Loch Buidhe 400 kV Substation

EIA Scoping Request

February 2024

Scottish & Southern Electricity Networks

TRANSMISSION

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1. INTRODUCTION

1.1 The Proposal

1.1.1 Scottish Hydro Electric Transmission plc, operating and known as Scottish and Southern Electricity Networks Transmission (SSEN Transmission), is the electricity transmission licence holder in the north of Scotland and has a duty under Section 9(2) of the Electricity Act 1989 to 'develop and maintain an efficient, coordinated and economical system of electricity transmission and to facilitate competition in the generation and supply of electricity.' SSEN Transmission also has obligations to offer non-discriminatory terms for connection to the transmission system, both for new generation and for new sources of electricity demand.

1.1.2 Renewable energy generation volumes connecting to the SSEN Transmission licensed area, particularly offshore wind, are expected to increase towards the end of the decade and into the 2030s. Most of this is likely to connect to the far north of the SSEN Transmission network thus requiring additional capacity to the north of Beauly to meet this demand. The Network Options Assessment (NOA) undertaken by the National Grid Electricity System Operator (NGESO) is one of the documents that sit under the Pathway to 2030: A Holistic Network Design (HND) to support offshore wind deployment for net zero. The NOA 2021/22 Refresh is an update to the NOA 2021/22 that was published in January 2022 in accordance with standard condition C27 of the NGESO transmission licence. It now fully integrates the HND's offshore network and confirms the wider onshore network requirements.

1.1.3 Together, the HND and the NOA 2021/22 Refresh have identified 94 schemes that are required to meet the Government's ambition for 50 GW of offshore wind by 2030. This comprises of 56 schemes that have been identified as HND essential options (options needed for 2030 for delivery of 50 GW offshore wind), and 38 optimal schemes from this NOA 2021/22 Refresh analysis.

1.1.4 NOA Option BLN4 identifies the requirement to reinforce the electricity transmission network between Beauly Substation and the existing Loch Buidhe Substation. This network reinforcement also triggers the requirement to construct new standalone substations at Spittal, Loch Buidhe and Beauly to be capable of operating at 400kV.

1.1.5 The scope of this EIA Scoping Report is the new substation at Loch Buidhe only. The new substations at Beauly and Spittal are being progressed as separate projects and are therefore outwith the scope of this EIA Scoping Report. It should be noted, however, that due to these projects being intrinsically linked that development work and external stakeholder engagement will be undertaken in parallel.

1.1.6 SSEN Transmission (hereafter referred to as 'the Applicant') is seeking planning permission from The Highland Council (THC) under the provisions of the Town and Country Planning (Scotland) Act 1997 (as amended) for construction and operation of the proposed new 400kV Loch Buidhe Substation (hereby referred to as 'the Proposed Development').The Applicant is voluntarily progressing the Proposed Development as EIA development due to the connection with the proposed 400 kV electricity transmission network which is a Schedule 1 Development.

1.2 The EIA Regulations

1.2.1 The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, hereafter referred to as the "Environmental Impact Assessment (EIA) Regulations", contains six schedules. Schedule 1 lists projects where EIA is mandatory. Schedule 2 lists projects where EIA may be required 'where proposed development is considered likely to give rise to significant effects on the environment by virtue of factors such as its nature, size or location'.

1.3 Purpose of the EIA Scoping Report

1.3.1 The purpose of this EIA Scoping Report is to ensure that the subsequent EIA is focused on the key impacts likely to give rise to significant adverse effects. As well as identifying aspects to be considered in the EIA this document also identifies those aspects that are not considered necessary to assess further and therefore could,

in the Applicant's view, be scoped out of the EIA. All relevant environmental issues are identified to confirm that the assessment process described will meet legislative requirements.

1.3.2 In accordance with Regulation 17(2) of the "EIA Regulations", this EIA Scoping Report contains:

- A plan sufficient to identify the Site which is the subject of the Proposed Development;
- A brief description of the nature and purpose of the Proposed Development and it its possible effects on the environment; and
- Such other information or representations as the person making the request may wish to provide or make.

1.3.3 This EIA Scoping Report has been issued to THC under the provisions of the Town and Country Planning (Scotland) Act 1997 (as amended) to inform the preparation of their Scoping Opinion.

1.3.4 The Applicant suggests that, as part of the process of consultation required under Regulation 17(4), THC invites consultees to comment on the following key questions:

- What environmental information do you hold or are aware of that will assist in the EIA described here?
- Do you agree with the proposed approach for baseline collection, prediction and significance assessment?
- Are there any key issues or possible effects which have been omitted?
- Do you agree with the list of issues to be scoped out, and the rationale behind the decision?
- Of those issues identified for assessment, which do you consider the most important/material and which the least?

1.4 Scoping Report Methodology

1.4.1 This EIA Scoping Report presents the findings of an initial appraisal of the likely environmental effects of the Proposed Development on the receiving environment, in order to inform THC's decision on the necessary scope and level of detail of information to be provided in the EIA report. It provides a basic overview of the baseline conditions as understood at the time of writing and the likely potential effects as a result of the Proposed Development. Where site survey and further assessment are deemed necessary, the methodologies are described. Environmental topics included for initial assessment in this EIA Scoping Report are:

- Landscape and Visual Impact;
- Ecology, Ornithology and Nature Conservation;
- Forestry;
- Cultural Heritage;
- Traffic and Transport;
- Geology, Hydrology, Hydrogeology and Soils;
- Noise and Vibration; and
- Land Use, Amenity and Socio-economics.

2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 Introduction

2.1.1 This chapter provides a description of the main elements of the Proposed Development.

2.2 Proposed Development

2.2.1 The Proposed Development is located approximately 9.5 km north-east of Bonar Bridge (see **Appendix A, Figure 2.1**). The specific location of the new substation (hereafter referred to as the 'the Site') is immediately adjacent to the south-western boundary of the existing 275 kV Loch Buidhe Substation. The Site is in an area of commercial forestry, which has already been partially cleared. Lochbuie Road runs to the west of the Site.

2.2.2 The Proposed Development would consist of:

- The construction of a new bellmouth and access road to the Proposed Development from the public highway;
- The construction of a temporary construction compound;
- The construction of a new level platform (approximately 616 m by 324 m) through cut and fill earthworks upon which an outdoor, air insulated switchgear (AIS), 400 kV substation complete with 400 kV double busbar arrangement will be installed;
- Installation of three new super grid transformers (SGT) and other associated equipment;
- A new substation control building;
- Installation of underground cables (UGC) to connect the Proposed Development to the existing Loch Buidhe Substation; and
- Erection of a 2.4 m high palisade security fence around the perimeter of the platform.

2.2.3 Any peat restoration potentially required off site in order to mitigate for the effects of the Proposed Development will be subject to separate consent if required and will not be assessed in the EIA. This is because sufficient detail on these mitigation areas may not be known at the time of the proposed planning application.

2.3 Construction Programme

2.3.1 Subject to planning permission and other required consents and approvals being granted, the indicative construction programme for the Proposed Development is as follows:

- Construction start: January 2026; and
- Operation: January 2029.

2.3.2 The detailed construction phasing and programme would be subject to change as the design progresses and necessary consents and wayleaves are agreed.

GEMPs

2.3.3 General Environmental Management Plans (GEMPs) have been developed by the Applicant. The GEMPs considered relevant to this project are provided in **Appendix B** and all construction work will be undertaken in accordance with these.

SPPs

2.3.4 Species Protection Plans (SPPs) have been developed by the Applicant and have been agreed with Nature Scot. These are provided in **Appendix C** and will be implemented during construction of the Proposed Development.

CEMPs

2.3.5 A Construction Environment Management Plan (CEMP) will be developed for the Proposed Development by the Principal Contractor in consultation with the Applicant, and key consultees as required. The principal objective of this document will be to provide information on the proposed infrastructure and to aid in avoiding,

minimising and controlling adverse environmental impacts associated with the Proposed Development. Furthermore, this document will aim to define good practice as well as specific actions required to implement mitigation identified in the EIA, the planning process and / or other licencing or consenting processes. Mitigation measures relevant to the Proposed Development will be incorporated into the overall CEMP for the Proposed Development. The CEMP will be prepared during the pre-construction phase and form part of the contractual requirements between the Applicant and the Principal Contractor.

2.4 Construction practices and phasing

Phase 1 - Enabling works

Road improvements and Access

2.4.1 Detailed access proposals will be developed by the Principal Contractor (once appointed). In general, based on desk study analysis and preliminary walkover inspections, access will be established through a new bellmouth and access road to the Proposed Development from the public highway.

2.4.2 The access strategy has not yet been determined. It will be included in the EIA and application for Planning Permission. It is anticipated that access will be achieved from the existing road network and no further amendments to the existing network will be required.

Temporary Site Compound

2.4.3 It is currently anticipated that a single main construction compound will be required, the location of which will be confirmed by the Principal Contractor.

Forestry Clearance

2.4.4 Construction would require the removal of sections of commercial forest, which would be undertaken in consultation with Scottish Forestry and the affected landowner.

2.4.5 After felling, any timber removed that is commercially viable would be sold and the remaining forest material would be dealt with in a way that delivers the best practicable environmental outcome and is compliant with waste regulations.

Phase 2 – Construction works

2.4.6 This phase would comprise:

- Installation of temporary construction drainage;
- Creation of a level platform through cut and fill earthworks;
- Installation of the control building and other infrastructure foundations;
- Installation of permanent site drainage;
- Erection of control building;
- Installation of new 2.4 m palisade security fencing with a 1.6m electrified anti-climbing extension and new gates; and
- Installation of electrical plant.

Phase 3 - Commissioning

2.4.7 The Proposed Development would be subject to an inspection and snagging process. This allows the Principal Contractor and the Applicant to check that the works have been built to specification and are safe to energise. The Proposed Development would also go through a commissioning procedure for the switchgear, communications, and protection controls through the substation. The circuits would then be energised so the Proposed Development can be connected to the National Grid.

Phase 4 - Reinstatement

2.4.8 Following commissioning of the Proposed Development, all construction sites will be reinstated. Reinstatement will form part of the contract obligations for the Principal Contractor and will include the removal of all temporary

access tracks and compounds, all work sites and replanting in accordance with a Landscape Design Plan that will be submitted for approval as part of the application for planning permission.

2.4.9 The following principles will inform the approach to reinstatement of all sites:

- Best practice will be followed for reinstatement of all sites; and
- Reinstatement principles are detailed in the GEMP (see **Appendix B**).

Reinstatement of Access Tracks

2.4.10 Reinstatement would involve replacement of topsoil, grading and installation of drainage as required. Graded areas would be allowed to vegetate naturally, although some seeding with a suitable upland seed mix may be required to stabilise sites.

2.4.11 Each site will be allowed to re-vegetate naturally wherever possible.

Reinstatement of Construction Compound(s)

2.4.12 Construction compound site(s) will be reinstated at the end of construction with all buildings and materials removed and all soils and peatland appropriately reinstated.

2.5 Construction Employment and Hours of Work

2.5.1 The Applicant takes community responsibilities seriously. The delivery of a major programme of capital investment provides the opportunity to maximise support of local communities.

2.5.2 Employment of construction staff will be the responsibility of the Principal Contractor but the Applicant encourages the Principal Contractor to make use of suitable labour and resources from areas local to the location of the works.

2.5.3 It is envisaged that there will be a number of separate teams working at the same time at different locations within the Proposed Development. The resource levels will be dependent on the final construction sequence and will be determined by the Principal Contractor.

2.5.4 Construction working is likely to be during daytime periods only. Working hours are currently anticipated between approximately 07.00 to 19.00 in summer and 07.30 to 17.00 (or within daylight hours) in winter. Any out of hours working would be agreed in advance with THC.

2.6 Construction Traffic

2.6.1 The construction will give rise to regular numbers of staff transport movements, with work crews travelling to work site areas. It is anticipated that the Principal Contractor will identify a single main compound area, with a safe area for parking away from the public highway.

2.6.2 Vehicle movements will be required to construct new or upgraded access roads; deliver the foundation materials to site; deliver and collect materials and construction plant from the main site compound (as listed in **Section 2.4**).

2.7 Operation and Management

Life of the Proposed Development

2.7.1 The Applicant is seeking planning permission for the Proposed Development in perpetuity. It is anticipated that the substation plant has a design life of approximately 40 years, after which it will be replaced with new equipment designed and installed to the relevant engineering specifications and environmental standards.

Maintenance Programme

2.7.2 Once operational, it is likely that monthly site visits would be made to the Proposed Development by maintenance personnel to undertake routine checks and operational switching. More specialist works, such as maintenance repairs or environmental management, will be required sporadically.

2.7.3 Residues and Emissions

2.7.4 **Table 2.1** provides a summary of the anticipated residues and emissions for the purpose of informing the scope of the EIA.

Table 2.1: Residues and Emissions

Topic	Potential residue/emission
Water	Construction: Surface water runoff and discharge is likely during construction. Pollution sources may arise as a result of soil erosion or from oil/ fuel or chemical storage and use. Operation: No water emissions or pollution sources have been identified for the operational phase.
Air	Construction: The construction phase would require the transport of people and materials by road, with associated emissions to the atmosphere. There are no air quality management areas within the vicinity of the Proposed Development. No significant air emissions are anticipated. Construction dust will be mitigated as part of the CEMP. Operation: Due to the nature of the Proposed Development no significant point source or diffuse air emissions would be produced during its operation. The Proposed Development would contribute to connecting renewable electricity generation capacity to the transmission network, in turn displacing emissions associated with fossil fuel-based electricity generation elsewhere.
Soil and subsoil	Construction: Soil and subsoil excavation, handling and storage would be required during construction. All soil and subsoil would be stored temporarily for use in reinstatement. Operation: No requirement for soil or subsoil excavation or handling during the operation phase has been identified. No pollution sources have been identified for the operational phase.
Noise and Vibration	Construction: Possible effects associated with construction and operation of the Proposed Development include: • noise during the construction phase; and, • noise due to construction traffic. Operation: Due to the nature of the Proposed Development no significant noise emissions are anticipated to be produced during operation apart from the super grid transformers. This will be assessed as part of the EIA and suitable mitigation will be designed if required.
Light	Construction: The temporary construction compounds are likely to be equipped with lighting installations for use during low light conditions and passive infra-red sensor controlled security lighting. Any effect would be temporary and not expected to be significant. Operation: No light sources have been identified during normal operation of the Proposed Development.
Heat, Radiation and Electromagnetic Fields (EMF)	Construction: No heat or radiation sources have been identified during the construction phase. There will be no significant EMFs generated during construction. Operation: No significant sources of heat or radiation will be generated during operation of the Proposed Development.

