerines are often also caught. A review of some of the footage caught on nest cameras provided by B. Etheridge, Highland Raptor Study Group, showed that meadow pipits were the dominant prey item, with other species identified including grey wagtail, chaffinch and lesser redpoll. A variety of passerine species were also

recorded on the meadow pipit transects, with the highest densities being found within the two hen harrier territories. This is at least partially due to the presence of birch *Betula spp.* and willow. along this part of the Strath. It is likely that these additional passerine species provide an important supplementary food source.

Red grouse *Lagopus lagopus*, mainly chicks and juveniles, are also an important prey item for hen harriers (Pearce-Higgins & Grant, 2012). Grouse numbers tend to increase as the proportion of heather increases up to around 50-60%, however, they also require wet habitats such as flushes and bogs to provide insect food for chicks (Pearce-Higgins & Grant, 2012). These habitat preferences are similar to those of meadow pipits and any habitat management which benefits pipits is therefore likely to have a positive impact on red grouse numbers. Occasionally rabbits *Oryctolagus cuniculus* may also be caught by hen harriers, when present at high densities, but this species seems to be largely absent at Cambusmore.

4.3.5 Predation

Nest predation, particularly by red fox *Vulpes vulpes*, can limit hen harrier numbers. This is especially the case when the hen harrier population is small and isolated, such as at Cambusmore. Fox predation has been linked to a decline in hen harriers on Skye (McMillan, 2017). Predation levels on Skye appear to vary each year and although not fully understood may be caused by variations in the fox population, or fluctuations in the availability of easier prey, such as rodents (Mcmillan, 2017). Foxes are likely to preferentially predate rodents when available rather than risk possible attack by a hen harrier. Only one of eight hatched chicks at Cambusmore is thought to have been predated by a fox. It is possible however that 2018 is not a representative year, if as discussed earlier, there is a higher average number of voles due to population cycles. If this is the case, there may be a subsequent increase in the fox population in the following year as part of the predator-prey cycle. It is certainly possible that predation by foxes has limited the population elsewhere at Cambusmore where there appears to be suitable hen harrier habitat.

4.3.6 Disturbance

[redacted]

[redacted]

4.4 Potential benefits to the hen harrier population due to woodland planting

The majority of previous studies have found hen harriers have benefited initially from woodland plantations. In Ireland, conifer plantations were found to be beneficial until the mature phase (Hinsley & Gilling, 2012). The likely benefit of woodland planting is that the areas are usually fenced which leads to an increase in growth of dwarf shrubs suitable for nesting. Additionally, overall vegetation height increases, particularly in areas affected by muirburn and grazing, leading to a rise in vole and meadow pipit numbers due to the increased habitat suitability. (Pearce-Higgins & Grant, 2012).

Research on Mull also found a positive link between the presence of woodland plantations and hen harriers (Haworth, 2018). It should be noted however that there are no foxes or badgers on Mull, both of which predate hen harrier nests and are likely to increase significantly with the presence of woodland in upland habitats. There are however foxes on Skye, where hen harriers breed in both commercial forest plantations and native woodland grant plantations. Despite the issues with predation discussed in the previous section, the hen harrier population is still higher on Skye than it was prior to the forest plantations (McMillan, 2017). This is probably because levels of predation vary each year, with successful breeding years able to balance out those with significant nest failure and maintaining a stable population. As discussed earlier, the impacts of predation on a small isolated population may be more detrimental.

The population of Hen Harriers on Skye and elsewhere (Mcmillan, 2017) has continued to breed within plantations beyond the closing of the canopy. This is probably due to large open rides of mature heather, flushes and wet grassland remaining within the plantations. Hen harriers will not hunt between densely planted trees of over 2.5m tall, where they are unable to manoeuvre or forage successfully (Madders, 2000). Despite this they will continue to hunt along rides and in unplanted areas within forests and woodland. It appears that if an area can provide suitable nesting sites and a critical mass of prey that hen harriers will breed there, providing there are no other prohibitive negative factors.

Hen harriers can thrive in areas where there are no trees present, however, it appears that woodland plantations and small trees such as willows can support densities of prey not found elsewhere. Plantations are therefore likely to support higher densities of harriers than elsewhere (Haworth, 2018), providing they are located in a mosaic of other habitats, which support high levels of hen harrier prey throughout the breeding season. Willows and birch trees located within the two Cambusmore territories were regularly utilised by hunting hen harriers, which would ambush passerines by flushing them from the trees.

4.5 Conclusions

The 2018 surveys located two active breeding territories[redacted]e both of which successfully fledged chicks. Surveys suggest that a mosaic of habitats which include mature heather, rush dominated flushes, wet grassland and small trees contains the most nesting sites and supports the greatest densities of prey. Both successful territories contained the highest proportion of suitable vegetation in terms of composition and structure compared to the rest of the survey area. One or more of these critical habitat components appear to be absent across much of the rest of the estate.

The far north of Cambusmore consists of a number of flushes and wet grassland habitats, but vole and meadow pipit numbers are lower than in the peak areas. Some of this land is still recovering from muirburn, which affects vegetation height, heather cover and therefore vole recolonisation. Swathes of the central Cambusmore estate are dominated by blanket bog which is unable to support high densities of meadow pipits or voles and lacks suitable nest sites for hen harriers.

The eastern and southern parts of the estate are dominated by areas recovering from muirburn and grazed grasslands. Strath Carnaig [redacted] seems to have suitable nesting habitats and moderate densities of meadow pipits. However, these areas contain slightly higher proportions of grazed grasslands and deer grass dominated wet heaths in combination with lower rush and small tree cover, which may help explain the lower densities of meadow pipits and voles. This area of the Strath along to the western end of Loch Buidhe may be described as suboptimal in its current condition.

The 2018 data suggests a contraction in range of hen harriers[redacted]. It may be that several additional pressures, such as predation or disturbance, are impacting on this population, which is inherently more vulnerable due to its small size and isolation. Due to these additional pressures, hen harriers may not be able to raise enough young in the suboptimal habitat to maintain a stable population. In conclusion, identifying these potential pressures, in combination with increasing prey availability, is vital for the population to recover. Recommendations for future management are discussed in the following section.

5 Habitat Management & Other Recommendations

5.1 Further survey work

It is recommended that hen harrier monitoring at Cambusmore is continued each year. This ensures that nests are found, monitored and any failures recorded, further helping to understand the population dynamics on the estate and identify any additional pressures such as nest predation. It is also suggested that foraging watches are carried out in conjunction with this monitoring to identify all favoured hunting areas of any territory found.

In addition, a full hydrological assessment and further habitat condition monitoring, targeted at flush and wet grassland should be carried out, further discussed in section 5.3. The CSM suggested that numerous flushes and some wet grassland may be drying out. These areas support the highest densities of field voles at Cambusmore and are also important components of meadow pipit territories. It is therefore important to ensure these habitats are maintained and expanded. Further discussion on potential management strategies of these habitats can be found in section 5.3

5.2 Woodland planting strategy

The main purpose of this study was to assess the current population of hen harriers at Cambusmore and to investigate the current potential for the habitats present to support increased numbers of hen harriers, in order to inform an assessment of the potential impacts of a large scale woodland planting scheme proposed at Cambusmore. Analysis of the data suggests that with appropriate habitat management, the estate could support an increase on the two hen harrier pairs currently present, even with an increase in woodland. As discussed in section 4.9 of this report, new woodland plantations are likely to benefit hen harriers through providing improved nesting and foraging habitats over the short term within plantation areas. This could be vital in preventing local extinction of the hen harrier at Cambusmore.

A suitable Conservation Management Plan should be produced and delivered alongside the woodland planting scheme. The central aim for the CMP should be to maintain or increase the amount of suitable nesting habitat and the overall density of prey items within any given potential hen harrier territory. The plan should also include the identification of other factors limiting hen harrier breeding success in the area and methods to try and reduce these. In the short term, erecting fencing around woodland plantations would likely meet this aim by increasing vegetation cover (It is strongly recommended that all fences are marked appropriately to reduce collision risk by avian species). However, long term it is essential to maintain open areas for foraging both within and outside of these plantations. These open areas need to be managed to maximise the coverage of optimal foraging and nesting habitat identified in this report. Potential management strategies to achieve this are discussed in section 5.3.

It is strongly recommended that areas surrounding current hen harrier territories are primarily targeted for positive habitat management. This may encourage occupation by new pairs within the vicinity of existing territories, creating a larger, less isolated and therefore less vulnerable population. Areas [redacted],

which are currently considered suboptimal should be targeted initially. In these areas it should take the shortest amount of time for the habitat to improve and support the required level of prey, therefore hopefully leading to a more immediate population recovery. It is generally thought that hen harriers exhibit conspecific attraction, which is certainly the case with the closely related Montagu's harrier *Circus pygargus*, a species which prefers to occupy territories close to those of other pairs (Cornulier & Bretagnolle, 2006). A phased planting approach is recommended, as this will maintain some immature woodland plantations within the landscape for many years to come.

An additional consideration when assessing the potential impacts of a woodland planting proposal are the wider ornithological benefits to other species. Away from good quality blanket bog in the north-west of Cambusmore as well as around the loch and woodland habitats, the avian species diversity is relatively low. This is particularly the case in the southern parts of Cambusmore and is portrayed in Figure 2. If the CMP aims to create and optimise both the woodland and open habitats this is likely to lead to an increase in species diversity. It is important to note that as large sections of the site can be classified as wet or dry heath, it is widely considered that without grazing impacts these areas would naturally revert to woodland (Averis *et al*, 2004).

In conclusion, the woodland proposal should be carried out in conjunction with a CMP which would be a landscape-based conservation strategy for Cambusmore. This could replace the existing species-specific habitat plan currently in place for the SPA. This strategy should aim to aid the recovery of the hen harrier population but also benefit other species found in the area.

5.3 Potential positive habitat management strategies

As previously discussed, planting trees and fencing these areas off will increase the density of both voles and passerines in these areas for the immediate future. Important plant species for voles such as purple moor grass and soft rush are likely to increase both in number and in height. This will be due to reduced grazing, and in the case of soft rush, also because the species colonises cutaways associated with plantations (Mclorry & Renou, 2003).

Over the longer term a more closed woodland canopy will reduce suitability for voles and meadow pipits. Therefore, in order to retain the suitability of these areas for hen harriers, an effective management strategy will need to be developed. In order to maintain nest sites, mature dwarf shrubs- preferably heather, needs to be present. In some areas mature heather is already present, where it is absent, a reduction in grazing will increase the growth rate. Heather management such as flailing rather than muirburn may be required in the future to prevent significant areas of heather becoming degenerate. This would encourage new growth and allow regeneration into mature heather stands, benefiting harriers by providing nest sites and providing habitat for important prey species such as meadow pipits and grouse.

Open areas should also be optimised for hen harrier foraging. Rush dominated habitats and wet grasslands require specific conditions to thrive. Acidic soils which are wet but not waterlogged are required, therefore an understanding the hydrology of the site is essential to ensure the appropriate level of drainage is maintained. Ditch blocking may be required to increase the water table in areas found to be drying out. Wetter areas could be retained or restored to blanket bog which, if part of a mosaic can provide important foraging for meadow pipits and numerous other species.

Wet grasslands and rushes also require a certain level of grazing (Averis *et al,* 2004). Low intensity cattle grazing is often the most beneficial as cattle manage and maintain target vegetation species. This grazing also provides the correct nutrient enrichment, prevents succession to other habitats, increases diversity of sward structure and maintains a suitable overall sward height. Cattle also trample the habitat which is a vital part of the management. It is important to calculate the correct density of grazing animals depending on habitat type and to be reactive to any signs of over, or undergrazing (SAC, 2007). Some shorter, drier grassland also appears important for meadow pipits and a number of other species such as lekking black grouse. It is recommended that a small percentage of this habitat is retained throughout the site.

Some non-native spruce regeneration was noted in habitats near to the plantation south of Loch Buidhe, the distribution of this can be found in Figure 5. It is recommended that where possible this regeneration is removed.

A number of rare or scarce blanket bog avian species were recorded incidentally in the northern part of Cambusmore. Any potential increase in predator species associated with woodland planting could be offset by increasing the condition of this habitat. A number of active artificial drainage channels were identified during the Cambusmore surveys. It is recommended that these are blocked using dams, which will increase the levels of surface water and foraging opportunities for species such as golden plover, dunlin and greenshank. Rare and declining waders such as lapwing and curlew were also found breeding on site in low densities. It is considered likely that these wader densities could at least be maintained after woodland planting, providing the open habitats they require are optimised to increase nesting and foraging opportunities. In the addition, the population of nest predators may need to be managed.

In conclusion, the CMP should take a holistic approach to benefit the broadest range of biodiversity possible.

6 References

Amar, A., Davies, J., Meek, E., Williams, J., Knight, A. and Redpath, S. (2010). Long-term impact of changes in sheep Ovis aries densities on the breeding output of the hen harrier Circus cyaneus. Journal of Applied Ecology, 48(1), pp.220-227.

Averis, A. Averis, B. Birks, H. Horsfield, D. Thompson, D. (2004). An illustrated guide to British upland vegetation. ISBN 1 86107 553 7

Baines, D., Redpath, S., Richardson, M. And Thirgood, S. (2008). The direct and indirect effects of predation by Hen Harriers Circus cyaneus on trends in breeding birds on a Scottish grouse moor. Ibis, 150, pp.27-36.

Bown, K., Begon, M., Bennett, M., Birtles, R., Burthe, S., Lambin, X., Telfer, S., Woldehiwet, Z. and Ogden, N. (2006). Sympatric Ixodes trianguliceps and Ixodes ricinus Ticks Feeding on Field Voles (Microtus agrestis): Potential for Increased Risk ofAnaplasma phagocytophilumin the United Kingdom?. Vector-Borne and Zoonotic Diseases, 6(4), pp.404-410.

Calladine, J., Chamerlain, D. Harding, N. (2004). Ornithological survey of a proposed wind farm site at Hill of Nigg BTO Research Report No. 375

Cornulier, T. and Bretagnolle, V. (2005). Assessing the influence of environmental heterogeneity on bird spacing patterns: a case study with two raptors. Ecography, 29(2), pp.240-250.

Environment.gov.scot. (2018). [online] Available at: https://www.environment.gov.scot/media/1185/climate-climate.pdf (Accessed Jul. 2018).

Evans, D., Redpath, S., Elston, D., Evans, S., Mitchell, R. and Dennis, P. (2006). To graze or not to graze? Sheep, voles, forestry and nature conservation in the British uplands. Journal of Applied Ecology, 43(3), pp.499-505.

Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). Raptors: a field guide to survey and monitoring (3rd Edition). The Stationery Office, Edinburgh.

Hayhow, D., Eaton, M., Bladwell, S., Etheridge, B., Ewing, S., Ruddock, M., Saunders, R., Sharpe, C., Sim, I. and Stevenson, A. (2013). The status of the Hen Harrier, Circus cyaneus, in the UK and Isle of Man in 2010. Bird Study, 60(4), pp.446-458.

JNCC (2006) Common Standards Monitoring Guidance for Upland habitats. ISSN 1743-8160.

Madders, M. (2000). Habitat selection and foraging success of Hen Harriers Circus cyaneusin west Scotland. Bird Study, 47(1), pp.32-40.

McCorry, M. J. and Renou, F. (2003). Ecology and management of Juncus effusus (soft rush) on cutaway peatlands. BOGFOR Research Programme. Forest Ecosystem Research Group Report Number 69.

McMillan, R.L. (2017). Hen Harrier Monitoring Study Skye – 2017. Unpublished.

Natural England. (2005). The importance of livestock grazing for wildlife conservation. Guidance Note

Pearce-Higgins, J. and Grant, M. (2006). Relationships between bird abundance and the composition and structure of moorland vegetation. *Bird Study*, 53(2), pp.112-125.

Redpath, S., Madders, M., Donnelly, E., Anderson, B., Thirgood, S., Martin, A. and Mcleod, D. (1998). Nest site selection by Hen Harriers in Scotland. Bird Study, 45(1), pp.51-61.

Redpath, S., Thirgood, S. and Clarke, R. (2002). Field Vole Microtus agrestis abundance and Hen Harrier Circus cyaneus diet and breeding in Scotland. Ibis, 144(1), pp.E33-E38.

Ruddock, M. and Whitfield, D. (2007). A review of disturbance distances in selected bird species. A report from Natural Research (Projects) Ltd to Scottish Natural Heritage.

SAC. (2007). Conservation grazing of semi-natural habitats. SAC Technical Note 586.

Schmidt, N., Olsen, H., Bildsøe, M., Sluydts, V. and Leirs, H. (2005). Effects of grazing intensity on small mammal population ecology in wet meadows. Basic and Applied Ecology, 6(1), pp.57-66.

SNH (2016). Assessing connectivity with special protected areas. SNH Guidance Note.

Wheeler, P. (2008). Effects of sheep grazing on abundance and predators of field vole (Microtus agrestis) in upland Britain. Agriculture, Ecosystems & Environment, 123(1-3), pp.49-55.

Wilson, M., Irwin, S., Norriss, D., Newton, S., Collins, K., Kelly, T. and O'halloran, J. (2009). The importance of pre-thicket conifer plantations for nesting Hen Harriers Circus cyaneus in Ireland. Ibis, 151(2), pp.332-343.