Topic	Potential residue/emission
Waste	Construction: The construction stage will require felling of woodland and vegetation removal.. As such, it is anticipated that forestry related residues (brash) would result from the felling operations. Waste will be disposed of at the time it arises and in line with current legislation and best practice. Operation: Limited waste may arise from operation and maintenance in the form of brash from vegetation maintenance or due to the replacement of faulty / damaged equipment. All waste will be disposed of at the time it arises and in line with current legislation and best practice.

2.8 Decommissioning

2.8.1 The Applicant is seeking planning permission for the Proposed Development in perpetuity. As such, no separate assessment of decommissioning will be presented in the EIA report as it is a permanent facility.

3. EIA APPROACH AND METHODOLOGY

3.1 Introduction

3.1.1 This chapter sets out the approach that will be taken to complete the EIA of the Proposed Development, including reference to legal requirements, best practice and the assessment of parameters.

3.1.2 The EIA Report will contain the information specified in Schedule 4 of the EIA Regulations. The approach to the assessment has been informed by current best practice guidance[1][2].

3.1.3 A detailed overview of the guidance and methodology adopted for each technical study is provided within the respective technical chapters of this Scoping Report (**Chapters 4 - 11**). Each technical chapter also outlines what has already done to inform the initial assessment of effects for the Scoping Opinion.

3.2 Identification Of Baseline

3.2.1 To identify the scale of likely significant effects as a result of the Proposed Development, it is necessary to establish the existing baseline environmental conditions.

3.2.2 The baseline scenario will be established through the following methods, where relevant:

- Desk-based studies;
- Review of existing information;
- Site visits and surveys;
- Modelling;
- Review of relevant national and local planning policies;
- Consultation with the relevant statutory consultees;
- Identification of Sensitive Receptors;
- Vantage Point Surveys; and
- Protected species and habitat surveys.

3.2.3 Consistent with the EIA Regulations, an identification of the aspects of the environment likely to be significantly affected by the Proposed Development has been undertaken to inform this EIA Scoping Report. In particular, this focused on potential impacts upon population, fauna, flora, soil, material assets including the architectural and archaeological heritage, landscape and inter-relationship between those factors.

3.3 Assessment of Likely Significant Environmental Effects

3.3.1 For the purposes of this EIA Report the terms used in the assessment of effects are generally defined as follows:

- 'Impact' is specific and defined as the action being taken, for example, cutting down trees.
- 'Effect' is defined as the change resulting from that action.

3.3.2 Where a more specific definition of the above terms is applicable to a technical discipline this will be clearly outlined within the technical chapters.

3.3.3 When identifying likely significant effects, all types of effect, such as beneficial and adverse, will be included. As stated in Institute of Environmental Management and Assessment (IEMA) 'Guidelines for Landscape and Visual Impact Assessment 3 (GLVIA3), 'identifying significant effects stresses the need for an approach that is in proportion to the scale of the project that is being assessed and the nature of its likely effects. Judgement needs to be exercised at all stages in terms of the scale of the investigation that is appropriate and proportional.'

[1] Planning Advice Note 1/2013: Environmental Impact Assessment
[2] Planning Circular 1/2017: Environmental Impact Assessment regulations 2017

3.3.4 The result of the assessment is the determination of whether the likely effect of the Proposed Development on the receptor in the study area would be significant or not significant, and adverse or beneficial.

Several criteria have been used to determine whether or not the likely environmental effects of the Proposed Development will be deemed 'significant'. The effects have been assessed quantitatively where possible. Generally, the significance of effects has been assessed using one of more of the following criteria:

- International, national and local standards;
- Sensitivity of receiving environment;
- Extent and magnitude of the effect; and
- Reversibility and duration of the effect.

3.3.5 Where no published standards exist, the assessments presented in the technical chapters will describe the professional judgements (assumptions and value systems) that underpin the attribution of significance. For certain technical topics, such as ecology, widely recognised published significance criteria and associated terminology have been applied and these are presented in the technical chapters and associated appendices where relevant.

3.3.6 The assessment of significance will consider the magnitude of change (from the baseline conditions), the sensitivity of the affected environment/receptors and (in terms of determining residual effects) the extent to which mitigation and enhancement will reduce or reverse adverse effects. In addition, further influences such as those listed below will be factored into the assessment using professional judgement:

- Likelihood of occurrence
- Geographical extent
- The value of the affected resource
- Adherence of the proposals to legislation and planning policy
- Reversibility and duration of the effect

3.3.7 The magnitude (scale) of change for each effect will be identified and predicted as a deviation from the established baseline conditions, for the construction and operational phases of the Proposed Development.

3.3.8 The sensitivity of the receptor / receiving environment to change will be determined using professional judgement, consideration of existing designations (such as Sites of Special Scientific Interest (SSSIs)) and quantifiable data, where possible.

3.3.9 Each effect will be assessed taking account of the predicted magnitude of change and the sensitivity of the receptor as shown in **Table 3.1** below to determine an overall significance.

Table 3.1: Matrix for Determining the Significance of Effects

		Sensitivity of Receptor/Receiving Environment to Change/Effect			
		High	**Medium**	**Low**	**Negligible**
Magnitude of Change/Effect	**High**	**Major**	**Major**	**Moderate**	Negligible
	Medium	**Major**	**Moderate**	Minor	Negligible
	Low	**Moderate**	Minor	Minor	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

3.3.10 Major and moderate effects are considered to be significant in the context of the EIA Regulations. Minor and negligible effects are not considered significant.

3.3.11 Specific criteria have been adopted for certain technical assessments in accordance with widely recognised EIA guidelines published by professional bodies (such as for landscape and visual impact assessment and the assessment of ecological effects), and, where applicable, these will be provided in the respective technical chapters.

3.3.12 The characteristics of an effect will vary depending on the duration of the activity causing the effect, the sensitivity of the receptor and the resultant change. It is therefore necessary to assess whether the effect is temporary or permanent and beneficial or adverse. Effects that are temporary are usually reversible and generally confined to the construction period.

3.4 Identification of Mitigation Measures

3.4.1 Following the initial assessment, mitigation measures will be recommended to prevent, reduce or remedy any significant adverse environmental effects identified. Such measures would be implemented during design, construction and/or operation of the Proposed Development. Each technical chapter will detail the measures recommended to mitigate any identified significant adverse effects, and a summary of the recommended mitigation measures will be provided.

3.4.2 Following the implementation of mitigation measures, an assessment of the significance of any residual effects will be undertaken. The findings will be presented in each technical chapter of the EIA Report.

3.5 Cumulative Effects

3.5.1 There are two aspects to Cumulative Effects, defined as follows:

- *In-combination effects:* The combined effect of the Proposed Development together with other reasonably foreseeable developments (taking into consideration effects at the site preparation and earthworks, construction and operational phases); and
- *Effects Interactions:* The combined or synergistic effects caused by the combination of a number of effects on a particular receptor (taking into consideration effects at the site preparation and earthworks, construction and operational phases), which may collectively cause a more significant effect than individually. A theoretical example is the culmination of disturbance from dust, noise, vibration, artificial light, human presence and visual intrusion on sensitive fauna (e.g. certain bat species) adjacent to a construction site.

3.5.2 The potential for cumulative effects will be considered in relation to other EIA development, for which an application has been submitted or approved, within the study area relevant to each particular topic. The basis for this is that these are the developments that have the potential to result in significant cumulative environmental effects in combination with those arising from the Proposed Development. Exceptions to this rule are other developments proposed by the Applicant, which are not yet the subject of an application or consent but are foreseeable to the Applicant and relevant to this EIA. These include the proposed Spittal to Loch Buidhe to Beauly 400 kV Overhead Line (OHL) and the UGC to connect the Proposed Development to the existing Loch Buidhe Substation which are separate applications. The list of developments to be considered in the cumulative effects assessment will be finalised four months prior to publication to allow sufficient time to complete the EIA Report.

3.6 Assumptions and Limitations

3.6.1 The key assumptions and limitations applied to the preparation of this EIA Scoping Report are set out below. Assumptions and limitations specific to certain topics are identified in the appropriate technical chapter.

- Baseline conditions have been established from a variety of sources, including historical data, but due to the dynamic nature of certain aspects of the environment, conditions will change during the construction and operation of the Proposed Development;
- Information received by third parties is complete and up to date; and
- The design, construction and completed stages of the Proposed Development will satisfy minimum environmental standards, consistent with contemporary legislation, practice and knowledge.

4. LANDSCAPE AND VISUAL IMPACT ASSESSMENT

4.1 Introduction

4.1.1 This chapter sets out the proposed scope and approach to the Landscape and Visual Impact Assessment (LVIA) of potential direct and indirect effects of the Proposed Development on landscape and visual amenity receptors during the construction and operation phases. Within this chapter, preliminary baseline data is presented and potential effects that are predicted to arise as a result of the Proposed Development are outlined. The chapter also provides recommendations on receptors to be scoped in and scoped out of the LVIA.

4.1.2 Landscape and visual effects are closely linked matters which means that there is often overlap of assessment methodology, but the two topics are assessed separately. Landscape assessment deals with the assessment of effects on the landscape as a resource in its own right (addressing effects on landscape features, character designations) and assessment of effects on visual amenity addresses the effects on views and the general visual amenity experienced by people (visual receptors).

4.1.3 The chapter is supported by the following figures:

- Figure 4.1 Landscape Character and Designations;
- Figure 4.2 Visual Receptors; and
- Figure 4.3 Zone of Theoretical Visibility.

4.1.4 The study area to the LVIA will extend to include landscape and visual receptors likely to be either directly or indirectly affected by the Proposed Development. For the purposes of this Scoping Report a study area of 2 km from the Proposed Development boundary has been adopted following review of potential receptors and the extent of predicted visibility of the Proposed Development provided in **Appendix A, Figure 4.3** (this extent has been reduced from an initial study area of 5 km). The Zone of Theoretical Visibility (ZTV) has utilised a 'bare-earth' model and assumed a height of 13 m to the proposed substation location.

4.1.5 The Study Area will be re-examined and confirmed as part of the LVIA where fieldwork, further studies and confirmation of the project details will increase the understanding of the extent of likely significant effects. The extent of the study area will be informed by visibility mapping. The final extent of the Study Area will be agreed through consultation with key stakeholders.

4.1.6 The extent of the proposed study area (and relationship to landscape and visual receptors is illustrated in **Appendix A, Figures 4.1 and 4.2**.

4.2 Baseline Conditions

4.2.1 The landscape context and location of visual receptors in relation to the Proposed Development have been identified following review of Ordnance Survey mapping, aerial imagery and online mapping resources and are discussed below. The location of landscape and visual receptors relative to the Proposed Development are indicated in **Appendix A, Figures 4.1** Landscape Character and Designations and **Appendix A, Figure 4.2** Visual Receptors.

Landscape Context

4.2.2 The Proposed Development falls within upper Strath Carnaig, between Loch Buidhe to the north and Loch an Lagain to the south and extending across the afforested slopes of Meall Mor. The Site would be located immediately to the south-west of the existing Loch Buidhe 275 kV substation on the lower, north-western slopes of Meall Mor. It would be sited within an area of partially cleared commercial forestry. The Site is surrounded by additional areas of commercial forestry and moorland extending onto the summits of the surrounding hills. These hills enclose the Site and the valley area, restricting the extents of wider views. The Proposed Development would be accessed from Lochbuie Road.

Landscape Character

4.2.3 The Proposed Development would fall within the Rounded Hills – Caithness & Sutherland 135 Character Type (LCT)[3]. Key characteristics of this LCT are provided below in **Table 4.1**.

Table 4.1: NatureScot LCT Rounded Hills – Caithness & Sutherland 135

NatureScot LCT	Description
Rounded Hills – Caithness & Sutherland 135	• *"Rolling hills forming broad, subtly rounded summits but with some more pronounced hills also occurring, these often featuring steeper slopes along the coast or where deeply truncated by deep glens;* • *Predominantly dense heather ground cover and mooorland grasses, but also some areas of bog;* • *Fragments of broadleaf woodland in inaccessible locations;* • *Scarcely settled with a largly uninhabitated interior and widely scattered crofts and farms on lower slopes adjoining straths and farmed landscapes;* • *Wind farms located in more accessible and generally lower rolling hills, either close to extensive forestry or the high voltage transmission line aligned broadly parallel to the south-east Sutherland coast;* • *Convex character of hill slopes limiting distant visibility and views of the hill tops when travelling through the landscape;* • *Views into the interior of the hils very restricted* • *Strong sense of wild character can be experienced within the more remote and littlemodified parts of this landscape*

Designated & Protected Landscapes

4.2.4 The Proposed Development is not located within a designated landscape and there are no designated landscapes (National Scenic Areas or Special Landscape Areas) within the proposed study area (as shown in **Appendix A, Figure 4.1**).

Visual Amenity

4.2.5 The indicative ZTV provided in **Appendix A, Figure 4.3** illustrates the likely extent of visibility of the Proposed Development and the location of potential visual receptors. The ZTV is presented on Ordnance Survey (OS) mapping and illustrates the potential visual envelope of the proposed substation at a height of 13 m. This is an indicative height which has been applied across the full extent of the Proposed Development as the layout has not yet been established and is therefore a 'worst case' scenario.

4.2.6 The ZTV illustrates a relatively confined visual envelope with the greatest potential for visibility occurring in the immediate surroundings of Sallachy (500 m west) and Sidhean Mor (750 m south-west), and to the north of Loch Buidhe extending to Garvery and east of Cnoc Garb-arigh beyond the 2 km study area. The limited extent of visibility of the Proposed Development is a result of the enclosed nature of the glen and the surrounding small hills and ridges that are a feature of this landscape. Where views occur of the Proposed Development it is likely that it will largely be viewed in combination with the existing 275 kV Loch Buidhe Substation.

4.2.7 Visual receptors likely to experience visibility of the Proposed Development include:

- Users of Lochbuie Road that adjoins the access road to the Site and passes through the glen; and
- Residential receptors in the vicinity of Sleastary approximately 2 km to the south-west.