Appendices

Appendix A. Common Standards Monitoring Results

This section provides the results of the Common Standards Monitoring (CSM) quadrats. Figure 4 shows the location of survey points which passed and failed. The analysis and can be found in Appendix C

Table 6: Table of Acid Grassland Common Standards Monitoring Analysis

CSM Acid Grassland Criteria	U4-1	U4-2	U4-3	U4-4	U4-5	U4-6	U4-7	U4-8	U4-9	U4-10	U4-11	U4-12	U4-13	U4-14	U4-15	U4-16	U4-17	U4-18	U4-19	U4-20	U4-21	U4-22	U4-23	U4-24	U4-25
>10% of vegetation forb																									
<10% vegetation bracken/ gorse/trees	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
<25% buttercup/daisy (combined)	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
No thistle, nettle or perennial rye grass		√	√	√	√	√		√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
<10% soft rush		√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√
<33% heath rush/springy turf moss	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√
>25% of plants >5cm above the ground/moss	√	√	√		√	√				√	√	√	√	√	√	√	√	√	√		√	√		√	√
>25% of plants less than 5cm above the ground	√			√	√		√	√	√			√					√	√		√	√	√	√		
Less than 10% dead plant litter	√				√	√	√	√	√						√		√	√		√	√	√			√
Less than 10% disturbed ground	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Pass/Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail

Table 7: Table of Blanket Bog Common Standards Monitoring Analysis

CSM Blanket Bog Criteria	M17-1	M17-2	M17-3	M17-4	M17-5	M17-6	M19-1	M19-2	M19-3	M19-4	M19-5	M19-6	M19-7	M19-8	M19-9	M19-10	M19-11	M19-12	M20-1	M20-2	M20-3	M20-4	M20-5	M20-6	M20-7	M15-4	M16-17	M25-6
At least 6 blanket bog indicator species	√	√		√	√				√	√	√	√		√	√	√	√		√		√	√	√				√
Fallax should not the only Sphagnum	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√
Heather, cotton grass or deer grass sp. <75% cover	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√	√	√			√	√	√	√	√	√	√	√
Less than 10% trees	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
No bent grass/ Y.fog/ Bracken/Buttercup	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 33% of last season's Calluna/Erica grazed	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 66% of M.gale grazed	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
No sign of burning in moss layer	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√
No sign of burning in plant layer if pools and/or hag present and/or within 10m of a watercourse	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Less eroding peat than stable peat	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 10% bare peat	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 10% drained	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< than 10% Sphagnum damaged	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	√
Pass/fail	Pass	Pass	Fail	Pass	Pass	Fail	Fail	Fail	Fail	Fail	Fail	Pass	Pass	Fail	Pass	Pass	Pass	Fail	Fail	Pass	Pass	Pass	Pass	Fail	Fail	Fail	Fail	Pass

Table 8: Table of Dry Heath Common Standards Monitoring Analysis

CSM Dry Heath Criteria	H9-1	H9-2	H9-3	H9-4	H9-5	H9-6	H9-7	H9-8	H9-9	H9-10	H9-11	H9-12	H9-13	H9-14	H9-15	H9-16	H9-17	H10-1	H10-2	H10-3	H10-4	H10-5	H10-6	H10-7	H10-8
>1 spp. Sphagnum or moss (NOT including P. commune) or Cladonia present	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 50% bog myrtle	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
> 50% of quadrat dry heath indicator species	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
2 or more dry heath indicator species should be present	√	√	√	√										√				√	√	√	√	√	√	√	√
< 10% bracken	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< than 20% trees	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
No thistle/buttercup/nettle	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 10% soft rush	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
> 10% of heather mature	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
No sign of burning in plant layer if pools and/or hag present and/or within 10m of a watercourse	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 33% of last season's heather grazed	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 66% of last season's bog myrtle grazed	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Pass/fail	Pass	Fail	Pass	Pass	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Pass	Fail	Fail	Fail	Pass	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Table 9: Table of Wet Heath Common Standards Monitoring Analysis (Table 1 of 2)

CSM Wet Heath Criteria	M15-1	M15-2	M15-3	M15-5	M15-6	M15-7	M15-8	M15-9	M15-10	M15-11	M15-12	M15-13	M15-14	M15-15	M15-16	M15-17	M15-18	M15-19	M15-20	M15-21	M15-22	M15-23	M15-24	M15-25
Cross-leaved heath	√	√	√		√	√	√	√		√	√	√		√	√	√	√	√	√	√	√	√	√	
20% of quadrat should be collectively heather & crowberry	√	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√
50% blanket bog indicator species	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 10% bracken	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
No Bent grass, Y.fog , buttercup	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 10% soft rush	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
No individual species should > than 75%	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	√			√
< 33% of last season's heather grazed	√	√	√		√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 66% of last season's bog myrtle grazed	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
No sign of burning in moss layer		√	√	√		√				√	√	√	√	√	√						√			√
No sign of burning in plant layer if pools and/or hag present and/or within 10m of a watercourse	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Less eroding peat than stable peat	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 10% bare peat		√	√	√	√	√		√		√	√	√	√	√	√	√				√	√			√
< 10% drained	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 10% Sphagnum damaged	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Pass/fail	Fail	Pass	Pass	Fail	Fail	Pass	Fail	Fail	Fail	Pass	Pass	Pass	Fail	Pass	Pass	Fail	Fail	Fail	Fail	Fail	Pass	Fail	Fail	Pass

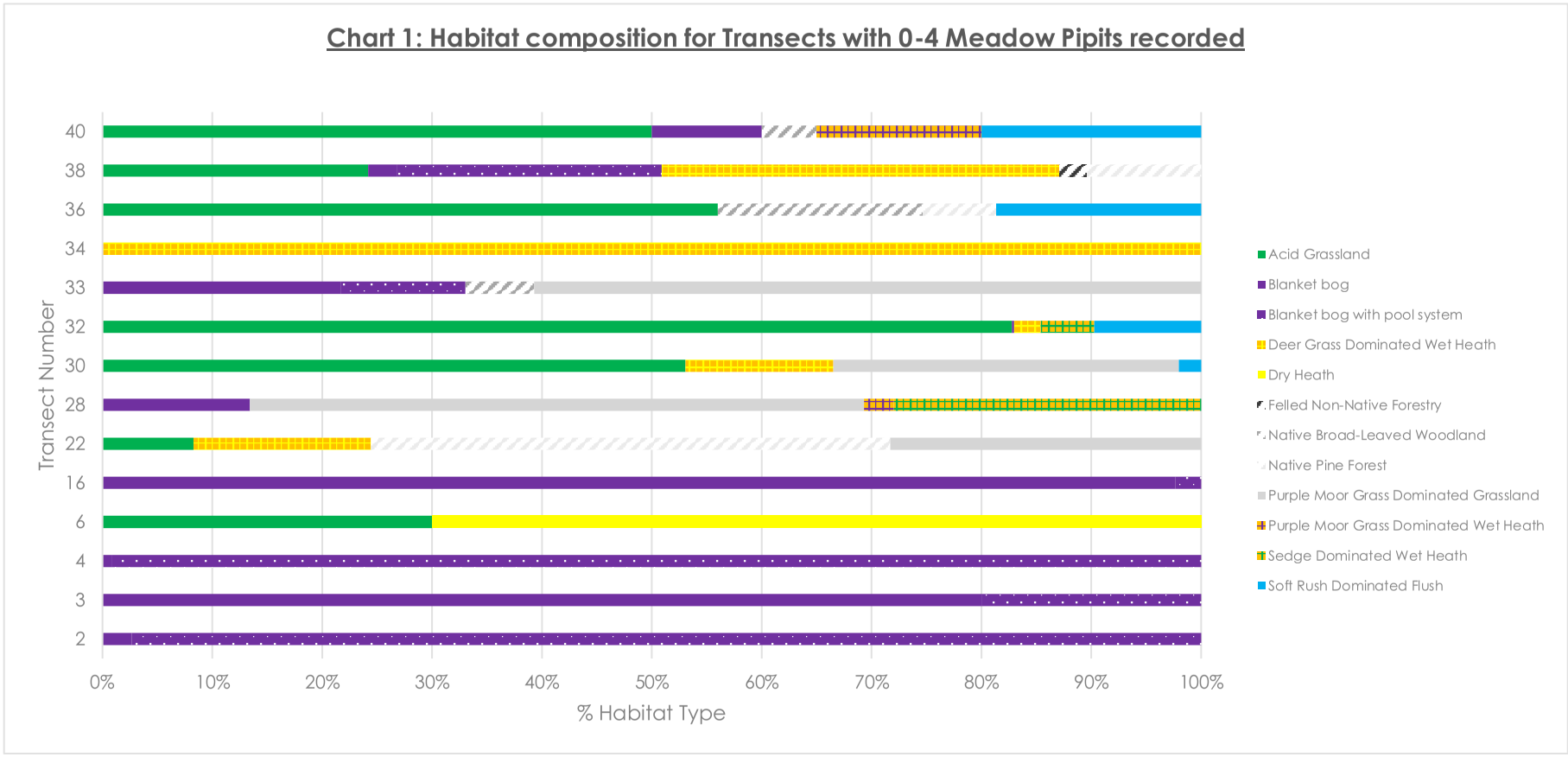
Table of Wet Heath Common Standards Monitoring Analysis (Table 2 of 2)

CSM Wet Heath Criteria	M15a-1	M15a-2	M15a-3	M16-1	M16-2	M16-3	M16-4	M16-5	M16-6	M16-7	M16-8	M16-9	M16-10	M16-11	M16-12	M16-13	M16-14	M16-15	M16-16
Cross-leaved heath	√	√	√	√			√	√	√		√	√	√		√			√	
20% of quadrat should be collectively heather & crowberry				√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
50% blanket bog indicator species		√		√	√	√	√		√		√	√	√	√	√	√		√	√
< 10% bracken	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
No Bent grass, Y.fog , buttercup	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 10% soft rush		√	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√
No individual species should > than 75%	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 33% of last season's heather grazed	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
< 66% of last season's bog myrtle grazed	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
No sign of burning in moss layer	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
No sign of burning in plant layer if pools and/or hag present and/or within 10m of a watercourse	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Less eroding peat than stable peat	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
<10% bare peat	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
<10% drained	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√
<10% Sphagnum damaged	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Pass/fail	Fail	Fail	Fail	Pass	Fail	Fail	Pass	Fail	Pass	Fail	Pass	Pass	Pass	Fail	Pass	Fail	Fail	Fail	Fail

Table 10: Table of Wet Grassland/Flush Common Standards Monitoring Analysis

CSM Wet Grassland Criteria	M6-1	M6-2	M6-3	M6-4	M6-5	M6-6	M6-7	M6-8	M6-9	M6-10	M6-11	M6-12	M6-13	M6-14	M6-15	M6-16	M6-17	M6-18	M6-19	M6-20	M23-1	M23-2	M25-1	M25-2	M25-3	M25-4	M25-5	M25-6	M25-7	M25-8
At least 2 Sphagnum sp. combined cover of > 30%												√					√				-	-	-	-	-	-	-	-	-
>10% soft rush	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	-	-	-	-	-	-	-	-
>10% Molinia	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	√	√	√	√	√	√	√	√	√	√
Presence of an indicator spp.		√															√					√	√	√	√	√		√		√
Combined cover of soft rush and purple moor grass should be 25-80%	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√		√	√	√		√	√	√			√	
Thistle/ nettle/bracken/buttercup /common daisy not >5% combined	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Perennial Rye grass/Y.fog /Buttercup not > individually 10% or combined 20%	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Tufted-hair grass < 20%	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	√	√	√	√	√	√	√
Minimum Graminoid height >5cm	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√		√	√	
Maximum Graminoid height < 80cm			√		√	√	√		√	√		√		√	√	√	√		√				√	√	√	√	√	√	√	√
< 20% dead plant litter	√		√			√		√	√	√		√	√	√	√		√	√	√											
< 10% bare ground	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Pass/fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Pass	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail	Fail

Appendix B. Meadow Pipit Transect Habitat Composition



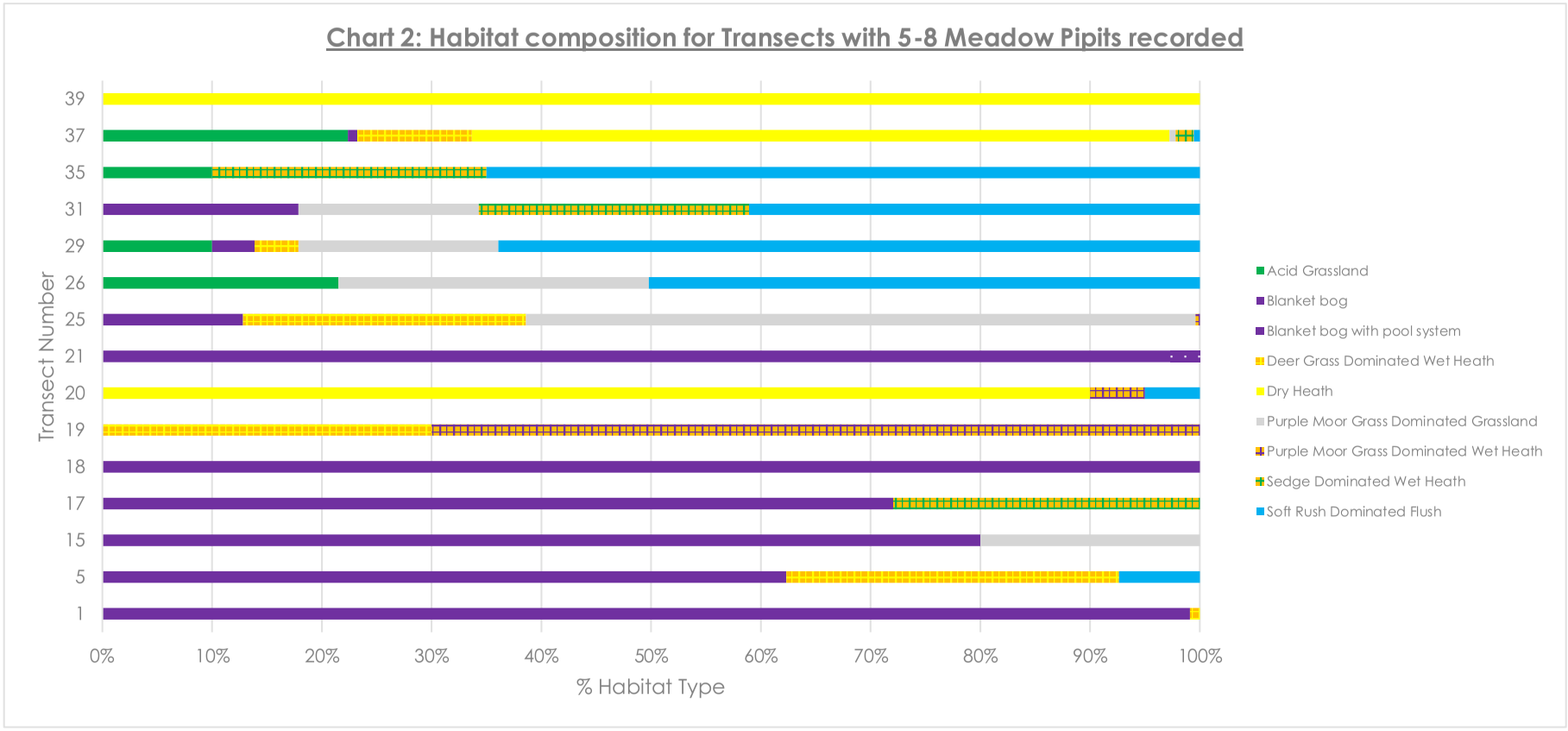


Chart 2: Habitat composition for Transects with 5-8 Meadow Pipits recorded
Transect Number
39
37
35
31
29
26
25
21
20
19
18
17
15
5
1
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
% Habitat Type
Acid Grassland
Blanket bog
Blanket bog with pool system
Deer Grass Dominated Wet Heath
Dry Heath
Purple Moor Grass Dominated Grassland
Purple Moor Grass Dominated Wet Heath
Sedge Dominated Wet Heath
Soft Rush Dominated Flush

Chart 3: Habitat composition for Transects with 9-12 Meadow Pipits recorded

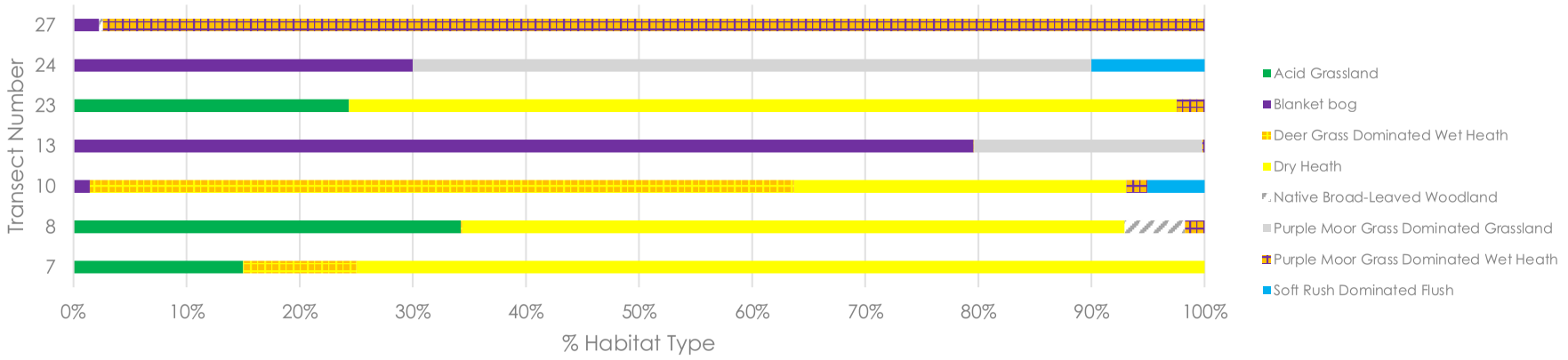
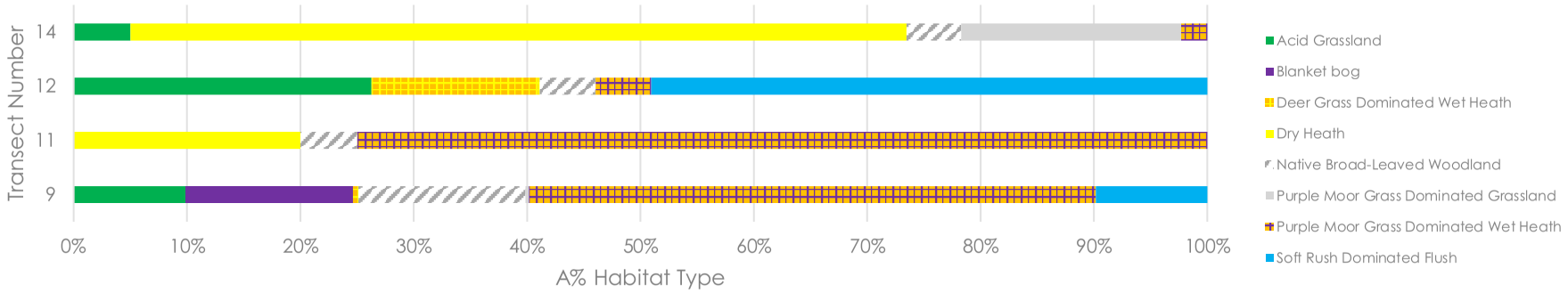


Chart 4: Habitat composition for Transects with 13 -24 Meadow Pipits recorded



Appendix C. Figures

Appendix G. Scottish Forestry Screening Response

Cambusmore Woodland Creation Screening Meeting Minutes

Location: Rogart Village Hall, Rogart

Date: 21/02/2018

Time: 10am start

Attendance

Name:	**Representing:**	**Expressed herein as:**
Gail Rogerson	Forestry Commission Scotland	GR
Gareth Phillips	Forestry Commission Scotland	GP
Ken Greenland	Cambusmore Estate	KG
Anthony Elletson	Cambusmore Estate	AE
Norrie Russell	RSPB	NR
Debbie Skinner	SNH	DS
David Patterson	SNH	DP
Malcolm Morrison	Jarrah Forestry	MM
Christopher Murray	Self	CM
Kelly Munro	Self	KM
Mark Hood	Self	MH
Margaret Hood	Self	MtH
Irene Anderson	Self	IA

Apologies

- None recieved

Reponses received prior to meeting (appended)

- Historic Environment Scotland
- Scottish Water

The following minutes are the key points that were raised during the meeting and have been placed into relevant categories. The order of these minutes does not necessarily reflect the order of the meeting.

Opening

- Housekeeping by GR.
- The meeting was opened by GR at 10am with introductions and an explanation of the EIA process and purpose. GR advised that FCS has determined consent is required and an EIA Report must be produced. The objective of the meeting is AE to outline the proposals and for those present to highlight issues which they think may lead to a significant impact on the environment.
- Meeting passed to KG followed by introduction to estate, estate objectives, and brief given to AE for the project.
- Meeting passed to AE to carry out presentation.

Presentation

Anthony Elletson summarised the proposal: Strath Carnaig Conservation Area Planting Proposal is a proposed new planting scheme that extends to approximately 2,140Ha within a 3,030Ha area. The proposal is a mixture of Native Broadleaves (NBL) planted at 1600/Ha, with areas of Conifer (CON) planted at min 2500/Ha. Ground cultivation will be through One Pass Spot-Cultivation. The current proposal maps are broad brush and only indicative of planting locations. Further refinement may be undertaken following screening which will be available for future consultation. Refinement will be assisted through Archaeological surveys, detailed peat depth survey, landscape analysis, and water management.

AE then talked through the components of the Concept Map for the benefit of those present. AE highlighted that SSE are interested in experimental planting of shrubs under powerlines and may require an access road to be installed alongside the line. Other access tracks would be produced over the area as well, though these would be small ATV tracks rather than forest roads.

Scale

MM: How big is the actual planting area?

AE: Just over 2,000 Hectares.

Common Grazing

CM: Concern for loss of common grazing at croft.

KG: We included your common grazing but your choice to plant or not.

GR: Common Grazing areas cannot be included and therefore will be removed from the application going forward.

KG: Agreed.

Access/Fencing

MtH: We walk on estate every day

CM: More detail on fencing required

AE: The final proposal will include detailed fence and access location.

Conservation

MtH: Counted 27 kits in this area. Significant bird activity but not on hill ground; mainly focussed near small lochs. Increase in Buzzard and Kite activity recently. Concerned about major change.

KG: Restructuring and creating glades in windblown northern conifer woodland to benefit additional species and environment.

NR: Too big a landscape change. 2,000Ha is too much in SPA. Open moorland is primary harrier habitat. There are no SPA's for Hen Harrier in woodlands. There is little experience or examples of effects of planting native woodlands in a Hen Harrier SPA. RSPB not against woodland expansion in SPA as recognise the importance of the designated oak/birch woodland but scale will be difficult. Moorland management should be encouraged. Experimental nature of this project is dangerous in an SPA; a designation of European importance. RSPB welcome the enhancement of Peatlands and Native Woodlands.

DS: Same thoughts as RSPB. This will have a significant effect on the SPA; a core area for Hen Harrier with 30-50% of breeding pairs. If this goes ahead there may be a loss of foraging, resulting in displacement of harriers and eventually lead to unfavourable status of designation. We need more information on the proposal and need evidence of how this will affect Hen Harrier. It is suggested that this proposal could be detrimental however nothing of this scale and type has ever been tried in an SPA.

GR: Concerns noted and EIA Report has been called on the basis of potential loss of Hen Harrier Foraging and Nesting habitats.

Though asked, no other stakeholders present wished to give comment.

It was agreed that no site visit was necessary given the present stakeholders all being familiar with the area.

GR explained next steps in EIA process.

GR requested scoping meeting with RSPB and SNH after this meeting concludes.

The meeting concluded with thanks from KG, AE and GR at approximately 11:30am.

Appendix H. Scottish Forestry Scoping Response

SCOPING OPINION

CAMBUSMORE ESTATE 030902211

Forestry Commission Scotland (FCS) has been asked to consider under the Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017 the impact of creating a new 3,030ha woodland at Cambusmore Estate, Sutherland. The majority of the proposed planting area falls within the Strath Carnaig and Strath Fleet Moors Special Protection Area (SPA) which is designated for its breeding population of Hen harriers.

FCS considered the screening opinion request and on the 21st February 2018 confirmed the proposals will require EIA consent for the following reason:

- The proposal will significantly affect the biodiversity of the Strath Carnaig & Strath Fleet Moors SSSI and SPA by impacting on the availability of the Hen harrier nesting and foraging habitats.

Following the scoping meeting which included Cambusmore Estate, RSPB and SNH on the 21st February FCS sought further information from RSPB and SNH on the impact of the proposals on the SPA. Taking into account the information which has been provided we have outlined the matters which must be assessed and addressed within the EIA Report.

Requirements of the EIA Report:

The part of the Strath Carnaig and Strath Fleet Moors SPA within the application site supports 30% of the breeding hen harriers within the SPA. A woodland proposal of this scale is likely to have a significant effect on the SPA's Conservation Objectives.

The EIA Report must demonstrate that the woodland creation proposal will not adversely affect the SPA's Conservation Objectives which are:

- To avoid deterioration of the habitats of the qualifying species (Hen harrier) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and

- To ensure for the qualifying species (Hen harrier) that the following are maintained in the long term:

  - Population of the species as a viable component of the site
  - Distribution of the species within site

- Distribution and extent of habitats supporting the species
- Structure, function and supporting processes of habitats supporting the species
- No significant disturbance of the species

To help inform the above the EIA report must provide an assessment of the short and long term impacts of the proposals including changes in:

- Foraging habitat, including prey levels and availability
- Nesting and roosting sites and habitats
- Potential for displacement of breeding Hen harriers
- Risk of predation

The assessment of prey levels and risk of predation should include consideration of potential or predicted changes in prey populations, populations of nest and roost predator species, competing species, fledging success. Current and proposed levels of predator control should be set out.

The assessment of foraging habitat should include consideration of the importance of the small areas of open habitats such as narrow streamside grasslands and flushes along seepage lines/springs, which are likely to support good small mammal populations.

The level and nature of any disturbance during any management or maintenance operations should be considered. The retention of suitable nest habitat should be on a scale to accommodate movement of nest locations by Hen harrier.

The SPA is currently is favourable declining condition. The EIA report should set out the current land use and as part of the assessment of the above factors, it should consider options for the scale, location and type of planting.

Information availability

In order to assist with the proposal design SNH would be able to provide the applicant with the Hen harrier nest locations for the application site plus a 2km buffer on receipt of a data request.

Forestry Commission Scotland.

28/03/2018

Appendix I. RSPB and SNH Scoping Responses

giving nature a home

rspb Scotland

Gareth Phillips
Forestry Commission
Highlands and Islands Conservancy
"Woodlands"
Fodderty Way
Dingwall
Ross-shire
IV15 9XB

21st March 2018

Your ref:

Our ref: 683807

Dear Gareth

Cambusmore New Woodland Planting Proposal: EIA Scoping Request

Thank you for consulting RSPB Scotland in relation to scoping the Environmental Impact Assessment (EIA) for the Cambusmore Estate planting proposal as attached to your information request letter and owners planting proposal document of 28th February 2018 (received 3 March 2018).

RSPB Scotland's has serious concerns in respect of the likely negative impact of the planting proposal on hen harrier and potentially an adverse effect on the integrity of the Strath Carnaig and Strath Fleet Moors Special Protection Area (SPA). The SPA is designated for breeding hen harrier. Most of the planned planting is within this SPA, and the total area that has been identified by Cambusmore Estate as being potentially suitable for planting equates to about a quarter of the available habitat for hen harrier within the SPA (not all of the land within the boundaries of the SPA currently provides suitable habitat for hen harrier). We consider the proposal to be a major land use and habitat change on too great a scale to take place within a hen harrier SPA. This is particularly given the unusual and effectively experimental nature of the proposal. We are not aware of any other planting proposal on this scale which has been proposed or taken forward within a UK hen harrier SPA.

The planting proposal is likely to have a significant effect on the SPA, and under the terms of the Conservation (Natural Habitats, & c.)Regulations 1994, Forestry Commission Scotland (FCS) would be required to carry out an appropriate assessment of the proposals' implications for the SPA in view of the site's conservation objectives. FCS would only be able to grant consent for the proposals if they conclude (through the appropriate assessment, and beyond reasonable scientific doubt) that the proposal would not adversely affect the integrity of the SPA. On the basis of the information available, we believe that FCS would not be able to conclude this, and therefore would not be able to grant consent. However, if proceeding with this proposal, the applicant would need to provide sufficient information to FCS to inform this appropriate assessment.

RSPB Scotland is pleased that the landowner's objective stated in the proposal is to focus on "conservation and environmental protection for the wide range of flora and fauna present". We also note that the owner stated at the Screening Meeting on 21 Feb 2018 that the Estate is particularly concerned to enhance the area for hen harrier and that this underlies their approach for this part of the Estate.

Given these objectives, we recommend that the Estate should reconsider the proposal and significantly reduce the extent of planting proposed. We ask that the landowner remains open minded about possible land management options within the estate during the course of the project planning and EIA processes. We recommend that the landowner considers the potential for agri-environment funding under the SRDP Agri-Environment Climate Scheme. Significant areas of the land in question would potentially be eligible for a number of management Options including Habitat Mosaic Management, Heath Management-Wader Management on Heath, Wader Grazed Grassland, Moorland Management, Summer Hill Grazing for Cattle, Predator Control, Bracken Management and Management of Scrub. Potentially, Capital Items associated with the above Management Options could include various fencing work, Heather Restoration/Management and Impact Assessment for Deer Management. Using a combination of these, a scheme for improving the condition of the largely open moorland could be developed to specifically benefit hen harriers, and other Options could be used to improve the wider biodiversity and climatic benefits of the deep peat areas present on the land using for example Capital Options such as Ditch Blocking.

We consider that the new woodland planting on the proposed scale is not compatible with delivering the estate's stated objectives for hen harrier and biodiversity. This is particularly true in relation to the hen harrier population where an estimated 30 to 50% of the SPA population would be affected; a clear adverse effect on the integrity of the SPA. We are concerned that direct and indirect impacts from the change of land use, level of habitat change and associated management change would impact negatively upon an internationally important designation and the specially protected species present.

Should the applicant still wish to proceed with a planting proposal then there are several issues that will need to addressed through the EIA process as detailed in the annex to this letter.

We hope these comments are helpful. Please get in touch, if you require further information.

Yours sincerely,

Norrie Russell
Senior Conservation Adviser
RSPB Scotland

Tel: 07769911870

Email: norrie.russell@rspb.org.uk

cc: SNH

Annex: Issues to be covered in a EIA

Impacts on hen harrier

Potential impacts on hen harrier should be considered in the context of the SPA population. Potential impacts on other species should be considered in relation to the Natural Heritage Zone (NHZ) 5 population.

Hen harriers in the UK select for open moorland in their breeding grounds, and SPAs designated for breeding hen harrier are predominantly open moorland as a result. A number of populations of hen harrier have been very negatively impacted by afforestation of former moorland habitat. The EIA should present data and justification addressing all the potential direct and indirect impacts across all parts of the site. It should include an assessment of impacts of any similar scale planting proposals on hen harrier populations with similar biogeography, prey and predator populations on mainland Scotland.

For hen harrier the assessment of the current proposals should cover the likely direct and indirect impacts of change including changes in:

- foraging, including prey levels and availability
- nesting
- roosting
- breeding success
- risk of predation

The assessment should include consideration of changes in prey populations/availability, changes in nest/roost predator species populations, change in competing species, fledging success and changes in levels of predator control. Reduction in breeding success by hen harrier as a result of nest predation by foxes for example has been shown to be very significant for a population associated with forestry plantations. The recent use of nest cameras has allowed for more accurate study of nest predation and a study on Skye for example found 65% of nest failures in a population largely associated with forestry to be caused by fox predation of chicks, also with some adult predation (McMillan, 2014).

Some of the component open habitats present may be of limited area, but of disproportionate importance to foraging hen harriers (and short-eared owls) such as narrow streamside grasslands and flushes along seepage lines/springs, which will support good small mammal populations. It is therefore important that mapping of foraging use by these species and/or prey species, is at a fine level relative to such habitats, particularly as planting (and natural regeneration) of native broadleaves/scrub is also likely to target these habitats. The assessment therefore needs to be able to look at the impact of planting and regeneration at this scale.

Levels of disturbance during any management or maintenance operations should be assessed. The assessment should also address the potential for maximising benefits and minimising negative impacts associated with the proposed planting. It should address harrier population ongoing requirements over future years to ensure the population is not impacted, for example through change in predator control effort or effectiveness, or through continued scrub and tree encroachment processes onto planned open moorland, caused by the creation of new seed sources/grazing changes. Assessed retention of suitable open nest habitat should be on a scale to accommodate the sometimes significant annual movement of nest locations by hen harrier as will be required into the foreseeable future.

Impacts on other bird species

Although we note that you have specifically requested information regarding impacts on hen harrier, we advise that that the ornithological assessment should address impacts on other species of concern, including those specially protected under Annex 1 of the EU Birds Directive, Schedule 1 of the Wildlife & Countryside Act 1981, Red Listed by IUCN or listed as Birds of Conservation Concern in the UK. Those species likely to be present on the site include merlin, short-eared owl, golden eagle, white-tailed eagle, black-throated diver, red-throated diver, black grouse, curlew and golden plover.

In addition, although it is not proposed to encroach on the low lying pasture in the north-east of the application area, it would be appropriate to assess the potential impacts of such a significant change in land management in the surrounding area on the attractiveness and suitability of this pasture for breeding farmland waders such as lapwing, oyster and curlew. Particularly in relation to the potential increase in negative edge effects including predation pressure.

The applicant should undertake breeding season surveys for all of the above-noted species, to be conducted in accordance with recognised good practice (Gilbert et al, 1998; Hardey et al 2013). We would also expect winter raptor surveys. Although we have no recent data, our records indicate that there was a hen harrier roost present within the proposed planting area in the early 2000s.

Cumulative and in-combination impacts

The EIA report should consider other nearby developments that might have "in combination" impacts on bird populations in the proposed planting area. In particular, we would ask that the "in combination" impacts on hen harrier be considered for the proposed Garvary wind farm and the proposed Loch Buidhe-Lairg overhead electricity transmission line (OHL). Both these projects are likely to impact on the SPA hen harrier population and both projects are currently at the scoping stage of EIA. We believe that SSE have undertaken hen harrier surveys in preparation for the EIA for the OHL and the results of these surveys may be informative to the EIA for the proposed Cambusmore woodland.

Black grouse are present within the general area of the proposed planting. Black grouse need ready access to a variety of woodland and open moorland habitats including areas of managed moorland or of sparse trees for a mix of heather, wet flushes with cotton grass, and grassland combined with nearby woodland. They appear to prefer woodland with an open canopy and understorey of vegetation but also use some denser stands of trees to provide shelter in severe winters. The EIA should consider how habitat change can be managed to favour black grouse without impacting hen harrier populations. In particular, the EIA needs to consider long term habitat availability in respect of the creation and maintenance of open space and areas of woodland with an open canopy. The EIA should also consider the impact of the proposed woodland planting as it is also likely to lead to changes in grazing regimes that will impact on black grouse habitat. For example, the EIA should consider alternatives to the total exclusion of grazing animals from areas of new woodland as an absence of grazing may ultimately lead to the undergrowth becoming too dense for black grouse (and other bird species) as well as a reduction in invertebrate numbers and diversity due to the loss of animal dung. Ideally, we would wish some light managed grazing in both wooded and more open areas in order to maintain a productive layer of mixed vegetation that will support a healthy invertebrate population to feed black grouse chicks.

Mitigation measures

Finally, the EIA report should include a clear description of the mitigation measures that are proposed to avoid, minimise or otherwise address potential adverse impacts, and a convincing assessment of residual impact following the deployment of these measures. For example, grouse have low flight paths and are susceptible to collision with fences and we would expect that fence marking will be included in the mitigation measures considered by the EIA. Evidence should be provided for the assumed effectiveness of proposed mitigation measures based on experience from other projects. The EIA report should also include habitat management plans for hen harrier and black grouse and any other species that are identified as nationally or regionally important.