[3] NatureScot, *Landscape Character Assessment of Scotland* (2019) Available online: https://www.nature.scot/sites/default/files/LCA/LCT%20135%20-%20Rounded%20Hills%20-%20Caithness%20&%20Sutherland%20-%20Final%20pdf.pdf (Accessed 03/03/2023))

4.2.8 The extent of likely visibility of the Proposed Development will be confirmed and illustrated as part of the LVIA following confirmation of the location and design of the substation.

4.3 Sensitive Receptors

Landscape

4.3.1 The existing baseline landscape character of the Site and the wider Rounded Hills – Caithness & Sutherland 135 would have some sensitivity to the Proposed Development as it is the 'host' landscape character unit.

Visual Receptors

4.3.2 As summarised above, the following visual receptors have been identified as particularly sensitive visual receptors due to their proximity to the Proposed Development:

- Residential receptors in the vicinity of Sleastary approximately 2 km to the south-west; and
- Users of Lochbuie Road.

Provisional Viewpoints

4.3.3 To provide illustrative views of the landscape context to the Proposed Development and inform the Visual Impact Assessment the LVIA will be supported by viewpoint assessment, A preliminary viewpoint list of viewpoints to be considered for the LVIA is included in **Table 4.2** below. The locations of the viewpoints relative to the Proposed Development are shown in **Appendix A, Figure 4.3**. The location and number of viewpoints to be included as part of the LVIA will be established through fieldwork and consultation with THC and NatureScot.

Table 4.2 Preliminary Viewpoint Locations

Viewpoint Number	Viewpoint Location and Grid Co-ordinates	Reason for Selection
1	500 m north E 265211, W 898202	Viewpoint is representative of views from Lochbuie Road that extends north of the Proposed Development, south of Loch Buidhe, and illustrates the baseline landscape context.
2	250 m south-west E 264764, W 897693	Viewpoint is representative of a sequential view from Lochbuie road to the south-west of the existing 275 kV Loch Buidhe Substation and west of the Proposed Development.
3	750 m south-west E 264426, W 896790	Viewpoint is taken from a residential access track and is representative of the wider landscape context and the visual amenity of residential properties on the lower slopes of Sidhean Mor.
4	2km south-west E 264135, W 895376	Viewpoint is representative of a sequential view from Lochbuie Road from the full extent of the 2 km study area towards the existing 275 kV Loch Buidhe Substation and Proposed Development.

4.4 Issues Scoped Out

4.4.1 It is proposed that only receptors which are likely to experience a significant effect resulting from the Proposed Development be addressed as part of the LVIA. In this regard it is proposed that the receptors identified in **Table 4.3** below be scoped in, and scoped out, of the assessment.

Table 4.3: Summary of Landscape and Visual Receptors to be Scoped in and Scoped Out

Receptor or Element	Scoped In	Scoped Out
Landscape Character and Designations	Landscape Character units falling within the 2 km study area including the 'host' LCT Rounded Hills – Caithness & Sutherland 135.	Landscape character and designations beyond the extents of the 2 km study area.

Receptor or Element	Scoped In	Scoped Out
Visual Receptors	Visual amenity of users of local paths and roads falling within the 2 km study area. Visual amenity of residents falling within the 2 km study area.	Visual amenity of users of local paths and roads beyond 2 km of the Proposed Development. Visual Amenity of residents beyond 2 km of the Proposed Development.

4.5 Potential Significant Effects

4.5.1 The potential significant effects identified for the different phases of the Proposed Development include:

Construction:

- Temporary direct and indirect landscape effects on landscape character both within the Site and at the local level due to the change in land use from commercial forestry to the construction of the Proposed Development and increase in traffic and machinery; and
- Temporary effects on the visual amenity of users of Lochbuie Road adjoining the Site and people undertaking recreational activities such as fishing at Loch Buidhe who would have views to construction activities and traffic movements and potentially construction lighting.

Operation:

- Effects on landscape character both within the Site and at the local level at Year 1, although these effects would reduce over time as visual screening and additional landscape establish and mature.
- Potential effects on the Rounded Hills – Caithness & Sutherland 135 LCT from the change in land use from commercial forestry to transmission. This would be mitigated for by landscape planting which would create a graded edge to the forestry following construction. This would provide some filtering to views if additional felling of the forestry is required; and
- Effects on the visual amenity of users of Lochbuie Road in Year 1, although these effects would reduce over time as visual screening and additional landscape establish and mature.

4.5.2 The LVIA will consider the potential effects resulting from the temporary construction phase, temporary vehicular routes for construction vehicles and temporary laydown area close to the Proposed Development. This will be followed by assessment of the long term / permanent effects resulting from the operational stage of the Proposed Development, comprising the new structure, permanent access tracks, signage, fencing and landscaping including potential ground modelling associated with the Proposed Development.

4.5.3 Significant effects on landscape / visual receptors are typically more likely where the following criteria are met:

- The Proposed Development results in large scale changes which introduce new or discordant elements into the landscape or view, rather than the introduction of small features similar to those already present;
- Effects on views from recognised and important viewpoints or amenity routes; and
- Large numbers of people are affected or the landscape in which people are located is of the highest sensitivity or scenic quality.

4.5.4 In this instance, the potential for significant effects on the landscape and visual resource as a result of the Proposed Development is expected to be relatively localised given the nature of the works (close to an existing overhead line) and the remote nature of the location (with limited settlement / visual receptors in the surrounding area). The main effects are anticipated to relate to the temporary and / or long-term effects on landscape character and views from sensitive receptors, such as residential properties, recreational receptors on core paths or at promoted hill top locations in closest proximity to the Proposed Development.

4.5.5 The LVIA will describe the overall effects on each receptor, with a clear narrative to explain the justification in a transparent manner. For each receptor, a conclusion will be drawn on whether the effect is significant or not.

4.6 Assessment Methodology

General

4.6.1 The landscape and visual assessments will be completed in accordance with the Guidelines for Landscape and Visual Impact Assessment published by the Landscape Institute and IEMA (3rd edition, 2013) and follow good practice guidance provided in the following sources (where appropriate):

- Landscape Institute (2021), 'Assessing landscape value outside national designations', Technical Guidance Note 02/21[4];
- Landscape Institute (2019), 'Visual Representation of Development Proposals', Technical Guidance Note[5];
- Landscape Institute (2019), Residential Visual Amenity Assessment TGN 2/19[6]; and
- NatureScot Landscape Character Assessment for Scotland (2019)[7].

4.6.2 The LVIA will be undertaken by a chartered landscape architect.

Visualisations

4.6.3 The format for presentation of visualisations supporting the LVIA will be agreed as part of the consultation process with key stakeholders. As a minimum all viewpoint photography will be taken in accordance with the Landscape Institute's Technical Guidance Note 06/19 'Visual Representation of Development Proposals'. Through the consultation process any need to illustrate the Proposed Development at different stages of the project or to illustrate seasonal variation will be confirmed.

Mitigation

4.6.4 As the LVIA is progressed the assessment will inform the development of opportunities for the mitigation of impacts resulting from the Proposed Development on Landscape and Visual receptors in addition to other related environmental considerations. In general, mitigation measures will seek to ensure that the Proposed Development takes account of all environmental constraints and opportunities and achieves an optimum environmental fit. These measures will be described in the LVIA.

4.6.5 It should be noted however that the nature of the Proposed Development means that some effects on landscape and visual receptors will be unavoidable. In this situation additional mitigation measures will be identified where possible in order to reduce the level of any predicted significant adverse impacts.

4.7 Questions to Key Stakeholders

4.7.1 In light of the findings of the initial desktop studies and preliminary identification of landscape and visual receptors, the following consultation questions are suggested for THC to ensure that the proposed methodologies and assessment are carried out in a robust manner and to the satisfaction of the determining authority:

- Do you have any comments on the proposed LVIA methodology?
- Do you consider there are any relevant policies or guidance documents not specifically mentioned in this chapter that should be taken into account when preparing the LVIA?
- Do you agree with the proposed 2 km study area?
- Do you agree with the aspects to be scoped in, and out, of the assessment?

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[4] Landscape Institute (2021), *Assessing landscape value outside national designations, Technical Guidance Note 02/21*. Available online at TGN 02-21: Assessing landscape value outside national designations | Landscape Institute (Accessed 03/08/2023))

[5] The Landscape Institute, *Visual Representation of Development Proposals, Technical Guidance Note 06/19*, 17th September 2019.

[6] Landscape Institute, *Residential Visual Amenity Assessment (RVAA) Technical Guidance Note 02/19* 15th March 2019. Available online at: https://landscapewpstorage01.blob.core.windows.net/www-landscapeinstitute-org/2019/03/tgn-02-2019-rvaa.pdf (Accessed 03/08/2023))

[7] NatureScot, *Landscape Character Assessment of Scotland* (2019) Available online: https://www.nature.scot/sites/default/files/LCA/LCT%20135%20-%20Rounded%20Hills%20-%20Caithness%20&%20Sutherland%20-%20Final%20pdf.pdf (Accessed 03/03/2023))

- Do you agree with the proposed viewpoint locations shown in **Table 4.2** and illustrated on **Appendix A, Figure 4.3**? Are there any additional viewpoints that should be considered?

5. ECOLOGY, ORNITHOLOGY AND NATURE CONSERVATION

5.1 Introduction

5.1.1 This chapter will consider the potential effects of the Proposed Development on habitats and species, including ornithology receptors, at the Proposed Development Site and within the wider local area. Evaluation of the existing baseline environment will be made through a combination of a desk-based study, field surveys and consultation. This chapter:

- Describes the key ecological and ornithological issues associated with construction and operation of the Proposed Development;
- Presents the proposed survey methods that will be used to generate ecological baseline information;
- Outlines the proposed approach to the ecological impact assessments (as part of the wider EIA);
- Outlines the proposed approach to biodiversity net gain (BNG); and
- Includes details of any consultation undertaken to date to inform the scoping.

5.2 Baseline Conditions

Desk Study

5.2.1 The Proposed Development baseline is informed by a range of published and publicly available data sources including:

- NatureScot SiteLink[8] data on designated sites and notable species in Scotland;
- NatureScot Scottish Biodiversity List (SBL)[9] - a list of species which are important for Scotland's biodiversity;
- Scotland's Environment Web Map[10] - an interactive map which shows biodiversity areas across Scotland;
- National Biodiversity Network (NBN) Atlas[11] - a national interactive map that shows biodiversity areas;
- Highland Biological Recording Group (HBRG) data on protected species along the proposed LT132 Spittal – Loch Buidhe – Beauly OHL 400 kV Reinforcement, including the Proposed Development;
- RSPB Bird Species data, for relevant bird species within a 6 km buffer from the Proposed Development, and proposed LT132 Spittal – Loch Buidhe – Beauly OHL 400 kV Reinforcement; and
- Highland Raptor Study Group (HRSG) data, containing records of Schedule 1 raptors relevant to the Proposed Development.

5.3 Sensitive Receptors

5.3.1 The ecological and ornithological baseline will be used to identify the sensitive ecological and ornithology receptors that could be affected by the construction and operation of the Proposed Development.

Designated Sites

5.3.2 The search area for designated sites is 5 km, except for SPAs, proposed SPAs, and other designations whose qualifying features include bird species or with potential hydrological connectivity.

5.3.3 The search areas for designated sites with ornithological interest are informed by the connectivity distances for the designated features, as defined by NatureScot[12]. The connectivity distance is the distance that species are

8 NatureScot SiteLink. Available at https://www.nature.scot/information-hub/snhi-data-services

9 NatureScot Scottish Biodiversity List. Available at https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list

10 Scotland's Environment Web Map. Available at https://map.environment.gov.scot/sewebmap/

11 National Biodiversity Network Trust (2023). The National Biodiversity Network (NBN) Atlas. Available at https://nbnatlas.org/

12 NatureScot (2016) Assessing Connectivity with Special Protection Areas (SPAs) – Guidance. Version 3, June 2016. NatureScot, Battleby. Available at https://www.nature.scot/doc/assessing-connectivity-special-protection-areas

likely to disperse or forage outside of their home range (not including migration). For species not listed in the NatureScot connectivity distance guidance, a precautionary search area of 10 km has been used.

5.3.4 For sites with potential hydrological connectivity, a precautionary search area of 10 km has been used. See also **Chapter 9: Geology, Hydrology, Hydrogeology and Soils**.

5.3.5 Any designated sites identified with no connectivity have been screened out and are not discussed within this report.

5.3.6 A review of the available data outlined in **Section 5.2.1**. has identified the designated sites listed in **Table 5.1**. No locally designated sites were identified within 5 km of the Proposed Development.

Table 5.1: Designated Sites relevant to the Proposed Development

Site	Features / Description	Proximity to the Proposed Development
Strath Carnaig and Strath Fleet Moors SPA and SSSI	Designated for supporting Annex 1 species, breeding hen harrier (*Circus cyaneus*). The site supports 12 breeding pairs (mean value between 2002-2004), representing about 2.5% of a GB population of 483 pairs.	The Proposed Development is entirely within this site
Dornoch Firth and Loch Fleet SPA and Ramsar (also designated as Dornoch Firth SSSI and Loch Fleet SSSI)	The SPA and Ramsar sites are designated for regularly supporting: **Annex I species:** • Breeding osprey (*Pandion haliaetus)* forage throughout the SPA (up to 6 territories within feeding range, 6% of the GB population, with 1 pair breeding within the site, 1% of the GB population. • Bar-tailed godwit (*Limosa lapponica)* (1989/90 to 1993/94 winter peak mean of 1,184 individuals, 2% of the GB population). **Migratory birds:** • Greylag goose (*Anser anser)* (1989/90 to 1993/94 winter peak mean of 1,146 individuals, 1% of the Icelandic/UK/Ireland biogeographic population). • Wigeon (*Anas penelope)* (1989/90 to 1993/94 winter peak mean of 15,304. **Waterfowl:** Regularly supporting in excess of 20,000 individual waterfowl. In the five-year period 1989/90 to 1993/94, a winter peak mean of approximately 34,500 individual waterfowl was recorded, comprising 22,000 wildfowl and 12,500 waders, including nationally important populations of: • Curlew (*Numenius arquata)* (1,397 individuals, 1.0% of the GB population). • Teal (*Anas crecca)* (1,592 individuals, 1.0% of the GB population). • Scaup (*Aythya marila)* (123 individuals, 1% of the GB population). • Redshank (*Tringa totanus)* (1,272 individuals, 1% of the GB population). • Wigeon (*Anas penelope)* (15,304 individuals, 5% of the GB population). • Greylag goose (*Anser anser)* (1,146 individuals, 1% of the GB population).	7.8 km

Site	Features / Description	Proximity to the Proposed Development
	The Ramsar and SSSIs are also designated for their coastal habitats. The Ramsar site is additionally designated for its population of harbour seal and two vascular plants.	
River Evelix SAC	Designated for supporting the Annex II species, freshwater pearl mussel (*Margaritifera margaritifera*). The only remaining small east coast river in Scotland that supports a surviving functional population particularly within the upper reaches of the river.	200 m
Mound Alderwoods SAC and SSSI	The SAC is designated for Annex I habitat, 91E0 Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion alvae*). The SSSI is designated for wet woodland, intertidal marine habitats and saline lagoons. Breeding bird assemblage comprising populations of species characteristic of lowland open water, wetland, and riverside habitats.	7.8 km
Migdale Rock SSSI	Native pinewood and vascular plant assemblage, including the nationally scarce species pyramidal bugal *Ajuga pyramidalis*, creeping lady's-tresses *Goodyera repens*, and the nationally rare rock cinquefoil *Potentilla rupestris*.	4.2 km
Spinningdale Bog SSSI	Valley fen	4.6 km
Torboll Woods SSSI	Upland oak woodland	7.4 km

Protected and Priority Species

Bats

5.3.7 No records of bats were identified within 2 km of the Proposed Development. However, habitats present include areas of commercial forestry; woodland edge, broadleaved woodland, watercourse corridors, and grasslands which provide suitable foraging and commuting habitat for bats. Suitable roost habitat may also be present, including within broadleaved woodland.