Survey data

The RSPB are unable to provide recent survey data for the proposed planting area. We have not undertaken any recent survey work (within the last 5 years) within the planned planting area. We note that SNH last undertook site condition monitoring in 2013 and believe SNH may have undertaken more recent surveys for hen harrier. The Highland Raptor Study Group are likely to have data on hen harrier and other raptors.

Other environmental impacts

In relation to other potential environmental impacts, RSPB Scotland is pleased that planting will be restricted to areas where peat depths are less than 0.5 m and would expect the EIA to include a detailed map of peat depths in areas that are to be targeted for planting. We would welcome assessment of any opportunities for improved peatland management and restoration. Separately, we would also expect some assessment of impacts on water quality and associated mitigation, and, in particular, measures required to protect the Rivers Carnaig and Fleet from silt and/or fertiliser runoff associated with the proposed planting.

Gilbert, G., Gibbons, D.W. & Evans, J. (1998) *Bird Monitoring Methods*. RSPB, Sandy.

Hardey, J., Crick, H., Wernham, C., Riley, H., Etheridge, B. & Thompson, D. (2013). Raptors: a field guide to survey and monitoring (3rd Edition). The Stationery Office, Edinburgh.

McMillan, R.L. (2014) "Hen Harriers on Skye, 2000-12: nest failures and predation". *Bird Study* 34:2

19 Mach 2018
RSPB

Scottish Natural Heritage
Dualchas Nàdair na h-Alba
All of nature for all of Scotland
Nàdar air fad airson Alba air fad

By email: gareth.phillips@forestry.gsi.gov.uk

Our ref: CNS/FO/SFGS/HI/CEA149649

Date: 20 March 2018

Dear Mr Phillips,

The Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017 Scoping Opinion request for the Cambusmore Estate Woodland Proposal.

Thank you for your letter dated 28 February consulting SNH on the scoping report for the above proposal. Following the screening and scoping meeting for the proposal on 19th February, we have considered the proposal further and have the following comments.

Protected Areas

Strath Carnaig and Strath Fleet Moors Special Protection Area (SPA) and Site of Scientific Interest (SSSI).

The Strath Carnaig and Strath Fleet Moors SPA is classified for its breeding population of hen harriers. The majority of the proposed planting area is located within the SPA. In our view, this proposal is likely to have a significant effect on the hen harrier interest. Consequently, once the Environmental Report (ER) is submitted the FCS will be required to carry out an appropriate assessment in view of the site's conservation objectives for its qualifying interests.

Based on the information within the screening/scoping report we have concerns relating to a woodland scheme of this scale within the SPA. The part of the SPA within the application site supports 30% of the breeding hen harriers within the SPA. A woodland proposal of this scale would result in the loss of a significant area of suitable open foraging ground in addition to the possible displacement of breeding hen harriers. Further to this it is possible that nesting opportunities for hen harriers would be reduced over time as the woodland becomes established. The SPA and SSSI are currently in "favourable – declining" condition however, may fall into unfavourable condition if suitable foraging and nesting habitat are lost.

We do however advise it may be possible to adapt the proposal in a way to ensure the SPA's conservation objectives can be met. In order to design a proposal which might be suitable for hen harriers we consider expert advice will be required. It may be helpful to contact Paul Haworth and Alan Fielding from Haworth Conservation given their experience/research with hen harriers and forestry, however other consultants with experience in this area could also be used. In order to assist with the proposal design we

would be able to provide the applicant with the harrier nest locations for the application site plus a 2km buffer if they wish to submit a data request to us.

The Mound Alderwoods Special Area of Conservation (SAC) and Site of Scientific Interest (SSSI)

The Mound Alderwoods SAC is designated for its alder woodland on floodplain feature. This site is located within the Cambusmore estate. The SAC is currently in unfavourable declining condition due to alder dieback and grazing pressure.

We note that the screening/scoping report states that the SAC is outwith the proposed plantable area however it will be included as part of the Long Term Forest Plan. We advise that the LTFP should include measures for deer management in order to reduce the browsing pressure at this site.

In addition to the browsing pressure, alder is suffering dieback across the site due to a combination of alder Phytophthora and water-logging. Whilst alder is a species of wet ground, and grows well when water is moving through a site, it suffers in standing water. Work is currently on going within the SAC to ameliorate this issue. This should lead to an improvement in the health of the alder, and a reduction in browsing pressure would enable regeneration of other tree species, improving the biodiversity value and resilience of the site. We do not recommend planting alder within the SAC, as natural regeneration should be adequate once browsing pressure is low enough.

Torboll Woodlands Site of Special Scientific Interest (SSSI)

Torboll Woodlands SSSI is designated for its upland oak woodland feature. The SSSI is located within the proposal boundary. The site is currently in favourable condition.

The main pressure within the SSSI is bracken which reduces the potential for the regeneration of native trees. We would not recommend large-scale planting to expand the woodland, as natural regeneration should be adequate. Site enrichment planting of site-native species such as oak, hazel, juniper, elm, aspen and birch cheery, etc could be used to increase the tree species diversity. This in turn would help with the control of bracken in the future.

European Protected Species

Otters

We consider that there is potential for otters to be present within the application area. We advise that an otter survey is undertaken to inform the ER. The survey should be undertaken by an experienced otter surveyor, and should include a systematic search for spraints, paw prints, otter paths, slides, food remains, holts and places used for shelter. If otters are identified then an Otter Protection Plan should be produced. The plan should include the following:

- details of how the development is likely to affect otters;
- mitigation measures to be employed to avoid any offence and minimise impacts on otters;
- summary of any residual impacts once mitigation measures have been taken into account.

Peatland

The proposed development boundary includes areas of carbon rich soils, deep peat and priority peatland habitat including areas identified as class 1 and 2 on the Carbon and Peatland 2016 map available from http://map.environment.gov.scot/Soil_maps/?layer=10

Class 1 and 2 areas are considered to be nationally important carbon-rich soils, deep peat and priority peatland habitat, areas likely to be of high conservation value or areas of potentially high conservation value and restoration potential.

From the available information the opportunities for woodland establishment in this area are likely to be limited, however this can only be confirmed by site-specific habitat and peat depth survey. We welcome the proposal to undertake a peat depth survey and note that no planting on peat with a soil depth of more than 50cm is proposed which we welcome. We advise that the results of the peat depth survey should be provided within the ER.

Deer Management

We advise than an assessment of the potential impacts on deer welfare, habitats, neighbouring and other interests (e.g. access and recreation, road safety, etc.) should be presented within the ER. Where significant impacts may be caused, a draft deer management statement will also be required to address the impacts. Please refer to our guidance " *What to consider and include in deer assessments and management at development sites*," available via the following link: https://www.nature.scot/professional-advice/planning-and-development/renewable-energy-development/types-renewable-technologies/onshore-wind-energy/general-advice-wind-farm

We would encourage the applicant, in line with The Code of Practice on Deer Management available from, https://www.nature.scot/professional-advice/land-sea-management/managing-wildlife/managing-deer/code-practice-deer, to collaborate with neighbours and other interested parties, as well as the East Sutherland Deer Management Group during the assessment and any subsequent management. If a Deer Management Statement is produced then it should comply with the Best Practice Guidance on Deer Management Plans which is available from http://www.bestpracticeguides.org.uk/planning/dmps

Consideration of Reasonable Alternatives

It would be helpful if the ER could demonstrate that alternative proposals have been considered and justification should be provided as to why these proposals have not been taken forward. It should be noted that we provided the applicant with an alternative planting proposal in March 2017 (refer to Annex 1).

Concluding Remarks

Please also note that this advice does not prejudice or constrain any future advice we may offer in relation to a subsequent formal application, and is based upon our understanding of the proposal at this time.

I hope you find these comments helpful. Should you wish to discuss this response then please don't hesitate to contact me using the contact details below or by email at Debbie.skinner@snh.gov.uk.

Yours sincerely,

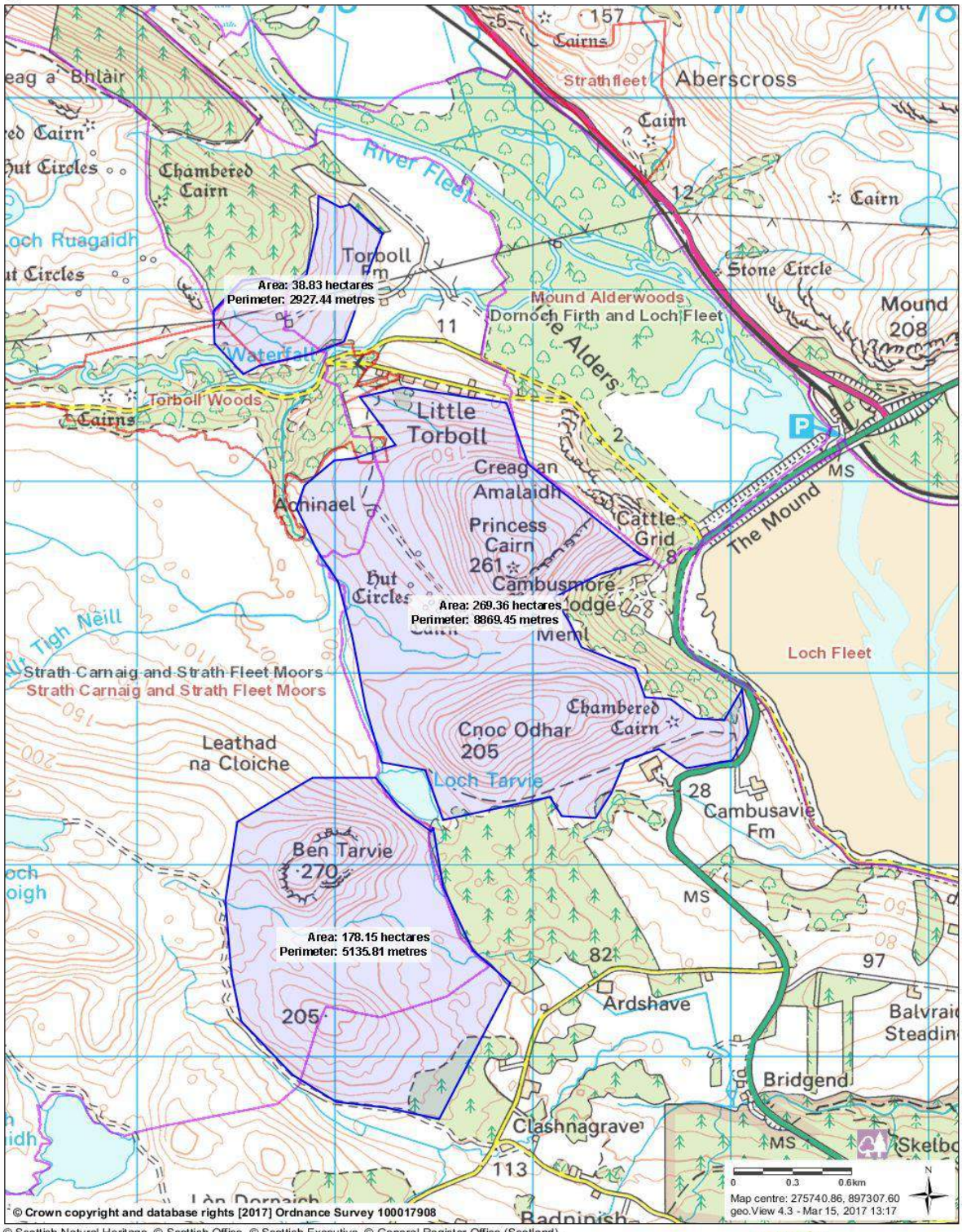
Debbie Skinner

Operations Officer
Northern Isles and North Highland

Annex 1

Alternative Planting Proposal as Suggested by SNH via Email from David Patterson (SNH) to Gareth Phillips on 16 March 2017

geo.View map



Scottish Natural Heritage
Dualchas Nàdair na h-Alba

Forestry EIA Report

Woodland Creation and Management

Cambusmore Estate, Sutherland
Volume 2: Figures (Non-Confidential)

5 July 2019

Contents

Cambusmore

K R Greenland Farming

Figure 1
Site Location

Key

Site boundary

atmos CONSULTING

0 0.5 1 2

Kilometres

N

Scale @ A3:
1:50,000

24/05/2019 48400/BP/019a

Drawn by: AA Checked by: TH Approved by: LK

Cambusmore

K R Greenland Farming

Figure 2
Proposed Development

Key

- Site boundary
- Fenceline
- Tracks

Planted areas

- W18 Native Scots Pine
- W4 Upland Birch
- Low Density Native Broadleaves / Natural Regeneration
- Diverse conifer

atmos CONSULTING

0 0.5 1 2
Kilometres

N

Scale @ A3:
1:45,000

05/07/2019 48400/HB/018b
Drawn by: AA Checked by: TH Approved by: LR

Cambusmore

K R Greenland Farming

Figure 3
Management and Grazing Areas

Key

- Site boundary
- Fenceline
- Grazing enclosure

Managament area

- Loch Buidhe
- Dalnamain
- Achinael

atmos CONSULTING

0 0.5 1 2
Kilometres

N

Scale @ A3:
1:45,000

04/07/2019 48400/SL/025a

Drawn by: AA Checked by: TH Approved by: LR

Cambusmore

K R Greenland Farming

Figure 4
Environmental Designations

Key

- Site boundary
- Special Protection Area
- Special Area of Conservation
- Site of Special Scientific Interest
- RAMSAR
- National Nature Reserve
- Ancient Woodland Inventory
- Scottish Wildlife Trust Reserves
- RSPB Important Bird Areas

atmos CONSULTING

0 1 2 4
Kilometres

N

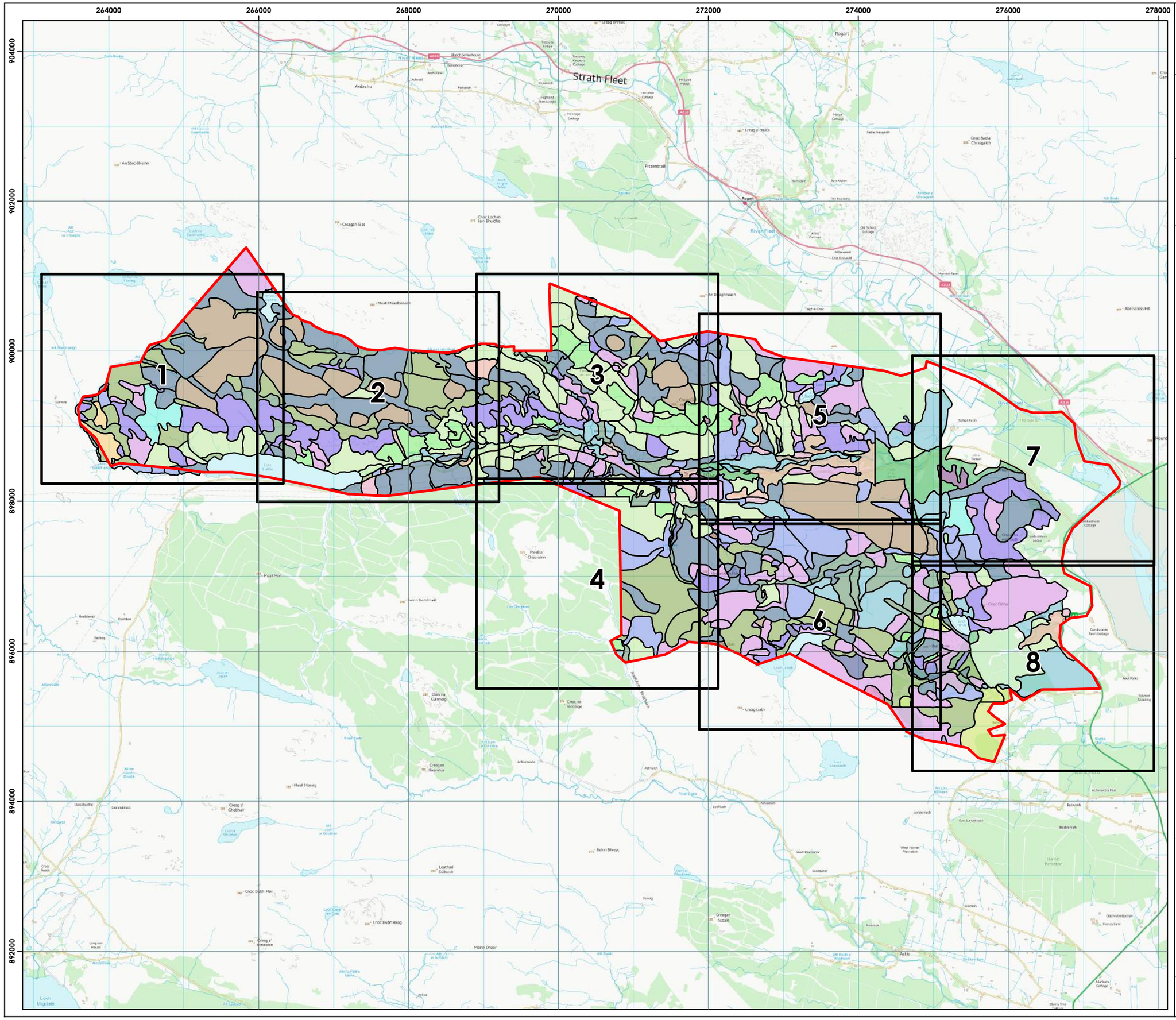
Scale @ A3:
1:80,000

03/07/2019 48400/EC/024a
Drawn by: AA Checked by: TH Approved by: JB

Cambusmore

K R Greenland Farming

Figure 10
NVC Habitat Survey Results Overview



Key

- Site boundary

Dominant NVC Community

- H10
- H9
- H9/M20
- M6
- M15
- M15a
- M15/M19
- M16
- M17
- M19
- M19/M16
- M20
- M23
- M25
- S9
- U20
- U4
- W11
- W18
- W4