5.3.8 All bat species in the UK are European Protected Species, with nine species of bat listed on the Scottish Biodiversity List as priority species.

Freshwater Pearl Mussel

5.3.9 No records of freshwater pearl mussel (*Margaritifera margaritifera*) were identified within 2 km of the Proposed Development.

5.3.10 Freshwater pearl mussel are a qualifying feature of the River Evelix SAC (200 m from the Proposed Development). They are also protected under the Wildlife and Countryside Act 1981 (as amended) and listed on the Scottish Biodiversity List as a priority species.

Otter

5.3.11 Records of otter *(Lutra lutra)* were identified within 2 km of the Proposed Development, predominantly associated with riparian areas. The surrounding landscape provides suitable commuting, foraging, and resting habitat for otter, particularly along rivers, burns, and lochs.

5.3.12 Otter is a European Protected Species and is listed on the Scottish Biodiversity List as a priority species.

Water Vole

5.3.13 Records of water vole (*Arvicola amphibius*) were identified within 2 km of the Proposed Development. Habitats including watercourses and ditches present within the Proposed Development and surrounding area are likely to be suitable for water vole so this species may be present.

5.3.14 Water voles are protected under the Wildlife and Countryside Act 1981 (as amended) and are listed on the Scottish Biodiversity List as a priority species.

Wildcat

5.3.15 No records of wildcat (*Felis silvestris*) were identified within the Proposed Development. Habitats including coniferous woodland, and areas of broadleaved and mixed woodland in and around the Proposed Development area could support wildcat. Wildcat is a European Protected Species and listed on the Scottish Biodiversity List as a priority species.

Pine Marten

5.3.16 No records of pine marten (*Martes martes*) were identified within the Proposed Development location. While pine marten are known make use of habitats within the Proposed Development such as conifer forest, they prefer woodlands on rocky hillsides and avoid open ground such as that to the north of the Proposed Development. While potentially suitable, the habitats present are unlikely to support pine marten. Pine Marten is a European Protected Species and on the Scottish Biodiversity list as a priority species.

Red Squirrel

5.3.17 No records of red squirrel (*Sciurus vulgaris*) were identified within the location of Proposed Development. However dreys were identified within the Proposed Development boundary during pre-construction surveys for the ground investigation works. Red squirrels make use of a range of woodland habitats such as the broadleaf and plantation woodland present within the Proposed Development and individuals are present within these forestry habitats. Red squirrel is a European Protected Species and on the Scottish Biodiversity list as a priority species.

Badger

5.3.18 No records of badger (*Meles meles*) were identified within the Proposed Development, however suitable habitat for commuting and foraging is present. Badgers are protected under the Protection of Badgers Act 1992 (as amended).

Amphibians and Reptiles

5.3.19 Records of common frog (*Rana temporaria*) was recorded in the desk study, areas surrounding the Proposed Development providing suitable terrestrial and aquatic habitat for these amphibian species.

5.3.20 No records for other amphibian and reptile species were identified through desk study, however suitable habitat for these species is present with the Proposed Development. Amphibians and reptiles are protected under the Wildlife and Countryside Act 1981 (as amended).

Birds

5.3.21 The Strath Carnaig and Strath Fleet Moors SPA and SSSI, which the Proposed Development is located within, is designated for breeding hen harrier. Records received from RSPB and HRSG confirm the presence of breeding hen harrier within the SPA and records from HRSG also confirm the presence of breeding peregrine falcon (*Falco peregrinus*) within 2 km of the Proposed Development.

5.3.22 Although not a feature of the SPA, wintering hen harrier are also likely to use the habitats within the Strath Carnaig and Strath Fleet Moors SPA and SSSI, including the potential presence of communal winter roosts. RSPB records also confirm recent or historical breeding records of the Wildlife and Countryside Act 1981 (as amended) Schedule 1 and Bird Directive Annex I species red-throated diver (*Gavia stellata*), black throated diver (*Gavia arctica*) and wood sandpiper (*Tringa glareola*) within 5 km of the Proposed Development.

The Proposed Development is within coniferous woodland plantation which is likely to support a relatively limited breeding bird assemblage, however the heathland and upland habitats in the surrounding area are suitable to support a range of upland breeding species such as meadow pipit (*Anthus pratensis*) and wheatear (*Oenanthe oenanthe*). Red List Birds of Conservation Concern recorded within 2 km of the Proposed Development include black grouse (*Lyrurus tetrix*) leks as well as breeding twite (*Linaria flavirostris*).

Habitats

5.3.23 Habitats present within the Proposed Development are predominantly coniferous plantation woodland and recently felled conifer plantation, with areas of grassland and heathland habitats, and watercourses including drainage ditches and burns.

5.3.24 No Annex 1 habitats have been identified from desk study or surveys undertaken. Low, Moderate and High potential groundwater dependent terrestrial ecosystems (GWDTE) habitats were identified during the Extended Phase 1 Habitat Survey and corresponding National Vegetation Classification (NVC) Survey (**see Section 5.6.1**). Assessment will be undertaken as part of the EIA. Further details on the assessment of GWDTE are presented in **Chapter 9: Geology, Hydrology, Hydrogeology and Soils**.

Invasive Species

5.3.25 No invasive species have been identified, however, in the absence of survey there is potential for these to be present.

5.4 Issues Scoped Out

5.4.1 It is considered that all ecological features identified within this report could be affected by lighting, noise, dust and visual disturbance caused by construction activities. However, it is considered reasonable to expect that these potential effects are managed through standard practice construction methods and guidance. In addition, a CEMP as well as the Applicant's GEMPs and SPPs will be produced (see **Appendix B and C**). These will capture all mitigation measures required in respect of ecological features to be implemented on Site, both as a result of the EIA and in order to comply with relevant legislation mentioned above. The implementation and audit of these measures will be overseen by an Ecological Clerk of Works (ECoW). With the adherence to both the CEMP and GEMP, as overseen by an ECoW, it is not considered that there is potential for significant impacts. Therefore, no further assessment of potential effects on ecological features during the construction phase is proposed.

5.4.2 Wetland habitats identified as potential GWDTE to be considered as part of the appraisal will be defined on the basis of hydrogeological conductivity calculations. This approach will result in some areas of potential GWDTE within 250 m of the Proposed Development being scoped out of the assessment.

5.4.3 Due to the nature of the works, impacts to protected sites designated only for habitat interest features at distances more than 250 m from the Proposed Development have been scoped out for construction and operation.

5.4.4 Due to the nature of the Proposed Development, it is proposed that impacts to Ecology, Ornithology and Nature Conservation via emissions to air are scoped out for construction and operation.

5.5 Potential Significant Effects

5.5.1 Potential adverse effects to ecological and ornithological receptors include:

- Direct mortality to fauna through e.g. traffic collisions and construction related operations (open trenches and woodland felling operations);
- Direct and indirect effects on designated ornithological features or supporting habitats of Strath Carnaig and Strath Fleet Moors SPA and SSSI;
- Indirect effects on designated ornithological features of the Dornoch Firth and Loch Fleet SPA and Ramsar Site;

- Disturbance / displacement of protected species and their places of shelter through construction related operations;
- Habitat loss, both temporary and permanent, associated with e.g. temporary and permanent infrastructure;
- Habitat fragmentation and severance, both temporary and permanent, associated with e.g. temporary and permanent infrastructure;
- Pollution associated with direct release of construction related contaminants to habitats, in particular to aquatic and/or wetland habitats;
- Hydrological change resulting in drying of e.g. GWDTE habitats or excessive wetting of dryer habitats;
- Biosecurity risks (spread of invasive species, amphibian diseases) resulting in biodiversity loss from the Site due to indirect mortality or species being out competed; and
- Cumulative effects from other developments, either built or proposed, within the zone of influence (ZoI) for ecological or ornithological features identified as sensitive receptors of the Proposed Development.

5.6 Assessment Methodology

5.6.1 The ecological impact assessment will be completed in accordance with the Chartered Institute of Ecological and Environmental Management (CIEEM) Ecological Impact Assessment Guidance[13].

5.6.2 The assessment will use the ecological baseline to identify the sensitive ecological receptors that could be of importance based on its national, regional, and local conservation status, and population / assemblage trends and other relevant criteria (including size, naturalness, rarity and diversity).

5.6.3 A Habitats Regulations Appraisal (HRA) Screening will be undertaken to identify any Likely Significant Effects (LSE) on the National Site Network. If LSE are identified, a full HRA will be undertaken to support an Appropriate Assessment.

Proposed Approach to Baseline Data Collection

5.6.4 The following surveys have been undertaken to date:

- Breeding Bird Surveys at the Proposed Development and adjacent land on 12th June, and 10th and 24th July 2023; and
- Extended Phase 1 and UK Habitat and targeted NVC Survey at the Proposed Development and adjacent land on 25th September 2023.

5.6.5 To inform the assessment of impacts on ecology and ornithology receptors the following additional surveys are proposed:

- Protected species surveys including for red squirrel, pine martin, badger, otter, water vole and reptiles;
- Breeding bird surveys including black grouse, breeding diver and breeding raptor surveys; and
- Wintering hen harrier roost surveys.

Proposed Approach to Biodiversity Net Gain

5.6.6 The Applicant has committed to delivering a 10% gain for biodiversity enhancement for all projects. This is aligned to the Scottish Government's National Planning Framework 4 (NPF4)[14] Policy 3 aim for proposed developments to contribute 'significant biodiversity enhancements'. It is also aligned with expectations to achieve 10% Biodiversity Net Gain (BNG) elsewhere in the UK.

[13] CIEEM (2018). Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester.

[14] The Scottish Government (2023) *National Planning Framework 4*, The Scottish Government, Edinburgh. Available at: https://www.gov.scot/publications/national-planning-framework-4/

5.6.7 The Applicant has developed specific guidance and toolkits to measure BNG, based on the Natural England Biodiversity Metric 3.1 and adapted to reflect the requirements of Scottish Habitats[15]. Area and linear habitats are assessed separately. The Toolkit produces a unit score for three categories of habitat: Biodiversity Units[16], Linear Hedgerow (H) Units and Linear Watercourse (W) Units[17]. The BNG toolkits are used to quantify losses and gains of biodiversity, allowing site locations or design options to be compared by quantifying the net change in biodiversity between the preconstruction baseline and proposed post-development units. This ensures that the mitigation hierarchy is embedded through project design and development and enables biodiversity units to be calculated and measured to ensure a 10% net gain against the baseline is delivered for each project.

5.6.8 Irreplaceable habitats and designated sites (e.g. SPAs, SACs, SSSIs) must be identified. Impacts to these areas should be avoided, mitigated and, as a last resort, compensated for, following national legislation, policy, and guidelines. Irreplaceable habitats include Ancient Woodland Inventory Categories 1a and 2a, ancient and veteran trees, and blanket bog (in good or moderate condition). Where unavoidable impacts to irreplaceable habitats are identified, these are assessed using a separate toolkit from non-irreplaceable habitats to ensure bespoke compensation can be provided. The biodiversity metric will be used to calculate the mitigation required for any losses, ensuring more habitat is restored than lost. Support for irreplaceable habitat restoration schemes is preferred over new habitat creation.

5.6.9 Consideration should also be given to the foraging habitat of SPA designated feature species, even where this is outside of the designated site area. The implications of proposed habitat changes with respect to SPA conservation objectives should be summarised in the BNG assessment report. Regarding foraging habitats, only impacts which may be considered to adversely affect SPA site integrity will be considered irreplaceable.

5.6.10 A Biodiversity Net Gain Assessment Report will be produced, detailing the approach to assessment and toolkit results (including baseline units, post development units, temporary impacts, and irreplaceable habitat impacts). The BNG Assessment report will include any proposed compensation to achieve the target biodiversity units. A Long-Term Habitat Management Plan will be produced to support the creation and/or enhancement of proposed post-development habitats in order to meet the proposed target conditions.

5.7 Summary

5.7.1 Protected and priority species which may potentially be present include otter, water vole, pine marten, red squirrels, reptiles and amphibians. Suitable habitat for bats, wildcat, and badgers is present within the Proposed Development site.

5.7.2 Habitats present are predominantly conifer plantation woodland and heathland and grassland. No Annex 1 Habitats have been identified from desk study or surveys undertaken. Low, Moderate and High potential GWDTE habitats were identified during the Extended Phase 1 Habitat Survey and corresponding NVC Survey. Assessment will be undertaken as part of the EIA.

5.7.3 For the ornithological baseline, a desk based review identified that the Proposed Development is used by a number of sensitive bird receptors including breeding Schedule 1 birds of the Wildlife & Countryside Act 1981, Annex 1 species of the Birds Directive, and Birds of Conservation Concern.