atmos CONSULTING

0 0.5 1 2
Kilometres

N

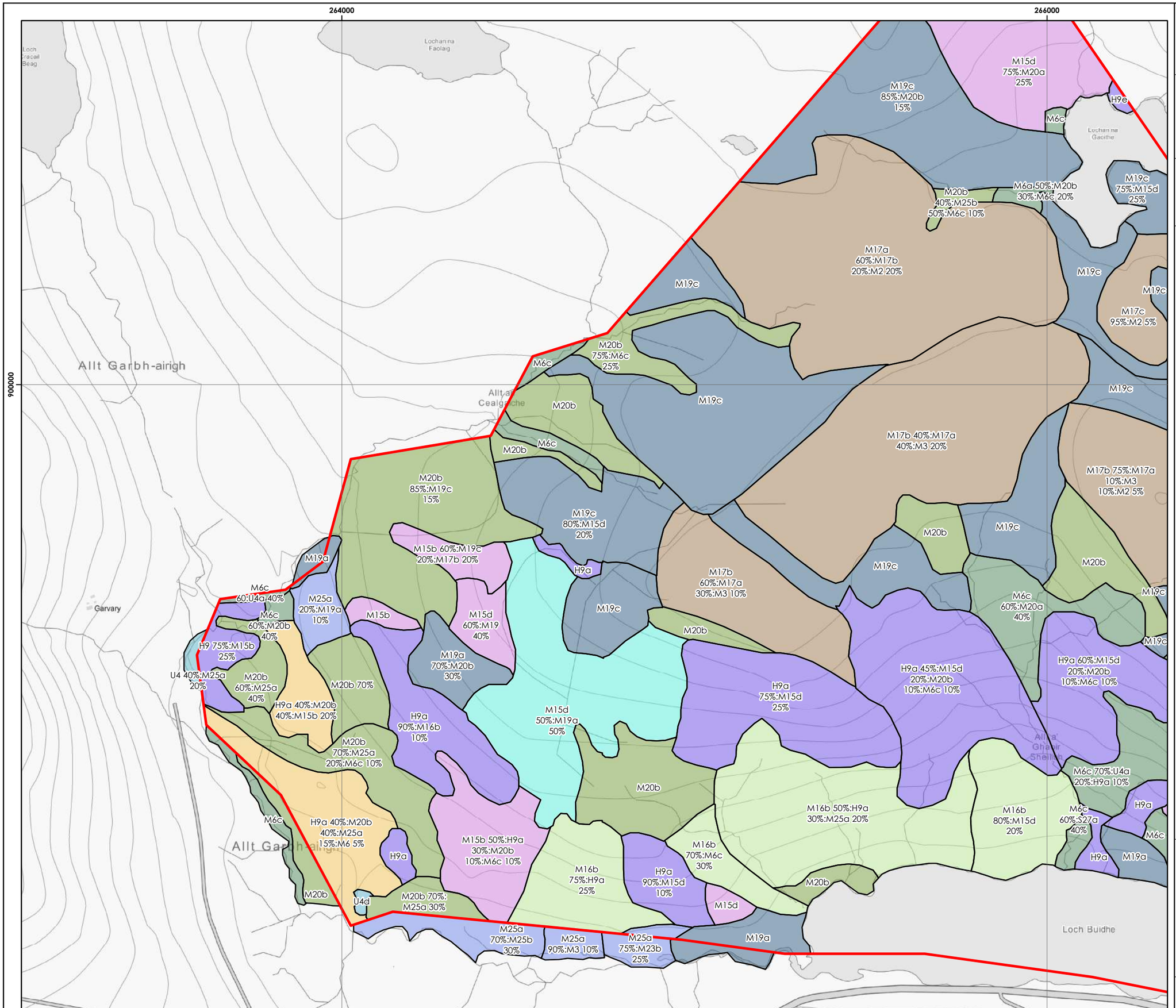
Scale @ A3:
1:47,000

03/07/2019 48400/HB/005a
Drawn by: AA Checked by: TH Approved by: TW

Cambusmore

K R Greenland Farming

Figure 10
NVC Habitat Survey Results
Map 1



Key

- Site boundary

Dominant NVC Community

- H10
- H9
- H9/M20
- M6
- M15
- M15a
- M15/M19
- M16
- M17
- M19
- M19/M16
- M20
- M23
- M25
- S9
- U20
- U4
- W11
- W18
- W4

atmos CONSULTING

0 0.125 0.25 0.5
Kilometres

N

Scale @ A3:
1:10,000

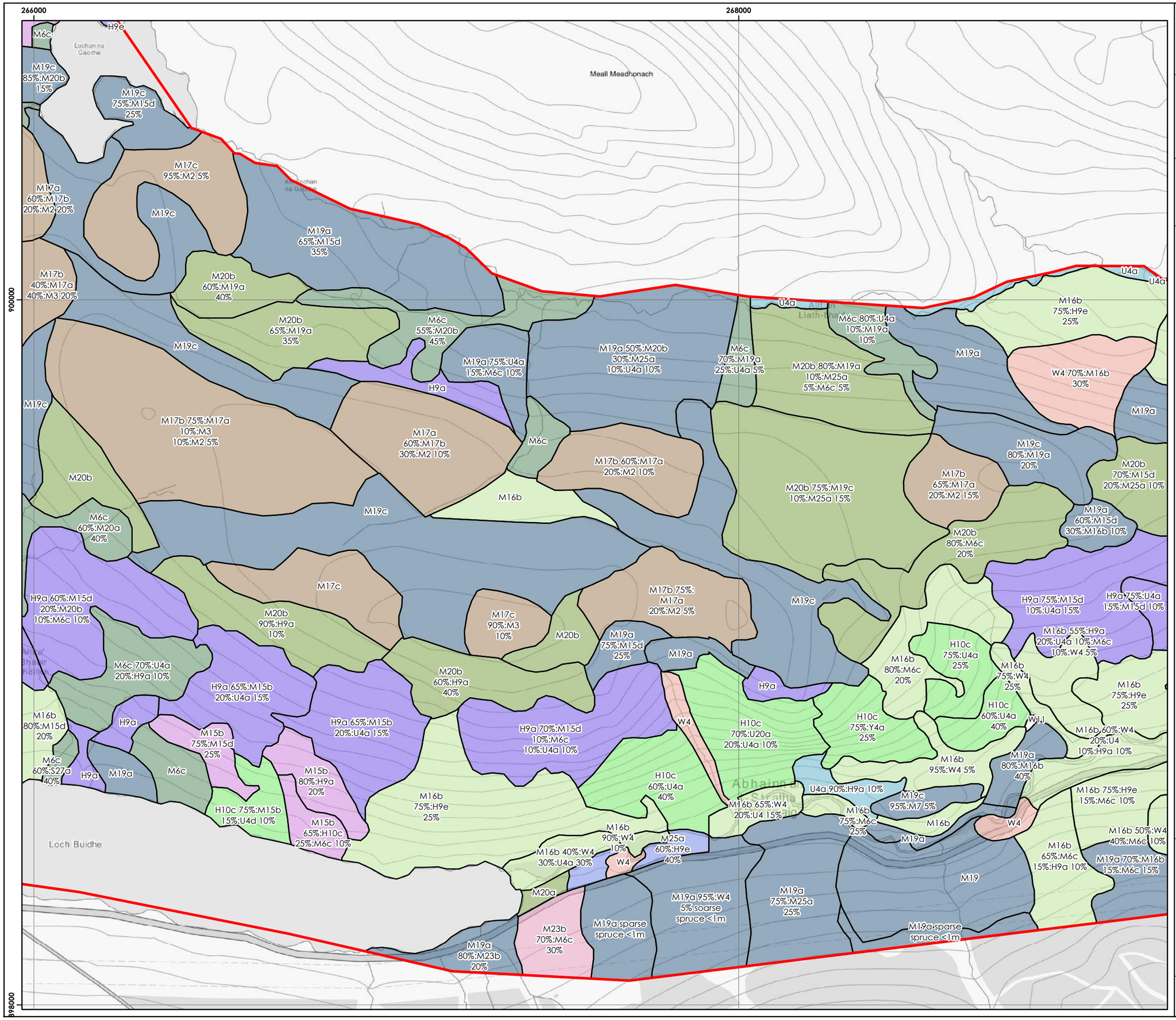
03/07/2019 48400/HB/005a

Drawn by: AA Checked by: TH Approved by: TW

Cambusmore

K R Greenland Farming

Figure 10
NVC Habitat Survey Results
Map 2



Key

- Site boundary

Dominant NVC Community

- H10
- H9
- H9/M20
- M6
- M15
- M15a
- M15/M19
- M16
- M17
- M19
- M19/M16
- M20
- M23
- M25
- S9
- U20
- U4
- W11
- W18
- W4

atmos CONSULTING

0 0.125 0.25 0.5
Kilometres

N

Scale @ A3:
1:10,000

03/07/2019 48400/HB/005a
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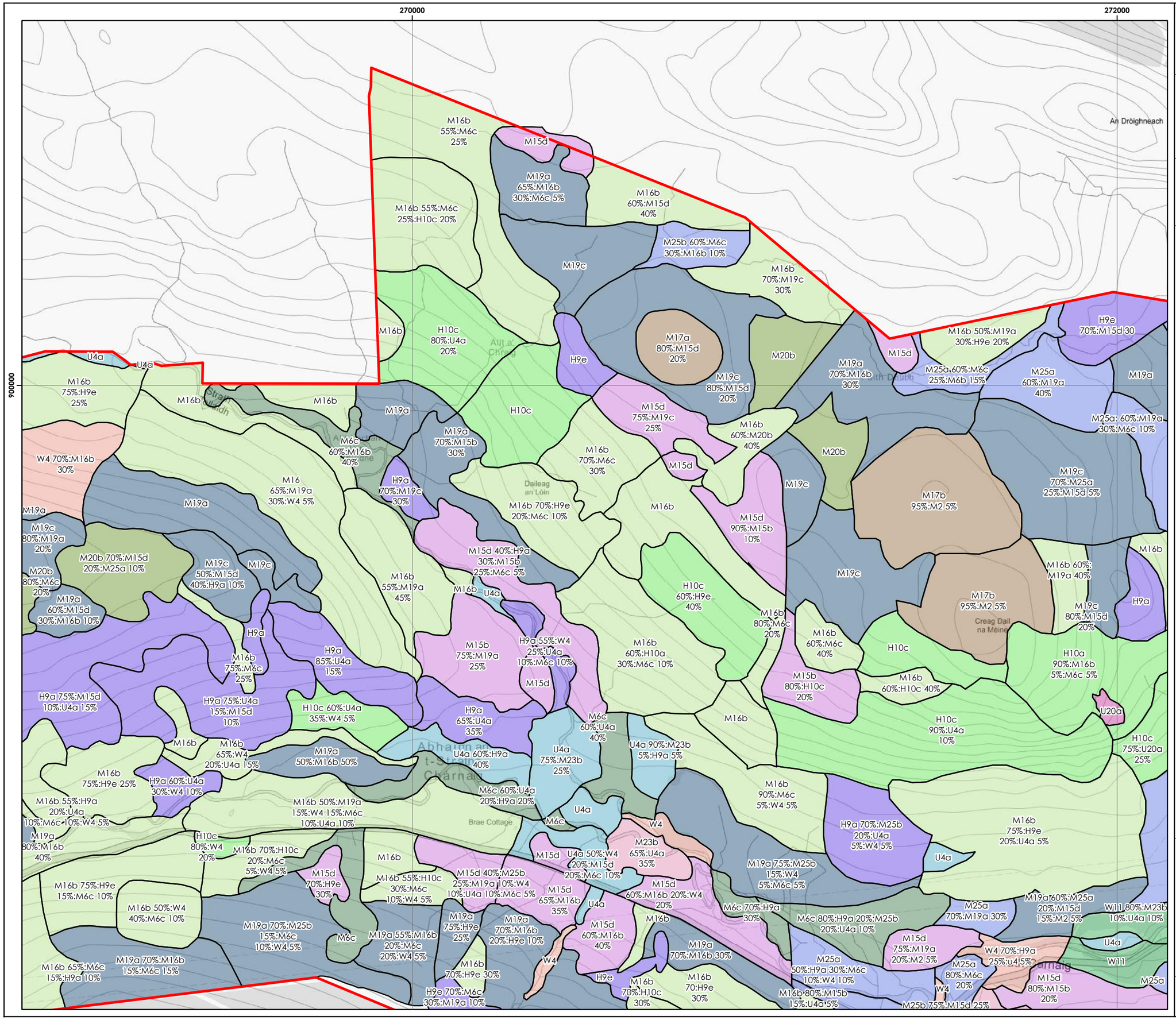
Cambusmore

K R Greenland Farming

Figure 10
NVC Habitat Survey Results
Map 3



Key

- Site boundary

Dominant NVC Community

- H10
- H9
- H9/M20
- M6
- M15
- M15a
- M15/M19
- M16
- M17
- M19
- M19/M16
- M20
- M23
- M25
- S9
- U20
- U4
- W11
- W18
- W4

atmos CONSULTING

0 0.125 0.25 0.5
Kilometres

N

Scale @ A3:
1:10,000

03/07/2019 48400/HB/005a

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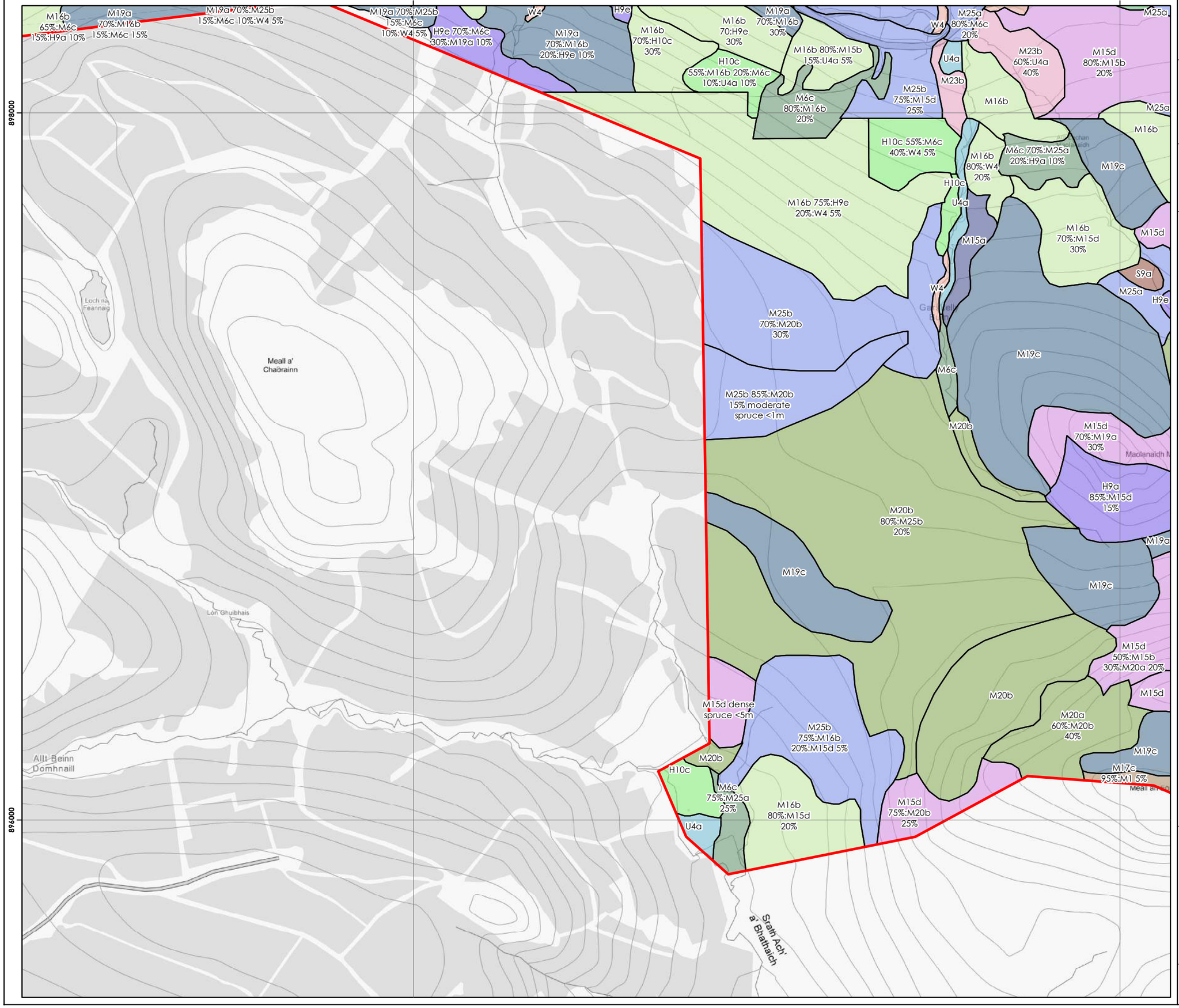
K R Greenland Farming

Figure 10
NVC Habitat Survey Results
Map 4



Key

- Site boundary

Dominant NVC Community

- H10
- H9
- H9/M20
- M6
- M15
- M15a
- M15/M19
- M16
- M17
- M19
- M19/M16
- M20
- M23
- M25
- S9
- U20
- U4
- W11
- W18
- W4

atmos CONSULTING

0 0.125 0.25 0.5
Kilometres

N

Scale @ A3:
1:10,000

03/07/2019 48400/HB/005a
Drawn by: AA Checked by: TH Approved by: TW

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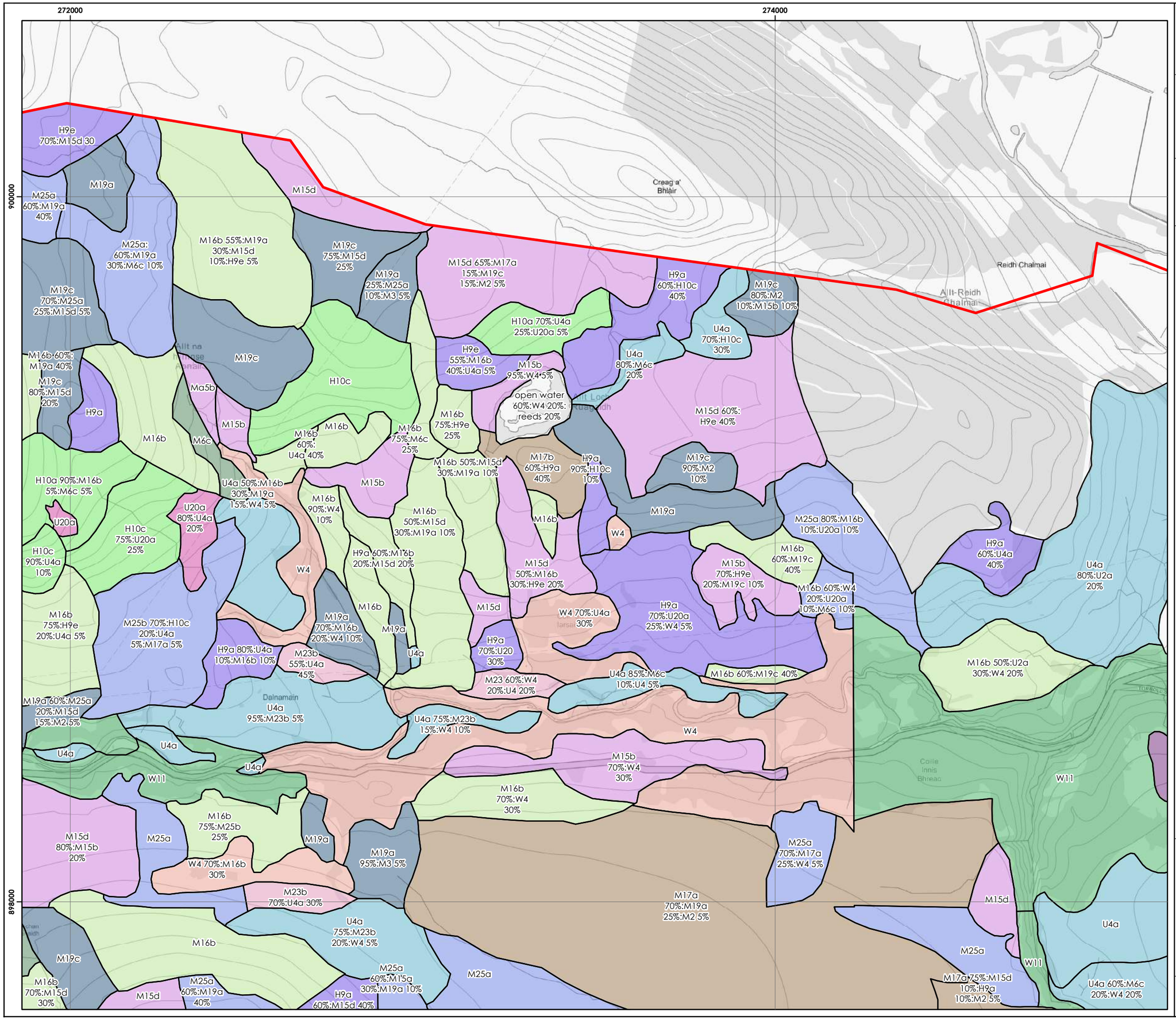
K R Greenland Farming

Figure 10
NVC Habitat Survey Results
Map 5



Key

- Site boundary

Dominant NVC Community

- H10
- H9
- H9/M20
- M6
- M15
- M15a
- M15/M19
- M16
- M17
- M19
- M19/M16
- M20
- M23
- M25
- S9
- U20
- U4
- W11
- W18
- W4

Scale @ A3:
1:10,000

03/07/2019 48400/HB/005a

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K R Greenland Farming

Figure 10
NVC Habitat Survey Results
Map 6

Key

Site boundary

Dominant NVC Community

- H10
- H9
- H9/M20
- M6
- M15
- M15a
- M15/M19
- M16
- M17
- M19
- M19/M16
- M20
- M23
- M25
- S9
- U20
- U4
- W11
- W18
- W4

atmos CONSULTING

0 0.125 0.25 0.5
Kilometres

N

Scale @ A3:
1:10,000

03/07/2019 48400/HB/005a

Drawn by: AA Checked by: TH Approved by: TW

276000

898000

River Fleet

The Alders

Torboll Farm

Little Torboll

Cambusmore Cottage

Cambusmore Lodge

Creag An Amalaidh

A836

H9a 60%:U4a 40%

U4a 80%:U2a 20%

M16b 50%:U2a 30%:W4 20%

M19c 40%:M16b 40%:W4 20%

M19c 70%LH9a 10%:W4 10%:M15d 10%

W11

H9a

U4a

M15d

M15d 40%:M19a 40%:M16b 20%

M19a 50%:M15b 20%:M19c 20%

H9a 50%:H10c 30%:M15d 20%

W11

M25a

U4a 60%:M6c 20%:W4 20%

M17a 75%:M15d 10%:H9a 10%:M2 5%

M17a 60%:M15d 45:M2 5%

H10c

M25a 60%:M15a 30%:M15d 10%

M25a 60%:H9e 20%:M15d 10%

H9a 80%:H10c 20%

M25a 90%:M3 10%

M25a 70%:M15a 10%:M15d 10%:M6c 10%

M19a 70%:M15d 15%:M17a 10%

M19a 95%:M2 5%

M15d

H10c 60%

M16b

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K R Greenland Farming

Figure 10
NVC Habitat Survey Results
Map 7

Key

Site boundary

Dominant NVC Community

- H10
- H9
- H9/M20
- M6
- M15
- M15a
- M15/M19
- M16
- M17
- M19
- M19/M16
- M20
- M23
- M25
- S9
- U20
- U4
- W11
- W18
- W4

atmos CONSULTING

0 0.125 0.25 0.5

Kilometres

N

Scale @ A3:
1:10,000

03/07/2019 48400/HB/005a

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K R Greenland Farming

Figure 10
NVC Habitat Survey Results
Map 8

Key

Site boundary

Dominant NVC Community

- H10
- H9
- H9/M20
- M6
- M15
- M15a
- M15/M19
- M16
- M17
- M19
- M19/M16
- M20
- M23
- M25
- S9
- U20
- U4
- W11
- W18
- W4

atmos CONSULTING

0 0.125 0.25 0.5
Kilometres

N

Scale @ A3:
1:10,000

03/07/2019 48400/HB/005a

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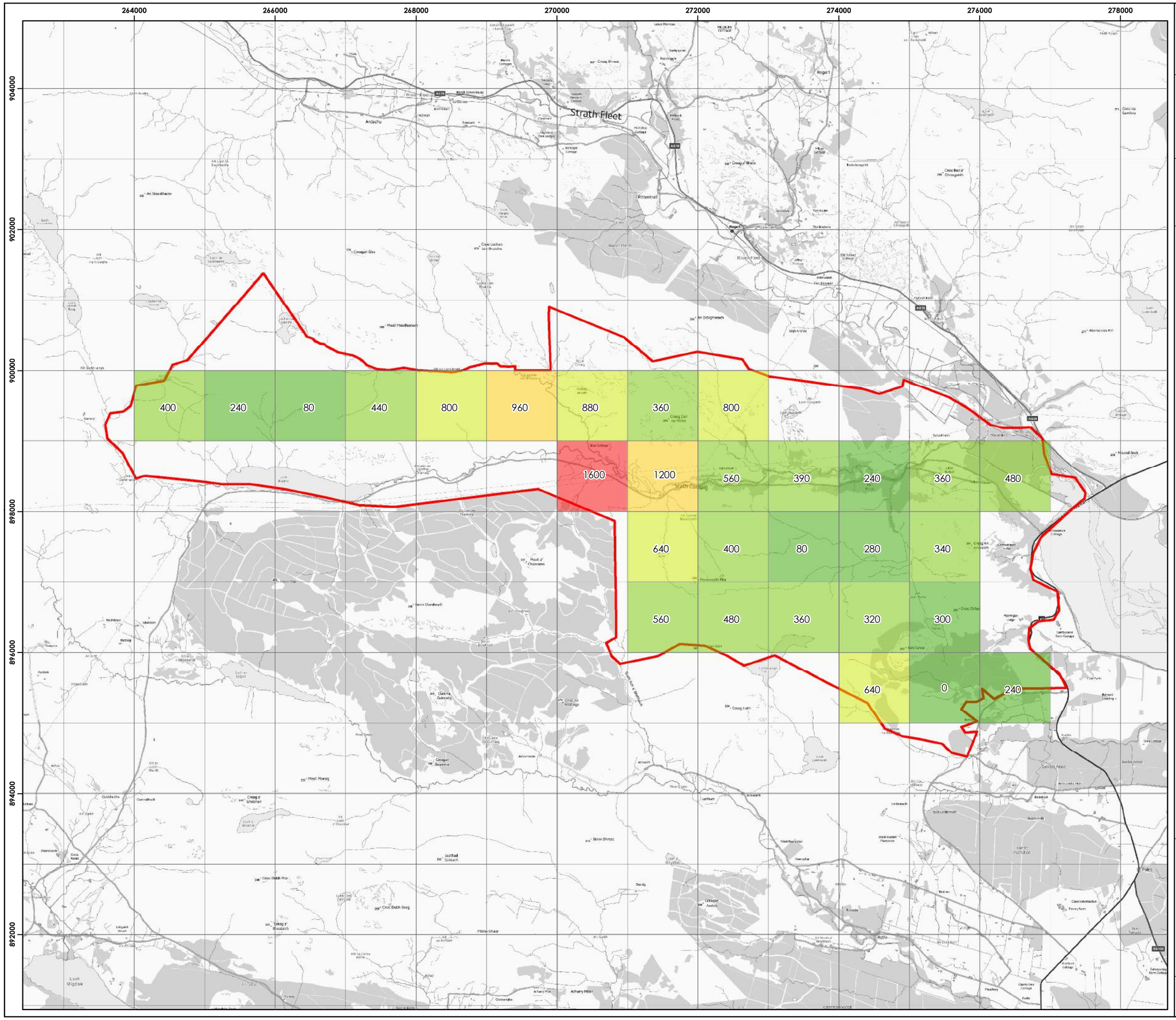
Figure 11a
Prey Availability
Meadow Pipits



Key

- Site boundary

Meadow pipits per square km

- 0 - 300
- 301 - 600
- 601 - 900
- 901 - 1200
- 1201 - 1500
- 1501 - 1800

atmos CONSULTING

0 0.5 1 2
Kilometres

N

Scale @ A3:
1:50,000

03/07/2019 48400/OR/010a

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Figure 11b
Prey Availability
Voles

Key

- Site boundary
- Vole Score 0
- Vole Score 1
- Vole Score 2

atmos CONSULTING

0 0.5 1 2
Kilometres

N

Scale @ A3:
1:45,000

03/07/2019 48400/EC/015a

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Figure 12
Mean Graminoid Height

Key

Site boundary

Average Graminoid Height

- <= 10cm
- 11 - 20cm
- 21 - 30cm
- 31 - 40cm
- 41 - 50cm
- 51 - 60cm
- > 60cm

atmos CONSULTING

0 0.5 1 2

Kilometres

N

Scale @ A3:
1:45,000

03/07/2019 48400/HB/017a

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Figure 13
Mean Dwarf Shrub Height

Key

Site boundary

Average Dwarf Shrub Height

- <= 10cm
- 11 - 20cm
- 21 - 30cm
- 31 - 40cm
- 41 - 50cm
- 51 - 60cm
- >60cm

atmos CONSULTING

0 0.5 1 2

Kilometres

N

Scale @ A3:
1:45,000

03/07/2019 48400/HB/016a

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Figure 14
Common Standards Monitoring Results - Overview

Key

- Site boundary
- CSM Pass
- CSM Fail

1

2

Strath Fleet

Strath Carnaig

264000 266000 268000 270000 272000 274000 276000 278000

904000 902000 900000 898000 896000 894000 892000

atmos CONSULTING

0 0.5 1 2
Kilometres

N

Scale @ A3:
1:50,000

03/07/2019 48400/HB/014a

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K R Greenland Farming

Figure 14
Common Standards Monitoring Results - Map 1

Key

- Site boundary
- CSM Pass
- CSM Fail

atmos CONSULTING

0 0.25 0.5 1
Kilometres

N

Scale @ A3:
1:25,000

03/07/2019 48400/HB/014a
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Cambusmore

K R Greenland Farming

Figure 14
Common Standards Monitoring Results - Map 2

Key

- Site boundary
- CSM Pass
- CSM Fail

atmos CONSULTING

0 0.25 0.5 1
Kilometres

N

Scale @ A3:
1:25,000

03/07/2019 48400/HB/014a
Drawn by: AA Checked by: TH Approved by: TW

Cambusmore

K R Greenland Farming

Figure 15
Habitat Summary Map
Overview

Key

- Site boundary

Dominant NVC Community

- Acid Grassland
- Native Pine Forest
- Native Broad-leaved Woodland
- Dry Heath
- Deer Grass Dominated Wet Heath
- Sedge Dominated Wet Heath
- Purple Moor Grass Dominated Wet Heath
- Purple Moor Grass Dominated Grassland
- Soft Rush Dominated Flush
- Blanket Bog
- Blanket Bog with pool system

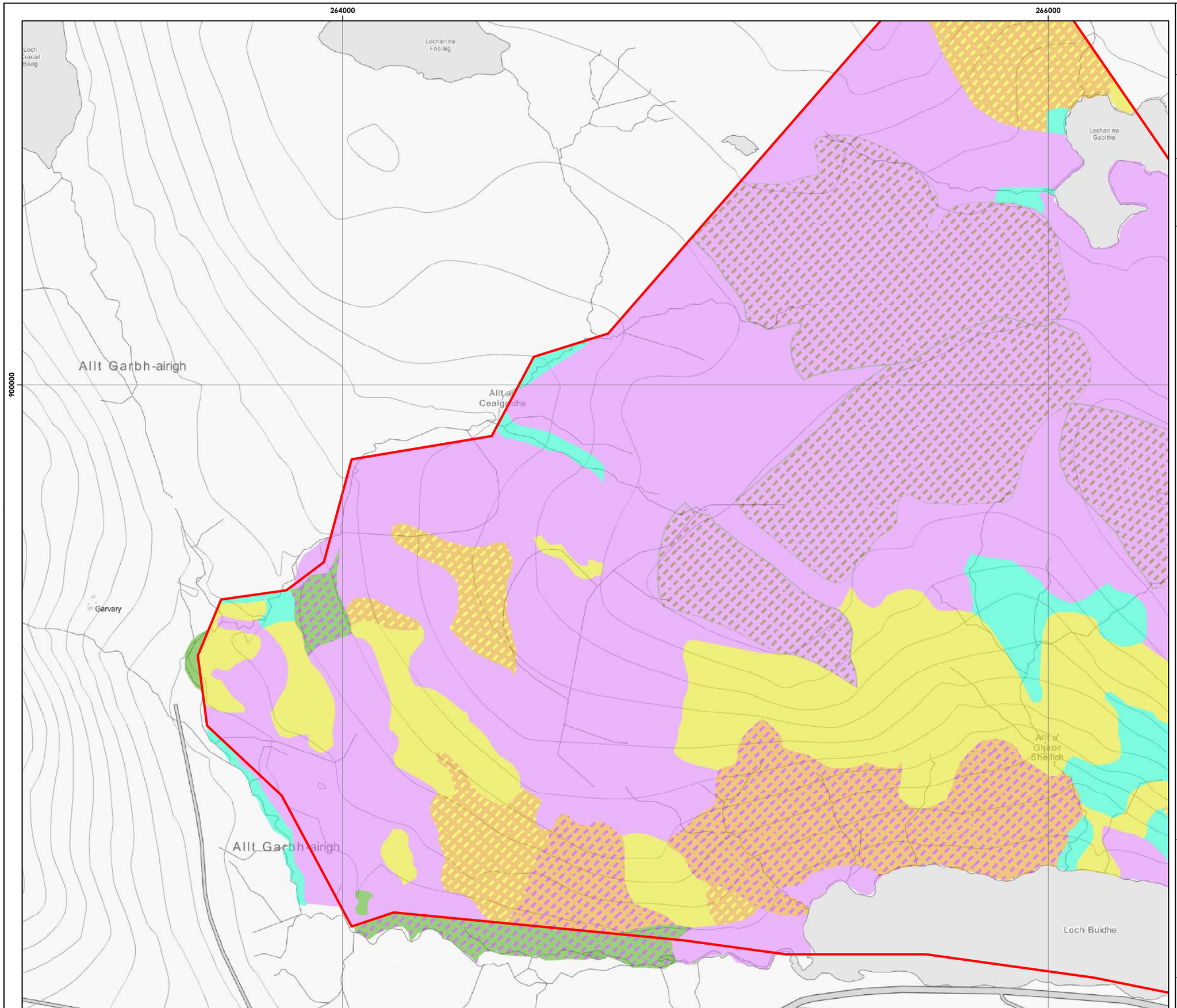
atmos CONSULTING

0 0.5 1 2
Kilometres

N

Scale @ A3:
1:47,000

03/07/2019 48400/HB/011a
Drawn by: AA Checked by: TH Approved by: TW



Cambusmore

K R Greenland Farming

Figure 15
Habitat Summary Map
Map 1

Key

- Site boundary

Dominant NVC Community

- Acid Grassland
- Native Pine Forest
- Native Broad-leaved Woodland
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- Deer Grass Dominated Wet Heath
- Sedge Dominated Wet Heath
- Purple Moor Grass Dominated Wet Heath
- Purple Moor Grass Dominated Grassland
- Soft Rush Dominated Flush
- Blanket Bog
- Blanket Bog with pool system