5.7.4 At this preliminary stage, possible effects scoped in include mortality and disturbance of protected and priority species and ornithology receptors, habitat loss and degradation, biosecurity risks, pollution, and changes to hydrology. Effects scoped out include ecological features that could be affected by lighting, noise, dust and visual disturbance caused by construction activities, some areas of potential GWDTE within 250 m of the Proposed Development, protected sites designated only for habitat interest features at distances more than 250 m from the Proposed Development and impacts via emissions to air.

[15] Scottish and Southern Electricity Networks (2020) TG-NET-ENG-526: Biodiversity Net Gain Toolkit User Guide. Version 3.01. SSEN, Perth
[16] The Biodiversity Units associated with area (polygon) habitats.
[17] The Biodiversity Units associated with linear habitats (hedgerows or watercourses).

6. FORESTRY

6.1 Introduction

6.1.1 This chapter will describe the existing forest resource, identifies potential for effects to occur and details the scope of information and assessment to be included in the EIA Report.

6.1.2 As mentioned earlier in this EIA Scoping Report, the Proposed Development is considered to be intrinsically linked to the proposed 400 kV OHL between Spittal and Beauly. The proposed 400 kV OHL comprises Schedule 1 Development for the purposes of *The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017* ('the Regulations') and so the Proposed Development is also being progressed voluntarily as EIA due its association with the OHL. The Proposed Development has therefore not been subject to an EIA Screening Request and thus consultation undertaken for that stage.

6.1.3 However, a Pre-Application response was requested from SEPA which noted that the Proposed Development should minimise the extent of tree felling and that proposals for reuse of forest material should be in line with SEPA's guidance: *Use of Trees Cleared to Facilitate Development on Afforested Land.* Further discussions with SEPA are welcomed and will be relied upon to inform the scope of the EIA Report.

6.2 Baseline Conditions

6.2.1 The Proposed Development would be located within the Achormlarie Plantation which consists of mainly coniferous plantation, with some areas of mixed and broadleaved woodland, grassland and heathland habitats, and watercourses including drainage ditches and burns. The proposed Development is within or adjacent to the Forest plantation, managed by Forest and Land Scotland as part of the National Forest Estate. None of the woodland which would be affected by the Proposed Development is classed as Plantation on Ancient Woodland Sites (PAWS) or included on the Ancient Woodland Inventory (AWI).

6.2.2 Site conditions are predominantly standing crop comprising 39 year old Sitka Spruce, Lodgepole Pine with elements of Hybrid Larch present with yield classes from 8 (HL) to 16 (SS). Soils within the Site comprise Peaty gleys with dystrophic blanket peat with peaty gleyed podzols and elements of peaty gleyed podzols with dystrophic semi-confined peat with peaty gleys.

6.3 Sensitive Receptors

6.3.1 As the Proposed Development will be located within, a significant area of coniferous forest, it is likely to have a significant effect on the forest environment and future forest management.

6.4 Issues Scoped Out

6.4.1 The Proposed Development boundary defines the limit for which the Applicant is seeking consent under the provisions of the Town and Country Planning (Scotland) Act 1997 (as amended). As such, the Forest Impact Assessment will not provide an assessment of any felling or restocking requirements outwith this. These works are the responsibility of the landowner and will be undertaken in accordance with the requirements set out within the Forestry and Land Management (Scotland) Act 2018.

6.4.2 Secondary effects resulting from forestry activities including effects on habitats and species, ornithology, hydrology and landscape and visual are considered within their respective chapters of this EIA Scoping Report and therefore would be scoped out of the Forest Impact Assessment.

6.5 Potential Significant Effects

6.5.1 The Proposed Development would require the removal of large sections of commercial forest. This would be undertaken in consultation with Scottish Forestry, Forest and Land Scotland and other affected landowners. The exact area of woodland to be removed to accommodate the Proposed Development and any associated OHL tie-ins would be assessed in a Forestry Impact Assessment which will be included in the EIA Report.

6.5.2 The Proposed Development would result in loss of forested area with the potential to affect forestry operations. The permanent removal of commercial plantation would potentially have long term adverse economic and

potential biodiversity impact. The biodiversity impact would be assessed thorough ecological surveys which will inform mitigation proposals detailed within the ecology chapter.

6.5.3 The total area to be felled shall be quantified once the extent of the required engineering works is known. After felling, any timber removed that is commercially viable would be sold and the remaining forest material would be processed via the best practicable environmental outcome that is compliant with UKFS and relevant waste regulations.

6.5.4 The Applicant will seek to minimise the impact to surrounding forestry by identifying areas considered to be at greater risk of windblow by agreeing areas identified for management felling to protect the integrity of the wider forest plantation.

6.5.5 The detail of future land management areas affected will influence the residual significance; notably by the potential for areas to be enhanced such as in the reinstatement of peatland.

6.6 Assessment Methodology

6.6.1 A targeted Forest Impact Assessment will be completed for the Proposed Development. It is anticipated that this will include the following activities:

- calculation and description of areas required to be cleared of woodland and identification of any areas which could be returned for replanting;
- an assessment of the effects of changes to the woodland composition and existing felling and replanting programmes; and
- proposals for mitigation if required under the terms of the EIA Regulations.

6.6.2 The preparation of the Forest Impact Assessment will refer to relevant industry guidance including, but not limited to:

- Forestry Commission (2011, 5th edition 2023): The UK Forestry Standard, The Government's Approach to Sustainable Forestry. Forestry Commission, Edinburgh;
- Scottish Government (2019) *Scotland's Forestry Strategy 2019-2029*. Scottish Government, Edinburgh
- UKWAS (2018): *The UK Woodland Assurance Standard* Fourth Edition. UKWAS, Edinburgh;
- Forestry Commission Scotland (2009): *The Scottish Government's Policy on Control of Woodland Removal*. Forestry Commission Scotland, Edinburgh;
- Forestry Commission (2011): *Forests and Water. UK Forestry Standard Guidelines* (and other guidelines in the same series). Forestry Commission, Edinburgh;
- SEPA (2013) Guidance on the Management of Forestry Waste . SEPA;
- The Highland Council (2006): Highland Forest & Woodland Strategy;
- The Highland Council (2013): *Supplementary Guidance. Trees, Woodlands & Development*. The Highland Council, Inverness; and Implementation Guidance (2019).

6.6.3 The Forest Impact Assessment would identify and quantify areas of forest which would need to be removed to accommodate the Proposed Development. Those areas available for replanting once construction is complete, and the net area of forest land lost, would be assessed against the potential impacts of this loss on the forest resource and structure. Both Felling and Compensatory Planting Plans would be produced once the total area of felling has been identified.

6.6.4 The Forest Impact Assessment would also detail how forest residues will be managed in line with the waste regulations as well as any proposals for mitigation where there is the potential for a significant adverse effect. The Forest Impact Assessment would be included as a chapter in the EIA Report.

6.7 Summary

6.7.1 The Proposed Development would require clearing areas of existing coniferous forest plantation. A targeted Forest Impact Assessment will be carried out as part of the EIA Report for the Proposed Development including calculation of areas of temporary and permanent loss.

6.7.2 Where a significant adverse effect is predicted under the terms of the EIA Regulations the Forest Impact Assessment will propose mitigation measures to address these effects.

6.7.3 Secondary effects resulting from forestry activities including effects on habitats and species, ornithology, hydrology and landscape and visual are considered within their respective chapters of this EIA Scoping Report and therefore would be scoped out of the Forest Impact Assessment.

6.7.4 Any felling or restocking requirements outwith the Proposed Development are the responsibility of the landowner and will be undertaken in accordance with the requirements set out within the Forestry Act 1967.

7. CULTURAL HERITAGE

7.1 Introduction

7.1.1 This chapter proposes an appropriate baseline and identifies the potential effects and impacts on sites of archaeological and cultural heritage interest resulting from the construction and operation phases of the Proposed Development.

7.1.2 In this context, 'cultural heritage' refers to evidence of historic activity including, buried or upstanding archaeological remains, buildings of historical or architectural interest, historic streetscapes, historic landscapes and historic battlefields. The assessment will have the following objectives:

- To identify and characterise the cultural heritage baseline. This will include consideration of both designated 18 and non-designated heritage assets;
- To consider the potential for both direct impacts upon heritage assets and indirect impacts upon their setting. This will include an assessment of the potential for cumulative effects resulting from the Proposed Development with other operational, consented or proposed developments; and
- To identify any mitigation measures that may be appropriate to either diminish or alleviate predicted significant or, if appropriate, non-significant adverse effects. This will be undertaken in consultation with stakeholders including both Historic Environment Scotland (HES) and THC's Archaeology service.

7.1.3 The cultural heritage assessment will use a study area within which all designated and recorded non-designated heritage assets will be identified. This study area will extend for 5 km beyond the Proposed Development's footprint for designated assets and 500 m beyond the Proposed Development's footprint for non-designated assets. A 5 km study area is considered appropriate given the maximum height of the Proposed Development's infrastructure elements (13 m) and because the landscape is partially screened by plantation forestry. Where appropriate and using expert input, the potential for indirect impacts upon the settings of designated assets located beyond the 5 km study area will be assessed as needed.

7.2 Baseline Conditions

Methodology

7.2.1 This assessment utilises data from the Computer Application for National Monument Record Enquiries (CANMORE), National Record of the Historic Environment (NRHE) and HES. In order to develop an appropriate baseline for assessment, a consideration is made for the potential direct and indirect impacts to designated and non-designated assets identified via these sources.

7.2.2 To identify assets that will be potentially directly impacted, a Proposed Development footprint was utilised on the assumption that assets inside have the potential to be wholly or partially removed by construction of the Proposed Development.

7.2.3 In cultural heritage terms, a direct impact refers to a change that materially alters the state of the baseline condition of a heritage asset resulting directly from a project activity and operational processes. These are identified and represented spatially by assessing and understanding the known heritage presence and context, in conjunction with the relationship to project design features. Potential direct impacts will result from construction activities associated with ground disturbance, and the installation of buried and above-ground infrastructure associated with the Proposed Development.

7.2.4 Direct impacts to heritage assets may occur as a result of the following Proposed Development activities:

- Road improvements and access creation;
- Site compound and construction/installation;
- Forestry clearance;

[18] In Scotland World Heritage Sites, Scheduled Monuments, Listed Buildings Conservation Areas, Inventoried Battlefields, Inventoried Gardens and Designed Landscapes and Historic Marine Protected Areas are considered to be designated.

- Construction compound installation;
- Creation of level platforms; and
- Proposed Development infrastructure installation such as security gates, control buildings, electrical plant.

7.2.5 In cultural heritage terms, an indirect impact refers to any change in the baseline condition of a heritage asset resulting from a project beyond the boundaries of the asset. Indirect impacts can have a variety of forms for instance if a project affects the water table, it could potentially damage the preservation of organic remains within buried archaeological contexts beyond its boundaries. However, the majority of indirect impacts result from changes to the settings of heritage assets as a consequence of new developments introducing visual intrusions.

7.2.6 To identify assets with indirect impacts and develop an understanding of the wider heritage context of the area, a 5 km buffer for designated assets and 500 m buffer for non-designated assets was created from the footprint. Then the assessment methodology was followed as described in **Chapter 3: EIA Approach and Methodology**.

Background

7.2.7 The Proposed Development is located in Sutherland in the Highlands of Scotland. Since the Mesolithic period, this part of modern Scotland has been inhabited, though evidence from this period is scarce[19]. Early artefactual remains from the Mesolithic and subsequent Neolithic periods, include stone tools, standing stones, rock-art, and pottery were found in temporary encampments. Evidence of the Bronze Age in the Highlands is unevenly distributed across the region and more research is needed. However, there is much more archaeological evidence than from previous time periods, including funerary practices such as burial cairns.[20].

7.2.8 During the Iron Age, the Highlands saw a larger number of enclosed settlements being constructed and there was an increased reliance on farming at these permanent settlements. The transition from Iron Age to Medieval periods in the Highlands is heavily debated, but there was a heavier influence of the Pictish Kingdom and Norse cultural traditions. The Loch Buidhe region's landscape character and economic practices during the Medieval, Post Medieval and Modern periods remained primarily based on agricultural activities including farming and pastoral practices. Historic 19th century ordnance survey (OS) maps and modern aerial imagery indicate it was rough or healthy pasture until the 20th century where it was later a site of conifer tree plantation. The majority of the Site remains covered in tree plantation except for the north-east section.

Baseline

7.2.9 A full list of designated assets including their description is provided in **Table 7.1**. No United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Sites (WHS), protected battlefields, gardens and designed landscapes, historic marine protected areas or conservation areas were identified within 5 km of the Proposed Development.

Designated Assets

7.2.10 No designated assets are recorded within Proposed Development boundary. No Category A Buildings are within 5 km of the Proposed Development. There is one Category B listed building, which is the LB52528 Lydsurach Crofthouse, Balblair Estate, near Bonar Bridge, and there are five Category C listed buildings within 5 km of the Proposed Development. These are:

- LB268 Migdale Free Church Wall and Gate Piers;
- LB269 Migdale Free Church Parish Room and Adjoining Cottage;
- LB270 Migdale Free Church Manse;

[19] Wickham-Jones and Susan Kruse. Palaeolithic and Mesolithic. Scottish Highland Archaeological Research Framework: Palaeolithic and Mesolithic. Available at: 4. Palaeolithic and Mesolithic | The Scottish Archaeological Research Framework (scarf.scot). Accessed 10/08/2023

[20] Kruse, Susand, Rod McCullagh and Allison Sheridan. Chalcolithith and Bronze Age Scotland Archaeological Research Framework. Available at: 6. Chalcolithic and Bronze Age | The Scottish Archaeological Research Framework (scarf.scot); accessed 10/08/2023

- LB271 Migdale Mill;
- LB272 Migdale Mill House.

7.2.11 There are six scheduled monuments within 5 km of the Proposed Development:

- SM4505 Creagan Reamhan, farmstead, kiln and fields 300m SSW of;
- SM1830 Brae Cottage, two hut circles 120m and 200m ESE of;
- SM1840 Brae,broch, Strath Carnaig W of Mound Junction;
- SM1785 Drumliah, chambered cairn,hut circles & clearance cairns, Tulloch;
- SM1799 Kyleoag, chambered cairn 150m NE of; and
- SM1813 Rivra, chambered cairn 520m N of.

Non-Designated Assets

7.2.12 There are no non-designated assets within the Proposed Development boundary. There are two non-designated assets within 500 m of the Proposed Development boundary:

- Canmore ID 333193 Alness / Criech; and
- Canmore ID 348673 Torbreck, Loch Buidhe.

7.2.13 A programme of archaeological monitoring via watching brief was undertaken during the ground investigation works (including the excavation of 21 trial pits, 18 boreholes and two soakaway pits) between 11th October and 8th November 2023. No archaeological deposits or features were encountered during the monitoring works.

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Table 7.1 Sensitive cultural heritage receptors

DES_REF	DES_TITLE	CATEGORY	DES_TYPE	Description	Distance from Proposed Development
LB52528	Lydsurach Crofthouse, Balblair Estate, near Bonar Bridge	B	Listed Building	A remarkably unaltered single storey and attic, three-bay, former crofthouse probably dating to around the mid-19th century. Lydsurach Crofthouse meets the criteria of special architectural or historic interest for the following reasons: Lysurach Crofthouse is an important example of a 19th century crofter's cottage for its remarkable lack of later alteration. Neither its exterior nor its interior have been altered to any significant degree since it was built and it remains unmodernised with no electricity, running water or sanitaryware. It is one of only what is probably now a handful of this type of building for its date to survive to this degree. It has retained its setting within a former crofting settlement, with exceptional wider views across the Dornoch Firth and to the surrounding Highland landscape. It is an important part of Scotland's vernacular building history and its crofting history, with particular relevance to the Scottish Highlands.	3.4 km
LB268	Migdale Free Church Wall and gate piers	C	Listed Building	Ecclesiastical building in use as such. Memorial to Rev. Gustavus Aird (1813-98) Minister of Creich Free Church, within enclosure. Present church built on site of that erected in 1843. Interesting group of Free Church buildings, enhanced by connection with Dr Gustavaus Aird, a local pioneer within the Free Church at the time of the 1843 Disruption (when he was Minister at Croich Parliamentary Church) and afterwards at Creich, where he was Free Church Minister from 1843 to the time of his death in 1898.	4.5 km SW
LB269	Migdale Free Church parish rooms and adjoining cottage	C	Listed Building	Parish room was former Free Church School. Adjoining cottage probably lived in by school teacher.	4.5 km SW
LB270	Migdale Free Church manse	C	Listed Building	1849. 2-storey, 3-bay with centre projecting 2 storey, 1 bay wing with side entrance; coursed rubble, tooled rubble dressings, harled flanks and rear. Bipartites in ground floor outer bays; 2-pane glazing; corniced end stacks; slate roof. 2 parallel later wings to rear.	4.5 km SW

DES_REF	DES_TITLE	CATEGORY	DES_TYPE	Description	Distance from Proposed Development
LB271	Migdale Mill	C	Listed Building	Early 19th century, single and 2-storey, L-plan built into side of slope with ramp to rear leading to (1st floor) gabled entrance. Remains of small pot barley mill close by.	4.5 km SW
LB272	MIigdale Mill House	C	Listed Building	Early 19th century, 2-storey, 3-bay with centre door and long single bay wing at west gable.	4.5 km SW
SM4505	Creagan Reamhan, farmstead, kiln and fields 300m SSW of	Secular: farmstead	Scheduled Monument	Secular: farmstead; field system; kiln. The monument is of national importance as an exceptionally good example of a small farmstead of the 18th century or earlier including good examples of each of the main components of such farmsteads; a house and small outbuildings, a cornkiln at the end of its own small building, rig and lazy beds, and a head dyke enclosing them. The monument includes a longhouse and four rectangular enclosures of two constructional phases, a small building having at its W end a filled-in cornkiln and a kaleyard. It also contains an area of rig and furrow SW of the buildings and, further west, lazy beds. A turf and stone dyke encloses the farmstead and fields. The monument is of national importance as an exceptionally good example of a small farmstead of the 18th century or earlier including good examples of each of the main components of such farmsteads; a house and small outbuildings, a cornkiln at the end of its own small building, rig and lazy beds, and a head dyke enclosing them.	1.8 km SE
SM1830	Brae Cottage, two hut circles 120m and 200m ESE of	Prehistoric domestic and defensive: hut circle, roundhouse	Scheduled Monument	Prehistoric domestic and defensive: hut circle, roundhouse	3.5 km E
SM1840	Brae,broch, Strath Carnaig W of Mound Junction	Prehistoric domestic and defensive: broch	Scheduled Monument	Prehistoric domestic and defensive: broch	3.6 km E
SM1785	Drumliah, chambered cairn, hut circles &	Prehistoric domestic and defensive: hut	Scheduled Monument	Prehistoric domestic and defensive: hut circle, roundhouse; Prehistoric ritual and funerary: chambered cairn	4.8 km SW

DES_REF	DES_TITLE	CATEGORY	DES_TYPE	Description	Distance from Proposed Development
	clearance cairns, Tulloch	circle, roundhouse; Prehistoric ritual and funerary: chambered cairn			
SM1799	Kyleoag, chambered cairn 150m NE of	Prehistoric ritual and funerary: chambered cairn	Scheduled Monument	Prehistoric ritual and funerary: chambered cairn	4.1 km S
SM1813	Rivra, chambered cairn 520m N of	Prehistoric ritual and funerary: chambered cairn	Scheduled Monument	This monument consists of a chambered cairn situated close to the E end of a ridge. The chambered cairn is of Orkney-Cromarty type and was excavated by Curle in 1909. It survives to a height of about 1.7m, measures 17m N- S by 16m E-W and has projections ("horns") to its W and E sides. Close to the centre of the cairn is a well defined polygonal chamber about 2.8m by 2.1m. The area to be scheduled is a circle 60m in diameter, to include the chambered cairn, the possible additional cairn to the SW and an area around in which traces of activities associated with the construction and use of these monuments	4.3 km S
CANMORE ID 333193	Alness / Criech	NO CLASS (EVENT)	Non-designated	During a walkover in 2011. A total of four sites were checked at Cambusmore, centred on cNH 646 973 and seven sites NW of Alness, centred on cNH 632 710. There appeared to be few archaeological concerns with these sites, with only a single possible burnt mound recorded in Area F (c. NH 60150 69710).	Within boundary not within site
CANMORE ID 13932	Allt na Sean-Airigh	Hut circle (prehistoric)	Non-designated	The hut-circle measures internally 0.5m N-S by 9.0m E-W. Outer facing stones are visible for some of the perimeter but no inner faces. Wall height is about 0.6m. The entrance is on the ENE. There is no positive trace of contemporary cultivation.	Within boundary not within site
CANMORE ID 13928	Loch An Lagain	CORN DRYING KILN (PERIOD UNASSIGNED), ENCLOSURE (PERIOD UNASSIGNED), FIELD SYSTEM(S)	Non-designated	A well-preserved corn-drying kiln measuring 1.9m by 1.6m internally and 0.8m deep lies at NH 6614 9566. The kiln flue is 1.2m long and 0.4m wide. It is contemporary with and surrounded by partially clearned 'fields'. An enclosure, surrounding an area of improved ground is depicted on the 1st edition of the OS 6-inch map (Sutherland 1879-81, cviii), but it is not shown on the current edition of the OS 1:10,000 map (1990).	Within boundary not within site

DES_REF	DES_TITLE	CATEGORY	DES_TYPE	Description	Distance from Proposed Development
		(PERIOD UNASSIGNED)			
CANMORE ID 13950	Meall Mor	FIELD SYSTEM (PERIOD UNASSIGNED), HUT CIRCLE (PREHISTORIC)	Non-designated	At NH 6495 9634 within a contemporary field system marked by numerous stone clearance heaps, linear stone clearance and some lynchets, is a hut circle. It measures 7.0m in diameter between centres of a wall of bare stones spread to 1.5m at the rear and increasing to 2.7m at the rubble blocked entrance in the SW. Surveyed at 1/2500.	Within boundary not within site
CANMORE ID 13923	Meall Mor	FIELD SYSTEM (PERIOD UNASSIGNED), HUT CIRCLE (PREHISTORIC)	Non-designated	Located during pre-afforestation survey.	Within boundary not within site
CANMORE ID 13924	Meall Mor	SHIELING HUT(S) (POST MEDIEVAL)	Non-designated	Rectangular shielings and field: noted during pre-afforestation survey. Two unroofed shieling-huts are depicted on the 1st edition of the OS 6-inch map (Sutherland 1879-81, cviii), but they are not shown on the current edition of the OS 1:10,000 map (1990).	Within boundary not within site
CANMORE ID 13926	Meall Mor	ENCLOSURE (PERIOD UNASSIGNED), SHIELING HUT(S) (POST MEDIEVAL)	Non-designated	Rectangular shielings and enclosure: noted during pre-afforestation survey. This group consists of three shieling-hut remains. The small enclosure is possibly related to NH69NE 16.	Within boundary not within site
CANMORE ID 13927	Loch An Lagain	CAIRNFIELD (PERIOD UNASSIGNED), HUT CIRCLE (PREHISTORIC), LYNCHET(S)	Non-designated	This hut circle lies within a wall up to 2.5m wide at the entrance on the SE. An occasional outer facing stone is visible on S. A gap in the wall on the SW is probably a mutilation; several peat covered clearance cairns lie to the S. Peat obscures positive identification of lynchets or banks.	Within boundary not within site

DES_REF	DES_TITLE	CATEGORY	DES_TYPE	Description	Distance from Proposed Development
		(PERIOD UNASSIGNED)			
CANMORE ID 13929	Loch Buidhe	CRANNOG (PERIOD UNASSIGNED)	Non-designated	There is no trace of an island in Loch Buidhe; there is a dam at the E end of the loch which has raised the level between 1.0m and 2.0m. Air photograph (Visible on RAF air photographs 106G/Scot/UK 166: 3156; flown 23 August 1946) shows an amorphous submerged feature at NH 6689 9831, significantly at a change of direction in the parish boundary. This may be the island to which Blundell refers.	110 m N
CANMORE ID 13930	Loch An Lagain	CLEARANCE CAIRN(S) (PERIOD UNASSIGNED), ENCLOSURE (PERIOD UNASSIGNED), HUT CIRCLE (PREHISTORIC)	Non-designated	The hut circle at NH 6634 9581 is almost totally obscured by peat, a depression in the walling on the ESE indicating the entrance. The enclosure at NH 6639 9582 is oval and lies on the edge of a terrace. It measures 7.5m N-S by 12.0m E-W within tumbled walling on the W and S. Almost certainly prehistoric in date, the hut circle and enclosure are in proximity to several clearance cairns to the N.	Within boundary not within site
CANMORE ID 13931	Ceann-Loch-Largain	BOTHY (PERIOD UNASSIGNED), ENCLOSURE(S) (PERIOD UNASSIGNED), FARMSTEAD (PERIOD UNASSIGNED), SHEEPFOLD (PERIOD UNASSIGNED)	Non-designated	Rectangular building foundations, enclosures, fields, sheepfold, bothy, and head dykes: noted during pre-afforestation survey. There are at least three rectangular building foundations as well as enclosures and fields and a modern sheepfold. A bothy lies 100m to WNW and there are extensive lengths of head dykes on the N and E. A farmstead, comprising one roofed and two unroofed buildings and an enclosure is depicted on the 1st edition of the OS 6-inch map (Sutherland 1879-81, cviii). One roofed building, three unroofed structures, two of which are buildings and two enclosures are shown on the current edition of the OS 1:10,000 map (1990).	60 m S
CANMORE ID 13933	Allt na Sean-Airigh	HUT CIRCLE(S) (PREHISTORIC)	Non-designated	Hut A at NH 6663 9563, lies on a dry shelf and measures overall 12.5m by 11.5m. Close to the entrance on the SE, the walling is 2.0m wide and 0.9m high. The interior and E segment of the wall have been mutilated and robbed.	Within boundary not within site

DES_REF	DES_TITLE	CATEGORY	DES_TYPE	Description	Distance from Proposed Development
				Hut B at NH 6661 9561 is represented by two short lengths of curvilinear wall flanking a depression representing the entrance. Some outer facing stones and wall core give a width of 2.1m and 0.3m high. Peat coveres the remainder of the area but the hut circle probably had a diameter of about 11.0m.	
CANMORE ID 13935	Loch An Lagain	SHIELING HUT(S) (POST MEDIEVAL)	Non-designated	These two rectangular shieling foundations and a sub-rectangular 'field' at Loch An Lagain, are probably contemporary with the most recent phase of NH69NE 16.	Within boundary not within site
CANMORE ID 13925	Leathad A'Chuailein	ENCLOSURE(S) (PERIOD UNASSIGNED), FARMSTEAD(S) (PERIOD UNASSIGNED), FIELD SYSTEM (PERIOD UNASSIGNED), KILN (PERIOD UNASSIGNED)	Non-designated	At Leathad A' Chuailein is a farmstead of four recent rectangular buildings around yard overlying earlier building foundations contemporary with field dyking and to the NW there is a recent bothy and enclosure. To the SE lies a farmstead of three rectangular building foundations, associated field boundary and field clearance heaps: see also NH69NE 17. A farmstead, comprising one roofed building and two unroofed buildings, and a field-system are depicted on the 1st edition of the OS 6-inch map (Sutherland 1879-81, cviii). Three unroofed buildings and the field-system are shown on the current edition of the OS 1:10,000 map (1990).	Within boundary not within site
CANMORE ID 87358	Leathad A'Chuailein	FIELD SYSTEM (PERIOD UNASSIGNED), HUT CIRCLE(S) (PREHISTORIC)	Non-designated	Hut-circle 'B' (NH 6542 9621), has been destroyed by the ploughing and planting associated with afforestation.	Within boundary not within site
CANMORE ID 348673	Torbreck, Loch Buidhe	BLACKHOUSE(S) (POST MEDIEVAL)	Non-designated	An excavation was undertaken, 8–16 April 2013, of a longhouse complex near Loch Buidhe prior to the development of a new electricity sub-station. The excavation recorded a longhouse complex of dry stone and turf structures consisting of three phases of construction. These included two distinct house structures with associated animal byres and a small ancillary building. The structures had obvious partitions. Both of the house structures revealed intact floor deposits and several internal architectural features.	Within boundary not within site

DES_REF	DES_TITLE	CATEGORY	DES_TYPE	Description	Distance from Proposed Development
				The E house provided strong evidence for internal divisions with a rectangular out-shot along its N edge and a smaller rectangular recess along its S edge. This latter feature was associated with the truncated remains of an internal wall. Within the centre of the house lay a large hearth made of flat stones. This was associated with a stone built draw-flue. A large rubble and dry stone culvert ran from the 'outshot' to the front of the building. The E house had both front and back entrances. The latter being associated with the 'outshot'. Two cruck post settings were also recorded. A stone apron c1m wide ran along the front of the building. A second house was recorded abutting the W wall of the first building. A large hearth with collapsed chimney was built into the NE corner of the house. A possible second hearth was located within the centre of the structure, although this was located close to the entrance and may be a large post-pad. To the W of this building, at the lowest point of the site, was an associated byre. This appeared to have been remodelled and a small ancillary building constructed at its E end. A small quantity of ceramic fragments and glass was recovered from the buildings, together with the remains of an iron cauldron and two copper buttons. Initial examination of the pottery indicates that it is of early 19th-century date. This correlates well with the known historical evidence for the site.	