atmos CONSULTING

0 0.125 0.25 0.5
Kilometres

N

Scale @ A3:
1:10,000

03/07/2019 48400/HB/011a

Drawn by: AA Checked by: TH Approved by: TW

266000

268000

900000

898000

Lochan na Gaoithe

Meall Meadhonach

Allt an Liath-bhaid

Abhainn an t-Strath Chàrnaig

Loch Buidhe

Cambusmore

K R Greenland Farming

Figure 15
Habitat Summary Map
Map 2

Key

- Site boundary

Dominant NVC Community

- Acid Grassland
- Native Pine Forest
- Native Broad-leaved Woodland
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- Purple Moor Grass Dominated Wet Heath
- Purple Moor Grass Dominated Grassland
- Soft Rush Dominated Flush
- Blanket Bog
- Blanket Bog with pool system

atmos CONSULTING

0 0.125 0.25 0.5

Kilometres

N

Scale @ A3:
1:10,000

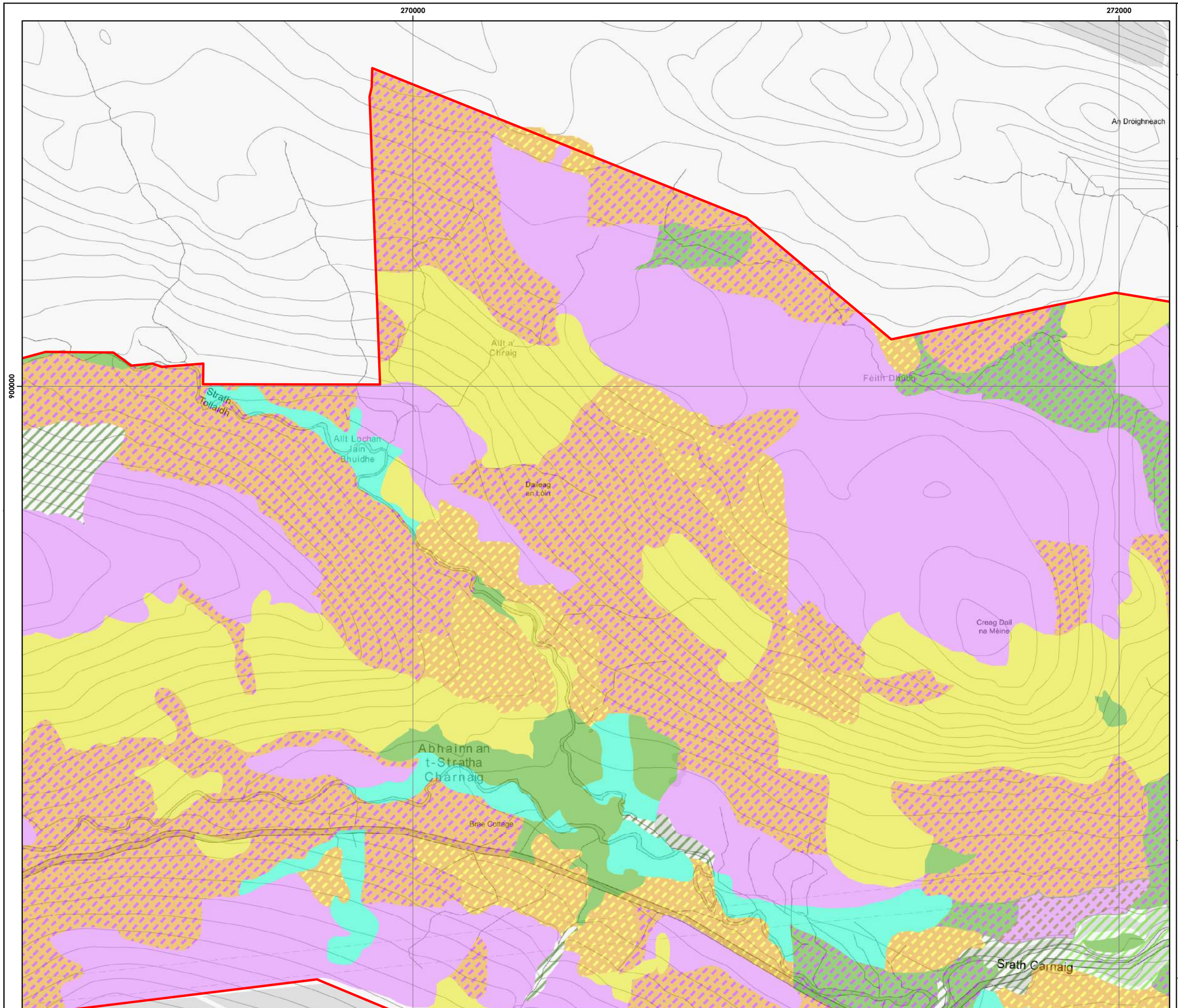
03/07/2019 48400/HB/011a

Drawn by: AA Checked by: TH Approved by: TW

Cambusmore

K R Greenland Farming

Figure 15
Habitat Summary Map
Map 3



Key

- Site boundary

Dominant NVC Community

- Acid Grassland
- Native Pine Forest
- Native Broad-leaved Woodland
- Dry Heath
- Deer Grass Dominated Wet Heath
- Sedge Dominated Wet Heath
- Purple Moor Grass Dominated Wet Heath
- Purple Moor Grass Dominated Grassland
- Soft Rush Dominated Flush
- Blanket Bog
- Blanket Bog with pool system

atmos CONSULTING

0 0.125 0.25 0.5
Kilometres

N

Scale @ A3:
1:10,000

03/07/2019 48400/HB/011a
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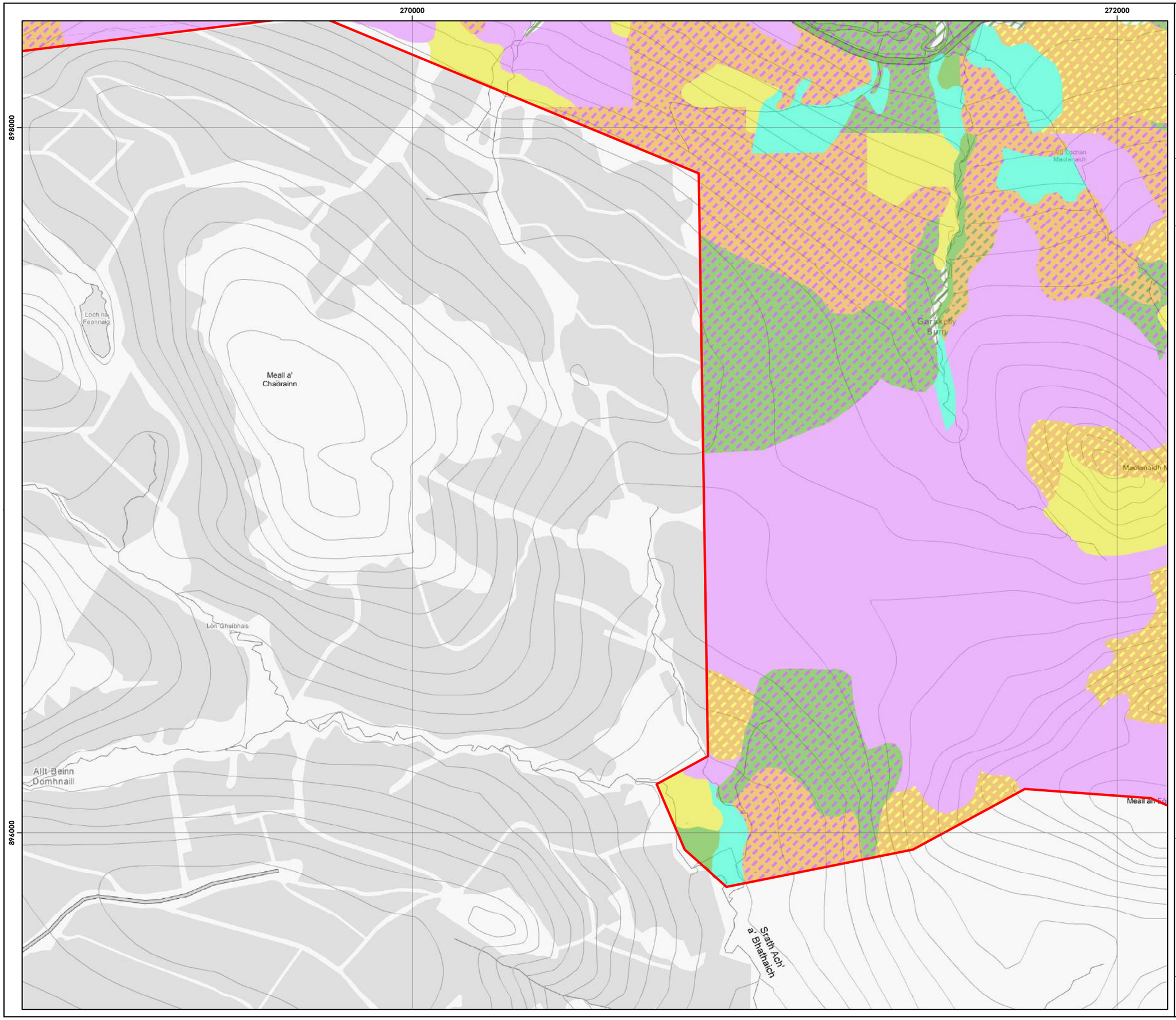
K R Greenland Farming

Figure 15
Habitat Summary Map
Map 4



Key

- Site boundary

Dominant NVC Community

- Acid Grassland
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- Native Broad-leaved Woodland
- Dry Heath
- Deer Grass Dominated Wet Heath
- Sedge Dominated Wet Heath
- Purple Moor Grass Dominated Wet Heath
- Purple Moor Grass Dominated Grassland
- Soft Rush Dominated Flush
- Blanket Bog
- Blanket Bog with pool system

atmos CONSULTING

0 0.125 0.25 0.5
Kilometres

N

Scale @ A3:
1:10,000

03/07/2019 48400/HB/011a
Drawn by: AA Checked by: TH Approved by: TW

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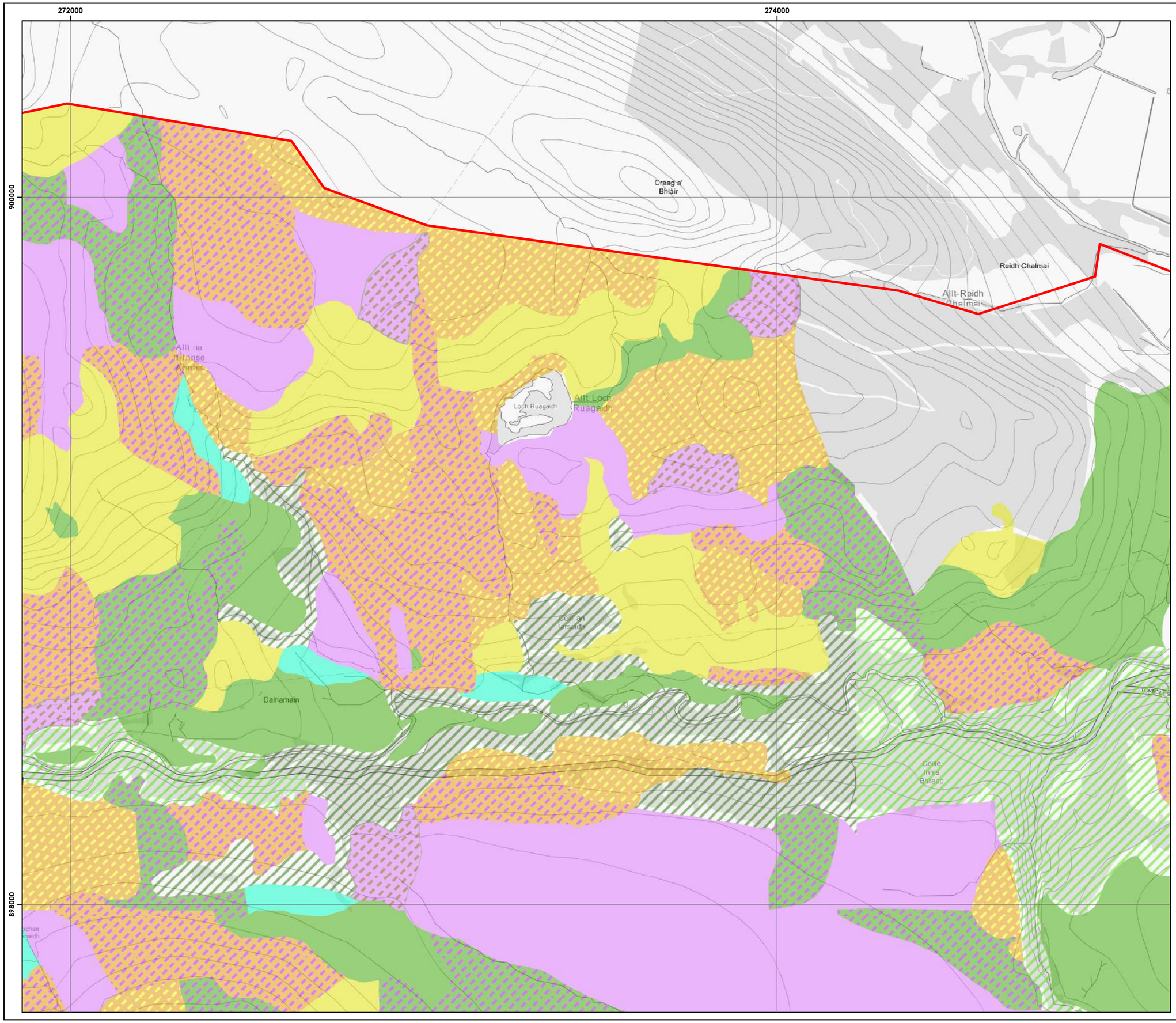
K R Greenland Farming

Figure 15
Habitat Summary Map
Map 5



Key

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Dominant NVC Community

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- Sedge Dominated Wet Heath
- Purple Moor Grass Dominated Wet Heath
- Purple Moor Grass Dominated Grassland
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- Blanket Bog
- Blanket Bog with pool system

atmos CONSULTING

0 0.125 0.25 0.5
Kilometres

N

Scale @ A3:
1:10,000

03/07/2019 48400/HB/011a
Drawn by: AA Checked by: TH Approved by: TW

272000

274000

896000

Maolanaidh Mór

Allt Tigh Néill

Meall an Fóin

Loch Laoigh

Creag Liath

An Uidh Dhubh

Cambusmore

K R Greenland Farming

Figure 15
Habitat Summary Map
Map 6

Key

- Site boundary

Dominant NVC Community

- Acid Grassland
- Native Pine Forest
- Native Broad-leaved Woodland
- Dry Heath
- Deer Grass Dominated Wet Heath
- Sedge Dominated Wet Heath
- Purple Moor Grass Dominated Wet Heath
- Purple Moor Grass Dominated Grassland
- Soft Rush Dominated Flush
- Blanket Bog
- Blanket Bog with pool system

atmos CONSULTING

0 0.125 0.25 0.5

Kilometres

N

Scale @ A3:
1:10,000

03/07/2019 48400/HB/011a

Drawn by: AA Checked by: TH Approved by: TW

276000

898000

River Fleet

The Alders

Torboll Farm

Little Torboll

TORBOLL STREET

Cambusmore Cottage

Cambusmore Lodge

Craag An Amalaidh

A836

A9

Cambusmore

K R Greenland Farming

Figure 15
Habitat Summary Map
Map 7

Key

Site boundary

Dominant NVC Community

- Acid Grassland
- Native Pine Forest
- Native Broad-leaved Woodland
- Dry Heath
- Deer Grass Dominated Wet Heath
- Sedge Dominated Wet Heath
- Purple Moor Grass Dominated Wet Heath
- Purple Moor Grass Dominated Grassland
- Soft Rush Dominated Flush
- Blanket Bog
- Blanket Bog with pool system

atmos CONSULTING

0 0.125 0.25 0.5

Kilometres

N

Scale @ A3:
1:10,000

03/07/2019 48400/HB/011a

Drawn by: AA Checked by: TH Approved by: TW

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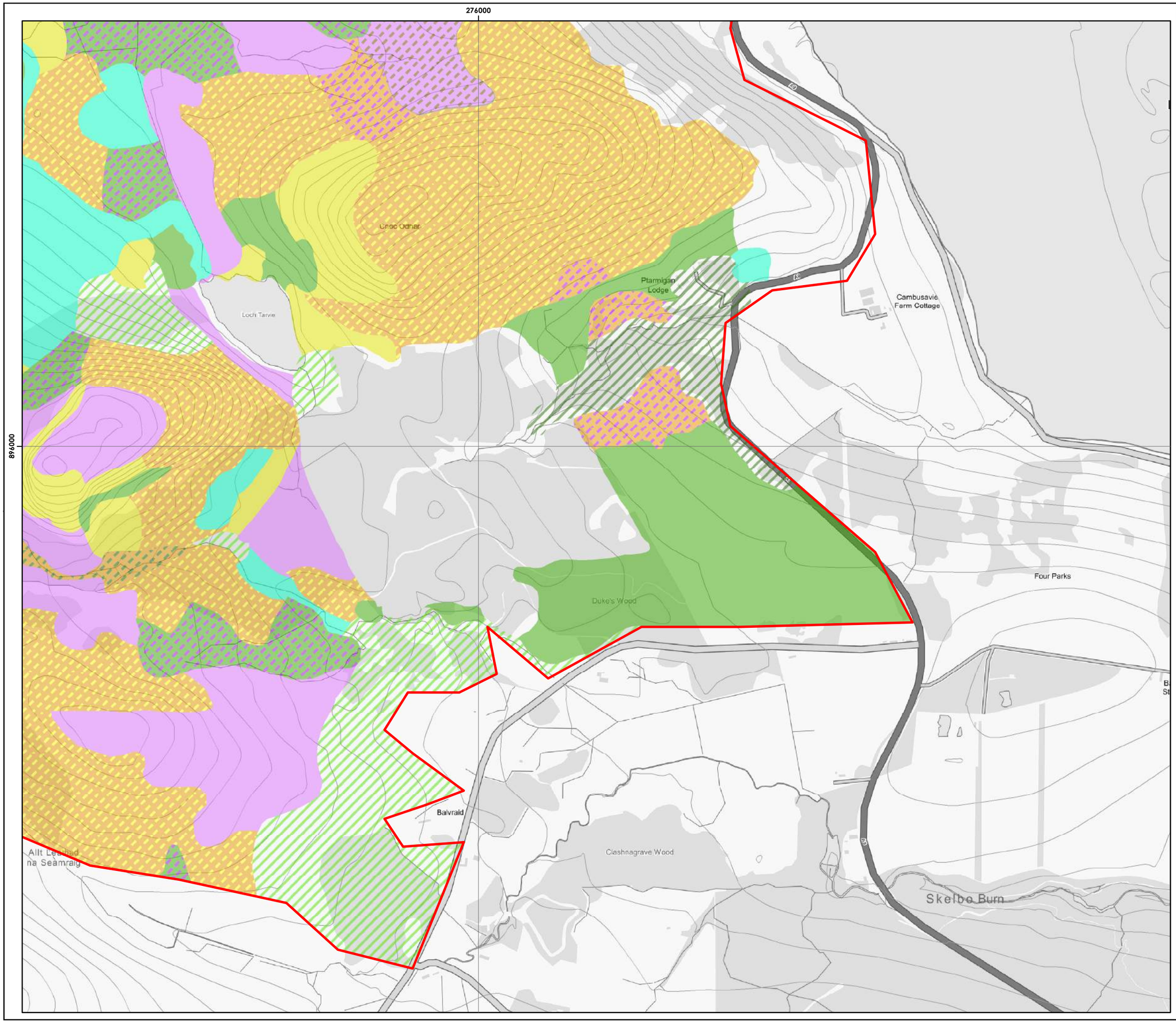
K R Greenland Farming