7.3 Sensitive Receptors

7.3.1 The sensitive receptors identified include designated assets that are either directly or indirectly impacted, as well as non-designated assets that are indirectly impacted. These receptors are:

- One no. Category B listed building (LB52528);
- Five no. Category C listed building (LB268, LB269, LB270, LB271, LB272); and
- Six no. scheduled monuments (SM1830, SM1840, SM1785, SM1799, SM1813 and SM4505).

7.4 Issues Scoped Out

7.4.1 The non-designated asset (Canmore ID 348673 Torbreck, Loch Buidhe) has been previously excavated and therefore has been wholly or partially removed from the landscape. Additionally, Blackhouses generally derive their significance solely from their form, material, folkloric cultural associations, and historic function, not their setting or siting within the wider landscape[21]. Therefore, no setting assessment is proposed for these assets and indirect impacts for them are scoped out for further assessment. Other non-designated assets identified are not anticipated to undergo direct, indirect or setting effects and can be scoped out of further assessment unless there are changes to the project footprint, wherein they may still require assessment.

7.5 Potentially Significant Effects

7.5.1 Effects to cultural heritage assets have the potential to occur during the construction and operation phases of the Proposed Development as a result of either direct or indirect impacts (see **Table 3.1**). The Proposed Development has the potential to introduce significant effects (Major or Moderate Effects, as per **Table 3.1**) to cultural heritage assets.

7.5.2 The sensitive receptors identified range in sensitivity from low to high (**Table 7.1**). During the construction phase, direct and indirect impacts to assets have the potential to occur during ground-breaking activities. These ground-breaking activities may result in irreversible impacts adverse to the integrity of the asset. The potential magnitude could range from negligible to high. Given the potential magnitude of impact as a result of the Proposed Development, there remains the potential to introduce significant adverse effects to these assets.

7.5.3 There is potential for additional unknown and buried archaeological remains to exist within the Proposed Development. Therefore, there remains the potential for significant effects as a result of direct impacts during construction activities.

7.5.4 It is not anticipated that there will be any direct impacts during the operational phase. However, all permanent indirect effects as a result of impacts to setting during construction will be maintained through operation.

7.6 Assessment Methodology

7.6.1 An assessment of direct and indirect impacts will be undertaken and presented in the EIA Report, with reference to field reports, setting assessments, best practice guidance and methodologies, and in agreement with the THC Archaeologist and HES as appropriate.

7.6.2 Effects on the cultural heritage resource will be assessed by comparing the visibility of the Proposed Development with known and potential cultural heritage sites and their setting. The creation of a Zone of Theoretical Visibility (ZTV) to analyse the visibility to and from the assets and the Proposed Development will help understand the impacts to the setting of assets which derive significance from their setting in the landscape. This assessment will be supported by the works undertaken by the LVIA.

7.6.3 An archaeological walkover survey and setting assessment will be undertaken to further develop the baseline by understanding the condition, extent, and nature of known assets and identifying any previously unknown

[21] BRANIGAN, K., & MERRONY, C. (2000). The Hebridean Blackhouse on the Isle of Barra. *Scottish Archaeological Journal*, *22*(1), 1–16. http://www.jstor.org/stable/27917418 and MAUDLIN, D. (2009). The Legend of Brigadoon: Architecture, Identity and Choice in the Scottish Highlands. *Traditional Dwellings and Settlements Review*, *20*(2), 45–57. http://www.jstor.org/stable/41758700

heritage assets. Additionally, a characterisation of the general ground conditions can be made in reference to potential preservation.

7.6.4 Avoidance is the preferred method of mitigating adverse impacts to cultural heritage assets but where avoidance is not proportionate or possible, an assessment should be made of the impact to asset and a mitigation strategy developed.

7.6.5 Additional archaeological investigations may be conducted as appropriate and proportionate, such as geophysical survey, trial trenching, and excavation, as determined by the results of the impact assessment and consultation with THC Archaeologist or HES where appropriate.

7.7 Summary

7.7.1 The Proposed Development presents the potential for significant effects to designated and non-designated cultural heritage assets as follows:

- One no. Category B listed building (LB52528) with indirect effects;
- Two no. scheduled monuments (SM1830 and SM4505) with indirect effects;
- One o. non-designated asset with potential direct/indirect effects (Canmore ID 333193 Alness / Criech); and
- The potential for unknown buried archaeology within the Proposed Development that may have direct impacts.

7.7.2 An archaeological walkover survey and setting assessment for the Proposed Development will be undertaken to further develop the baseline and inform the impact assessment in relation to direct and indirect impacts to known sensitive receptors. During this walkover, suitably qualified archaeologists will assess the Proposed Development's potential for buried archaeology as well as identify any unknown extant archaeological assets on the surface. A programme of archaeological monitoring via watching brief was undertaken during the ground investigation works, but reported no archaeological deposits or features were encountered. There remains the potential for previously unknown buried archaeology to be present on Site.

8. TRAFFIC AND TRANSPORT

8.1 Introduction

8.1.1 This chapter will assess the potential effects relating to Traffic and Transport in relation to the construction and operation phases of the Proposed Development.

8.1.2 The assessment will be based on the effect of Heavy Goods Vehicle (HGV), private car and delivery vehicle movements during the construction of the Proposed Development. A small number of Abnormal Indivisible Load Vehicles (ALVs) will be required for the transportation of substation components. The traffic and transport chapter will:

- Address potential disruption to pedestrians, cyclists and existing road users during the construction and operational phases of the Proposed Development;
- Assess changes to local traffic flows during the construction and operation phases of the Proposed Development;
- Assess the effect of the changes on the transport network and the level of significance of any effects established; and
- Take account of the objectives of the local and strategic transport policy.

8.2 Baseline

8.2.1 The study area has been defined by the public road network in the vicinity of the Proposed Development and potential delivery corridors to be used during construction by Abnormal Load Vehicles (ALVs) and by general construction traffic, including staff.

Therefore, the roads identified within the proposed study area are as follows:

- A-Roads: A9 (trunk road) from Dalmore to Evelix and the A949 from Clashmore to Bonar Bridge; and
- Minor Roads: Lochbuie Road (U3521) (Strathcarnoch Road, Bonar Bridge).

8.2.2 The roads highlighted above to be used for construction traffic associated with the Proposed Development were also used for the construction of the existing 275 kV Loch Buidhe Substation. It is understood that sections of the U3521 were upgraded to include features such as new passing bays and upgrading small bridges to facilitate construction traffic. Access to the Site will be via a new access junction off the U3521 to the south of the Site. All new access junctions would have appropriate sight lines and designed in accordance with THC Design Guide.

8.2.3 Baseline traffic flows will be sought from THC, Transport Scotland, and the Department for Transport (DfT) open traffic count site. Should new traffic count data be deemed necessary, this data would be obtained via a week-long deployment of Automatic Traffic Counters at locations established during consultation with THC and Transport Scotland. For the purposes of the EIA, the identified baseline traffic flows will be adjusted to an agreed future baseline using Low Growth National Road Traffic Forecast (NRTF) estimates.

8.2.4 Accident data for the road network within the identified study area would be sourced from Crashmap.co.uk, an online accident review resource and where possible from Transport Scotland for the A9 trunk road.

8.3 Sensitive Receptors

8.3.1 The following sensitive receptors have been identified, and will be considered in the assessment;

- Motorised users of the surrounding road network, which includes vehicle drivers and public transport users;
- Non-motorised users of the surrounding road network, which includes users of core path networks, and non-designated public routes, including pedestrians, cyclists, equestrians, and vulnerable groups; and
- Communities within the study area.

8.4 Issues Scoped Out

8.4.1 Potential effects which have been scoped out of further assessment are listed below.

Operational Traffic

8.4.2 As the Proposed Development would not require full time staff presence, it is expected that the amount of traffic related to the operational phase of the Proposed Development would be low. Vehicle movements associated with the operational phase will only be required during routine maintenance visits using cars or Light Good Vehicles (LGVs) on average four times per calendar month (once per week). Therefore, it is believed that the operational traffic's effects would be minimal, and no further assessment is required.

Air Quality

8.4.3 The IEMA (2023) Guidelines for the Environmental Assessment of Road Traffic advise that significant impacts to local air quality may occur if changes to LGVs are more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an Air Quality Management Area (AQMA) and more than 500 AADT elsewhere. For HGVs, the criteria are more than 25 AADT within or adjacent to an AQMA, and more that 100 AADT elsewhere. Based on the expected volume of construction traffic, none of the above criteria will be met or exceeded. In addition, the Proposed Development is not located within an AQMA and due to the temporary nature of the increase in vehicles using the proposed access route, any effects on local air quality will be short term and reversible.

Visual Effects

8.4.4 The movements of abnormally loaded vehicles could be considered visually intrusive. This effect would be short-term and would only occur during the movement of abnormal loads. The movements of HGVs are not considered visually intrusive as it is an everyday occurrence and any effects will be short term, fully reversible and would only occur during construction hours. Any likely significant environmental effects relating to visual effects due to traffic generated during the construction phase of the Proposed Development will be considered within the landscape and visual amenity assessment (see **Chapter 4: Landscape and Visual Impact**). The assessment of visual effects has therefore been scoped out of this chapter.

8.5 Potentially Significant Effects

8.5.1 Certain details of the construction programme, including required items of plant, are unknown at this stage of the Proposed Development. However, the impacts of construction traffic have the potential to result in significant effects at nearby receptors and will be assessed. The likely effects for Traffic and Transport associated with the construction phase of the Proposed Development assessed as part of the EIA are as follows:

- Severance;
- Fear and intimidation;
- Road safety;
- Driver delay;
- Non-Motorised user amenity;
- Pedestrian delay; and
- Hazardous loads.

8.6 Assessment Methodology

8.6.1 An assessment will be carried out as part of the EIA to include the likely number of construction traffic movements and the capacity of local roads to accommodate construction traffic.

8.6.2 The assessment would be completed with reference to the best guidelines detailed below in addition to other related technical and planning guidance and in consultation with THC and Transport Scotland:

- The Transport Assessment Guidance[22] (Scottish Government, 2012);
- Guidelines for the Environmental Assessment of Traffic and Movement[23] (IEMA, 2023);
- National Planning Framework 424 (Scottish Government, 2023) Part 2, Policy 13 on Sustainable Transport; and
- Planning Advice Note (PAN) 7525: Planning for Transport (Scottish Government, 2005).

8.6.3 The scope of assessment will be agreed with Transport Scotland and THC once the estimated trip generation during construction has been finalised. This will be included as part of the EIA Report.

8.6.4 In accordance with the IEMA (2023) Guidelines for the Environmental Assessment of Road Traffic, an assessment should be undertaken:

- Rule 1: On road links where traffic flows are predicted to increase by more than 30% (or where the number of heavy goods vehicles is predicted to increase by more than 30%); and
- Rule 2: Traffic flows are predicted by 10% or more in any other specifically sensitive areas.

8.6.5 Where the relevant thresholds are exceeded, an assessment will be provided as part of the EIA to include the likely number of construction traffic vehicle movements, and the capacity of local roads to accommodate construction traffic, with reference to the potential effects of severance, fear and intimidation, road safety, driver delay, non-motorised user amenity, and pedestrian delay.

8.6.6 Where thresholds for potential significant effects are not exceeded, detailed assessments are not required. However embedded mitigation will be provided within the EIA Report, along with a commitment to work with Transport Scotland and THC in order to agree detailed traffic management proposals for implementation during the construction phase.

8.6.7 Once the environmental and population impacts and the road links to be included within the analysis have been identified, the next stage of the assessment is to quantify the magnitude of the environmental impact and to identify the scale and nature of the effect to determine the level of significance that such change may have. The magnitude of potential change will be identified through the following:

- Consideration of the Proposed Development;
- The degree of change to baseline conditions predicted as a result of the Proposed Development;
- The duration and reversibility of an effect and professional judgement; and
- Best practice guidance (IEMA, 2023) and legislation.

8.6.8 A combination of the sensitivity of the receptor and the magnitude of effect would then be used to inform the significance of the effect as outlined in **Chapter 3: EIA Approach and Methodology**. For many effects there are no simple rules or formulae which define thresholds of significance and there is, therefore, a need for interpretation and judgement on the part of the assessor, backed up by data or quantified information where possible.

8.6.9 Standard mitigation measures that are likely to be included in the assessment are:

- Production of a Construction Traffic Management Plan; and
- A Staff Sustainable Access Plan.

8.6.10 An Abnormal Load Route Assessment (ALRA) will also be undertaken to confirm that the proposed route can accommodate the AILs and that their transportation will not have any detrimental effect on the proposed

22 The Scottish Government (2012) Transport Assessment Guidance [Online] Available at https://www.transport.gov.scot/media/4589/planning_reform_-_dpmtag_-_development_management__dpmtag_ref__17__-_transport_assessment_guidance_final_-_june_2012.pdf . (Accessed on 04/09/2023)
23 Institute of Environmental Management and Assessment (IEMA) (2023). IEMA Guidelines: Environmental Assessment of Traffic and Movement
24The Scottish Government (2023) National Planning Framework 4 [Online] Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/strategy-plan/2023/02/national-planning-framework-4/documents/national-planning-framework-4-revised-draft/national-planning-framework-4-revised-draft/govscot%3Adocument/national-planning-framework-4.pdf (Accessed 04/09/2023)
25 The Scottish Executive (2005). Planning Advice Note, PAN 75, Planning for Transport. Available at: https://www.gov.scot/binaries/content/documents/govscot/publications/publication/2005/08/planning-advice-note-pan-75-planning-transport/documents/0016795-pdf/0016795-pdf/govscot%3Adocument. (Accessed on 04/09/2023)

haulage route and will identify any additional off-site improvement works which are required in order to make the route viable.