Figure 15
Habitat Summary Map
Map 8



Key

- Site boundary

Dominant NVC Community

- Acid Grassland
- Native Pine Forest
- Native Broad-leaved Woodland
- Dry Heath
- Deer Grass Dominated Wet Heath
- Sedge Dominated Wet Heath
- Purple Moor Grass Dominated Wet Heath
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- Blanket Bog with pool system

atmos CONSULTING

0 0.125 0.25 0.5
Kilometres

N

Scale @ A3:
1:10,000

03/07/2019 48400/HB/011a

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K R Greenland Farming

Figure 16
Other Notable Species
Breeding Territories

Key

Site boundary

Survey area

Category

Schedule 1/Annex 1

Scottish Priority Species

Not designated

Breeding Status

Confirmed

Probable

Possible

Red listed species - BOCC

Amber listed species - BOCC

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0 0.5 1 2

Kilometres

N

Scale @ A3:
1:50,000

03/07/2019 48400/OR/012a

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48400

Non-Technical Summary

Woodland Creation and Management

Cambusmore Estate, Sutherland
Volume 3

K R Greenland Farming

5 July 2019

Contents

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Volumes

Volume 1 – EIA Main Text (Confidential and Non-Confidential Versions)

Volume 2 – Figures (Confidential and Non-Confidential Versions)

Volume 3 – Non-Technical Summary

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K R Greenland Farming

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Document Prepared By

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Project Manager

Lauren.kellaway@atmosconsulting.com

Document Approved By

Peter Nairne

Technical Director

Peter.nairne@atmosconsulting.com

Version	Date	Reason
1.1	05/07/2019	Issued to SF

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IV6 7RZ

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Mold Business
Park,
Wrexham Road,
Mold,
CH7 1XP

Preface

This document comprises the Non-Technical Summary (NTS) which is a summary of the Environmental Impact Assessment Report (EIA Report), (Atmos, 2019) prepared to provide environmental information for the planting of 1,258 hectares (ha) of native broadleaf, mixed conifer and shrubs of varying densities alongside ongoing management of land at Strath Carnaig, Cambusmore Estate in Sutherland, Scottish Highlands (hereafter referred to as 'the Proposed Development').

The EIA Report has been produced to provide information on the nature and extent of the likely significant environmental impacts of the Proposed Development.

For reference Forestry Commission Scotland (FCS) became Scottish Forestry (SF), an executive agency of the Scottish Government, on 1st April 2019

The application for consent has been made to SF under the Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017.

The EIA includes the following documents;

- Volume 1: EIA Report Main Text (Confidential and Non-Confidential Versions);
- Volume 2: EIA Report Figures (Confidential and Non-Confidential Versions);
- Volume 3: Non-Technical Summary;

In addition a number of supporting documents have also been prepared to support the Application. Further details of these can be found in the following Appendices of Volume 1;

- Appendix A: Issues Log;
- Appendix B: Draft Habitat Management Plan;
- Appendix C: Soils;
- Appendix D: Woodland Creation Potential Report;
- Appendix E: Archaeology;
- Appendix F: CONFIDENTIAL Hen harrier Report;
- Appendix G: Scottish Forestry Screening Response;
- Appendix H: Scottish Forestry Scoping Response; and
- Appendix I: RSPB and SNH Scoping Responses.

The EIA is available for viewing by the public during normal office hours at the offices of Scottish Forestry, Fodderty Way, Dingwall, IV15 9XB office. The documents will also be available online on request from the SF. Comments can be submitted by email to highland.cons@forestry.gov.scot or sent to;

Scottish Forestry
Fodderty Way,
Dingwall,
IV15 9XB

Further details about this project can be provided on request from;
Atmos Consulting Ltd
CBC House
24 Canning Street

Edinburgh, EH3 8EG
E-mail: info@atmosconsulting.com
Tel: 0131 346 9100

The EIA Report can be purchased from Atmos for £500 for a paper hard copy or £10 for a CD copy.

1 Introduction

This Non-Technical Summary (NTS) accompanies the Environmental Impact Assessment Report (EIA Report), (Atmos, 2019) which is submitted alongside the planning application by K R Greenland Farming ('the Applicant') for the proposed planting of 1,258 hectares (ha) of native broadleaf, mixed conifer and shrubs of varying densities alongside ongoing management of land at Strath Carnaig, Cambusmore Estate in Sutherland, Scottish Highlands (hereafter referred to as 'the Proposed Development').

Atmos Consulting Ltd. (Atmos) was appointed by the Applicant to undertake an Environmental Impact Assessment (EIA) for the Proposed Development. The Proposed Development is located approximately 11 kilometres (km) south west of Golspie and 13km northwest of Dornoch (Figure 1) and comprises the planting of some 1,258 ha of trees and ongoing management of the site.

This NTS summarises the content and conclusions contained within the EIA Report, which was produced in accordance with *The Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017* ('The Regulations'). The EIA Report presents the findings of the EIA and is designed to describe the Proposed Development, identify and assess potentially significant environmental impacts and to propose mitigation where appropriate.

1.1 The Applicant

The Applicant is K R Greenland Farming, who are responsible for undertaking farming and land management activities on behalf of Cambusmore Estates Ltd. The Applicant runs agricultural herds together with undertaking woodland and sporting management on the Cambusmore Estate, with a strong emphasis on conservation and enhancing biodiversity. The Applicant has been active in promoting the farming and tourism interests of Sutherland and Caithness through its active participation in the success of North Highland Products Ltd.

Atmos Consulting Limited (Atmos) is an experienced environmental consultancy providing environmental assessment and planning expertise, working on behalf of the Applicant and is acting as agent for the Proposed Development.

1.2 Environmental Impact Assessment (EIA)

The primary purpose of the EIA process is to inform the decision maker of the environmental implications of a development proposal. Through this process information is collected about the possible environmental impacts of a proposed development. These findings are evaluated and presented in a systematic and transparent manner to assist consultation, to inform the design of the Proposed Development and to enable the decision makers to take account of these impacts in their consenting process determination. Further to that, the EIA also helps to identify controls over the construction or operation that are needed.

The scope of the EIA for the Proposed Development was agreed with SF through a formal Screening meeting and Scoping Opinion received in March 2018 and subsequent consultation with SF and relevant stakeholders. The submitted application and EIA will be considered by SF and statutory consultees under The Forestry (Environmental Impact Assessment) (Scotland) Regulations 2017 for EIA Consent.

The EIA has identified the potential impacts of the Proposed Development on the environment and an assessment was made as to whether these impacts could be significant. A number of mitigation measures to reduce potentially significant impacts have been incorporated into the design of the Proposed Development or are proposed as part of the planting process or the ongoing management of the Proposed Development.

The EIA Report sets out the findings of the EIA completed in accordance with The Regulations. The EIA Report contains the environmental information required for the determination of the application and is structured as follows:

- Volume 1: EIA Report Main Text (Confidential and Non-Confidential Versions);
- Volume 2: EIA Report Figures (Confidential and Non-Confidential Versions);
- Volume 3: Non-Technical Summary;

The findings of the assessments are intended to assist SF, and other stakeholders, in coming to a view about whether or not, and how, the Proposed Development should proceed.

A specialist team was put together to undertake the assessment in line with the Scoping Opinion from SF and consisted of the Following;

Table 1: Project Team

Section	Team	Statement of Competence
Planning Non-Technical Summary Biodiversity and Nature Conservation	Atmos Consulting	Atmos has a proven track record in Environmental Impact Assessments. All in the team are appropriately qualified and members of relevant professional bodies.
Woodland Creation Potential Report and Soils Report	Andy Kennedy	Andy has a BSc in Forestry and approximately 38 years in the industry. He has previously worked for Scottish Forestry (prior to SF) for 10 years and the Forestry Research for 18 years as a research forester and field surveyor. The last 15 years Andy has specialised on soils and derived subjects. He has also taken roles as a soil surveyor, trainer of soils surveyors for FC across the UK, quality auditor of soil survey contractors and advisor to FC operations management and policy groups. The Woodland Creation Potential Report was supported by Malcolm Morrison who has a diploma in Forestry from the Scottish School of Forestry (1986) and has 32 years of experience of forestry in the Highlands of Scotland.
Archaeology	AOC Archaeology	AOC is one of the most experienced heritage consultancy practice and is registered is a Registered Archaeological Organisation (RAO) through the Chartered Institute for Archaeologists (CIfA).
Issues Log Draft Habitat Management Plan	Anthony Elletson	Anthony has 25 years' experience in woodland and related project management and contracting, solicitor (non-practising), regulatory consulting and strategic business planning frequently relating to sites with specific sensitivities.
	Ken Greenland	Ken is the owner of Cambusmore Estates, he is a

Section	Team	Statement of Competence
		farmer and land manager of 40 years' experience. Quantity Surveyor and project manager for 30 years gaining experience in a wide range of projects frequently involving sensitive sites.
	Jenny Bell	Jenny has more than 20 years' experience in ornithology. She has developed extensive knowledge of survey methods on both avian and non-avian ecology and has contributed to developing Scottish Natural Heritage (SNH) guidance using bespoke methodology.

1.2.1 Consultation

A vital aspect of the EIA process is consultation, both to agree which environmental topics require to be assessed and to understand public perception of the Proposed Development in order to help in the design process. Screening and Scoping consultation was undertaken throughout the development of the EIA in order to confirm the scope and extent of environmental assessment required.

1.3 The Proposed Development

The Proposed Development is located approximately 11 kilometres (km) south west of Golspie and 13km northwest of Dornoch, to the west of the A9 Inverness Wick trunk road, and comprises the planting of some 1,258 ha of open hills currently dominated by heath, bog and grassland habitats. The current land use comprises of rough grazing with some isolated non-grazing areas due to areas of deep peat.

The Proposed Development is located within the wider Cambusmore Estate which comprises some 5,000 ha. Elevations across the site vary considerably with the highest elevation of 307m above ordnance datum (AOD) at the summit of Meall an Eoin in the southeast dipping to circa 115m along parts of the existing access roads in the centre of the site.

The Proposed Development is located within the Strath Carnaig and Strath Fleet Moors Site of Special Scientific Interest (SSSI) and Special Protection Area (SPA) which is designated for its breeding population of Hen harriers *Circus cyaneus*, see Figure 3.

1.3.1 Project Alternatives

Prior to the final design presented within this EIA Report numerous alternative uses were considered for the land which are summarised below:

- Grouse Moor - A section of the Proposed Development site was formerly used as a grouse moor and re-establishing this use was considered by the Applicant. However due to considerable expenditure associated with increasing bags, rebuilding butts, upgrading estate tracks, employment of additional gamekeepers, extensive heather burning together with feeding costs and restrictions on sheep grazing it was concluded that such a use would neither be financially viable nor compatible with the overall objectives for Cambusmore as a whole
- Continue Current Management - Consideration was given to maintaining the current management of the area contained within the Proposed Development.

Efforts over a number of years to undertake muirburn had not been successful due in large part to climatic and ground conditions together with seasonal constraints around early ground nesting birds, this therefore inhibited efforts to promote heather and grass rejuvenation on the hill. Therefore, maintaining the current management regime for the site would ultimately lead to a further decline in the quality of habitat and this option was discounted as it was considered that it did not offer sufficient habitat enhancement potential and would result in considerable expenditure.

- Commercial Woodland – the possibility of afforestation was considered from successful evidence of a neighbouring woodland. Peat depth surveys were undertaken and discounted large parts of the proposed area unplantable. Access to the proposed planting areas would of required a large network of expensive roading. Alongside this by having commercial woodland operation would likely lead to a negative impact upon Hen harrier habitats and thus the integrity of the SPA likely could not be maintained.

1.3.2 Preferred Option

The Proposed Development presented in this EIA therefore comprises the planting of mixed conifer, native broadleaf trees and shrubs of varying densities alongside ongoing management. The planting proposal is proposed to be made up of the tree species as detailed further in Section 3.2.1 of the EIA Report and illustrated in Figure 2.

The Proposed Development started off as a much larger project which has undergone a number of iterations to arrive at what is now the subject of this EIA report. Having excluded all areas of deep peat, common grazing's and potential grazing areas.

The arrival of the final design of the Proposed Development was also informed by an NVC survey which afforded more detail as to species suitability. This was further refined by removing planting from hilltops and other areas which would be visually intrusive. Access to various Hen harrier records further refined the Proposed Development so as to secure and promote breeding and foraging habitat. This has resulted in large areas of open ground being designed into low and variable density planting of native broadleaves and Scots Pine across large parts of the Proposed Development area.

Having established what areas were able to be planted the decision was made to confine species selection within the SPA to native species of tree, shrub and scrub. This has resulted in areas of Scots Pine, Upland Birchwood and low density Native broadleaves together with one area on the eastern edge (and partially out with the SPA) proposed to contain limited quantities of Norway Spruce. There will be no diverse conifer within the SPA.

Recognising that parts of Cambusmore Estate to the west of the A9 trunk road lie out with the Strath carnaig and Strath Fleet Moors SPA consideration was given to incorporating these areas within the Proposed Development to create viable wildlife corridors between differing parts of the estate and also in an effort to offer a limited amount of potentially commercial woodland (albeit on a long term basis).

2 Policy Context

The Proposed Development has followed the requirements of both the Forestry (EIA) (Scotland) Regulations 2017 and the SF EIA for Forestry Projects (2018).

It is also in line with the Mackinnon Review of 2016 which considers a range of recommendations in which Forestry proposals should be assessed and considered.

3 Biodiversity and Nature Conservation

Consultation during Scoping identified the presence of the Strath Carnaig and Strath Fleet Moors Special Protection Area and its qualifying Hen harrier population as the ornithological feature requiring consideration within the EIA Report.

Data was obtained from Highland Raptor Study Group relating to the historic distribution of Hen harriers within the Proposed Development and in 2018 surveys were undertaken to:

- Identify breeding harriers within and around the Proposed Development;
- Carry out vegetation surveys across the Proposed Development;
- Measure prey species density; and
- Map flight activity of harriers.

This established a good understanding of the likely value of areas of the Proposed Developments and the underlying habitats to be assessed with respect to Hen harriers.

Examination of the Proposed Development suggested that the greatest changes to the site will occur in areas with lower value for harriers, although there were some exceptions to this. The proposal includes changes which will improve the habitat for harriers by reducing grazing on the site which will promote vegetation growth and differentiation as well as increasing the diversity of habitats present by introducing small areas of woodland and scrub outside of the woodland areas to be planted. Hen harriers prefer habitat mosaics so increasing the diversity across the development is favourable for them.

Additionally habitat changes in the short and medium term is likely to increase prey availability across planted areas; these will decline as canopy closes, but edge effects will be maintained. Reduction in grazing pressure and increased habitat diversity will also likely improve the habitat for prey species.

Predator control will be undertaken to ensure that the habitat changes do not result in an increase on predation on vulnerable nests. Measures were also identified to ensure that disturbance during planting or management is restricted to protect breeding Hen harriers.

As a result, there are no adverse significant effects identified for Hen harriers and thus the SPA. Significant beneficial effects were identified in relation to the increase in habitat quality for Hen harrier as a result of the changes in habitat and grazing pressures on the Proposed Development.

4 Summary Conclusion

The Proposed Development has been carefully designed to minimise environmental impact and overall the Proposed Development is considered to have **beneficial** significant impacts on biodiversity and nature conservation (in terms of the EIA Regulations).

5 References

Atmos Consulting Ltd (2019) *Volume 1 EIA Report, Main Text; Confidential.*

Atmos Consulting Ltd (2019) *Volume 1 EIA Report, Main Text; Non- confidential.*

Forestry Commission Scotland, 2018, EIA for Forestry Projects.

Scottish Government, (2017) Forestry (EIA) (Scotland) Regulations 2017.