8.7 Summary

8.7.1 There is only the potential for effects from traffic and transport during the construction phase of the Proposed Development. Once the trip generation numbers have been agreed, the final scope of the assessment, including plans for baseline data collection, will be discussed with Transport Scotland and THC.

9. GEOLOGY, HYDROLOGY, HYDROGEOLOGY AND SOILS

9.1 Introduction

9.1.1 This chapter will assess the potential effects relating to Geology, Hydrology, Hydrogeology, and Soils in relation to the construction and operation phases of the Proposed Development. This includes impacts on surface water and groundwater resources, Water Framework Directive (WFD) water body status objectives, and flood risk, alongside geology, soils, and peat.

9.1.2 The assessment of ground and water within this chapter will determine the baseline geological, hydrological, and hydrogeological conditions and establish the potential constraints associated with the Proposed Development. The assessment will be informed by publicly available resources, knowledge of the Proposed Development and of the existing 275 kV Loch Buidhe Substation.

Study Areas

9.1.3 The following study areas will be considered as part of the hydrological and hydrogeological assessment:

- Core Study Area: outlined by the Proposed Development boundary; and
- Wider Study Area: a 2 km buffer zone around the Core Study Area. The Proposed Development is not expected to impact the geological, hydrological, or hydrogeological environment outside of the Wider Study Area due to dilution and attenuation of potential pollutants.

9.1.4 The ground and water study areas are presented in **Appendix A, Figure 9.1**.

9.2 Baseline

9.2.1 An initial desk-based baseline review was undertaken to obtain information on geological, hydrological, and hydrogeological conditions and relevant receptors within the Core and Wider Study Areas. The following data sources were consulted as part of the initial baseline review:

- The Scottish Government's Scotland's Environment Map[26];
- Scottish Environment Protection Agency's (SEPA) Online Water Classification Hub[27];
- SEPA Flood Maps[28];
- NatureScot's Environmental Designations Map[29];
- The national soil map of Scotland[30];
- The Coal Authority Interactive Map Viewer[31];
- Zetica UXO Risk Maps[32];
- The British Geological Survey (BGS) 1:625,000 hydrogeology maps[33];
- The BGS 1:50,000 geology map[34];
- BGS GeoIndex Onshore mapping portal[35];
- Meteorological Office Rainfall Data[36];

[26] The Scottish Government. (2023) *Scotland's Environment Map*, accessed 23/05/2023 [Online], <https://map.environment.gov.scot/sewebmap/>.
[27] SEPA. (2015) *Online Water Classification Hub*, accessed 23/05/2023 [Online], <https://www.sepa.org.uk/data-visualisation/water-classification-hub>.
[28] SEPA. (2022) *Flood Maps*, accessed 23/05/2023 [Online}, <https://map.sepa.org.uk/floodmaps>.
[29] NatureScot. (2023) *Environmental Designations Map*, accessed 23/05/2023 [Online], < https://sitelink.nature.scot/map>.
[30] Scotland's soils. (2013) *National soil map of Scotland*, accessed 01/08/2023 [Online], <https://map.environment.gov.scot/Soil_maps/?layer=1>.
[31] The Coal Authority (2023) *Interactive Map Viewer*, accessed 07/09/2023 [Online], <https://mapapps2.bgs.ac.uk/coalauthority/home.html>.
[32] Zetica (2023) UXO Risk Map, accessed 07/09/2023 [Online] ,< https://zeticauxo.com/downloads-and-resources/risk-maps/>.
[33] British Geological Survey. (2022) *GeoIndex Onshore*, accessed 01/08/2023 [Online], <https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.108909826.161073475.1659437544-300955731.1659437544>.
[34] British Geological Survey. (2022) *GeoIndex Onshore*, accessed 01/08/2023 [Online], <https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.108909826.161073475.1659437544-300955731.1659437544>.
[35] British Geological Survey. (2022) *GeoIndex Onshore*, accessed 25/01/2024 [Online], <https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.108909826.161073475.1659437544-300955731.1659437544>.
[36] Meteorological Office. *UK Climate Averages* accessed 23/05/2023 [Online], <http://www.metoffice.gov.uk/public/weather/climate>.

- The National River Flow Archive (NRFA)[37];
- Ordnance Survey (OS) 1:50,000 (Digital); and
- OS 1:25,000 Map (Digital).

Site Context

9.2.2 The Site is located on the north-western slope of Meall Mò, adjacent to the south-western boundary of the existing 275 kV Loch Buidhe Substation. Access to the existing 275 kV Loch Buidhe Substation is taken off Lochbuie Road, to the north-west of the Site. The Site lies approximately 9.5km to the north-east of Bonar Bridge, within THC area, centred on Ordnance Survey National Grid Reference (OSNGR) 265194 E, 897429 N.

9.2.3 Currently, the Site comprises of commercial forestry, of which some has already been partially cleared, and bare ground. An unnamed surface watercourse (Unnamed Watercourse A) is present within the Site, draining in a north-westerly direction towards Allt Garbh-airigh. Further details on this watercourse are provided in **Section 0**.

9.2.4 Existing ground levels at the Site comprise an overall fall from approximately 230 m Above Ordnance Datum (AOD) in the south-east to approximately 200 m AOD in north-west adjacent to the existing 275 kV Loch Buidhe Substation access track.

Geology

9.2.5 The BGS GeoIndex Onshore mapping portal[38] includes general geological map data for the UK. Although the portal does include records of boreholes, shafts and wells from all forms of drilling and ground investigation work, there are none recorded within the vicinity of the Site.

9.2.6 The BGS 1:50,000 bedrock geology map shows that most of the Core Study Area is underlain by the Altnaharra Psammite Formation comprising Psammite and Micaceous Psammite. The very south of the Core Study Area adjacent to Loch an Lagain is underlain by Migdale Pluton comprising Monzogranite. Migdale Pluton comprising Monzogranite is also noted in a few isolated instances through the centre of the Core Study Area.

9.2.7 The BGS 1:50,000 superficial deposits map indicates that most of the Core Study Area is situated on superficial deposits comprising Peat with the very north and south of the Core Study Area as well as a few instances throughout the centre of the Core Study Area shown to be situated on Till and Morainic Deposits (Undifferentiated), comprising Diamicton, Sand and Gravel.

Contaminated Land

9.2.8 Activities associated with the Site's use as a forestry plantation, as well as subsequent tree felling in the northern site area, may have resulted in contamination associated with fuel and oils. Construction of the nearby existing 275k kV Loch Buidhe Substation may have also resulted in contaminants being present on the Site. These are activities typically unlikely to result in contamination. Therefore, it is considered unlikely for significant levels of contamination to be present at the Site. Furthermore, any spills that may have occurred would have been minor and would not have resulted in significant contamination resulting in potential risk to human health or environmental receptors and it is therefore proposed to be scoped out.

9.2.9 The Coal Authority Interactive Map Viewer[39] indicates that the Site does not lie in an area that has been affected by coal mining, which can be a source of contamination.

9.2.10 In addition to this the Zetica UXO (Unexploded Ordinance) Risk Map[40] indicates that the Site is located within an area of low risk for UXO, indicating that UXO and associated contaminants are unlikely to be present at the Site.

[37] National River Flow Archive. (2023) Accessed 23/04/2024 [Online], <https://nrfa.ceh.ac.uk/>.
[38] British Geological Survey. (2022) *GeoIndex Onshore*, accessed 25/01/2024 [Online], <https://mapapps2.bgs.ac.uk/geoindex/home.html?_ga=2.108909826.161073475.1659437544-300955731.1659437544>.
[39] The Coal Authority (2023) Interactive Map Viewer, accessed 07/09/2023 [Online] < https://mapapps2.bgs.ac.uk/coalauthority/home.html>
[40] Zetica (2023) UXO Risk Map, accessed 07/09/2023 [Online] ,< https://zeticauxo.com/downloads-and-resources/risk-maps/>

Soils

9.2.11 The national soil map of Scotland[41] indicates that most of the Core Study Area (excluding southern and western boundaries) is situated on component soils comprising peaty gleys with dystrophic blanket peat with peaty gleyed podzols; soils which are part of the Gleys major soil group and Peaty Gleys major soil subgroup. The very west, and south of the Core Study Area is shown to be situated on component soils comprising peaty gleyed podzols with dystrophic semi-confined peat with peaty gleys; soils which are part of the Podzols major soil group and the peaty gleyed podzols major soil subgroup.

9.2.12 The Carbon and Peatland Map 2016[42] details that the Site is mostly underlain by Class 5 peat. This is not designated as a high priority peatland habitat and is classified as "*Class 5 Peat: Soil information takes precedence over vegetation data. No peatland habitat recorded. May also include areas of bare soil. Soils are carbon-rich and deep peat*." Land on the northern and western Site boundary is classified as Class 1 and Class 2 peat, nationally important carbon-rich soils of high conservation value. Class 1 Peat is defined as "*Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas likely to be of high conservation value*" and Class 2 Peat is defined as "*Nationally important carbon-rich soils, deep peat and priority peatland habitat. Areas of potentially high conservation value and restoration potential*". However, no development is proposed in these areas.

9.2.13 The Site is within an area with a Land Capability for Agriculture (LCA) classification of 5.3 (land capable of supporting improved grassland) and therefore falls outwith the classes of Prime Agricultural Land (PAL – Classes 1, 2 and 3.1).

Surface Hydrology

9.2.14 The Site is located within the Scotland WFD River Basin District (RBD), in the catchment of the River Fleet to the north and the Dornoch Coastal to the south, and four nested catchments as outlined below:

- River Fleet – Loch Fleet to Rogart river catchment;
- Abhainn an t-sratha Charnaig river catchment;
- Loch Buidhe lake catchment; and
- Allt Garbh-airigh river catchment.

9.2.15 Based on an initial, high-level review of SEPA and OS data, the main WFD surface water bodies which are hydrologically connected to the Site are:

- Allt Garbh-airigh (SEPA ID: 20073) located approximately 75 m to the north of the Core Study Area and approximately 570 m to the north of the Site has an overall WFD waterbody classification of "Good". Allt Garbh-airigh is a tributary of Loch Buidhe;
- Loch Buidhe (SEPA ID: 100096) is located adjacent to the northern boundary of the Core Study Area and approximately 600 m to the north-east of the Site and has an overall WFD waterbody classification of 'High". Loch Buidhe covers are area of 60 hectares, receives an inflow via several watercourses to the north, west and south-east and outflows to the River Fleet via Abhainn an t-sratha Charnaig; and
- Abhainn an t-sratha Charnaig (SEPA ID: 20072) is located approximately 2 km to the north-east of the Site, downstream of Loch Buidhe, and has an overall WFD waterbody classification of "Good". Abhainn an t-sratha Charnaig drains in an overall easterly direction for approximately 18.4 km before discharging into the River Fleet.

9.2.16 The River Fleet (Loch Fleet to Rogart) (SEPA ID: 23390) and Loch Fleet are downstream of the Site, located approximately 10.7 km and 11.3 km to the east of the Site, respectively. The River Fleet has an overall WFD waterbody classification of "Moderate", whilst Loch Fleet has an overall WFD waterbody classification of

[41] Scotland's soils. (2013) *National soil map of Scotland*, accessed 01/08/2023 [Online], <https://map.environment.gov.scot/Soil_maps/?layer=1>.
[42] Scotland's Environment, Carbon & Peatland 2016. Available at: https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/ accessed 25/01/2024

"Good". However, due to the distance between these waterbodies and the Site, they have been scoped out of further assessment.

9.2.17 The River Evelix (SEPA ID: 20079) is located within the Wider Study Area and has an overall WFD waterbody classification of "Good". However, due to topography and existing forestry drainage the River Evelix is hydrologically disconnected from the Proposed Development and has been scoped out of further assessment.

9.2.18 Based on a high-level review of OS data and information contained within the UK Centre for Ecology & Hydrology (UKCEH) Flood Estimate Handbook (FEH) web service mapping, further non-WFD surface water features have been identified within the Wider Study Area, with those hydrologically connected to the Site listed below:

- Unnamed Watercourse A is a drainage channel located within the Site boundary. Originally, this watercourse drained in a north-westerly direction across the north-eastern area of the Site. However, commercial forestry practices across this area are thought to have modified the upstream course of this watercourse. Aerial imagery indicates that Unnamed Watercourse A now drains along the boundary between the existing forestry line and area of cleared forestry. To the north of the Site, this watercourse enters a culvert, draining under the access road of the existing 275 kV Loch Buidhe Substation, before continuing in a north-westerly direction, under Lochbuie Road, and towards Allt Garbh-airigh. Originally, Unnamed Watercourse A would likely have drained in a northerly direction across land to the north of Lochbuie Road, however, satellite imagery suggests this watercourse now drains west and then north but ultimately still discharges into Allt Garbh-airigh;
- Unnamed Watercourse B is a roadside ditch located within the Core Study Area, adjacent to eastern side of Lochbuie Road. Satellite imagery suggests that there are two culverted outfalls from this drainage ditch, both under Lochbuie Road, one to the north which outfalls to Unnamed Watercourse C, and a second to the south which outfalls to Alltan Dubh; and
- Alltan Dubh is located within the western area of the Core Study Area, on the other side of Lochbuie Road, as is a tributary of Allt Garbh-airigh.

9.2.19 The surface hydrology baseline is presented in **Appendix A, Figure 9.2**.

Hydrogeology

9.2.20 The BGS 1:625,000 hydrogeology map shows the bedrock unit is classified as 'low productivity aquifers' whereby small amounts of groundwater may be present in near surface weathered zones and secondary fractures.

9.2.21 The Site is shown to be situated on the Northern Highlands Groundwater Body (SEPA ID: 150701), which has an overall WFD classification of "Good". Further downstream from the Site, the River Fleet drains across land underlain by the Dornoch Groundwater Body (SEPA ID: 150544) that has an overall WFD classification of "Good".

Private Water Supplies

9.2.22 Publicly available mapping provided by THC indicates that there are three known PWS within 2 km of the Core Study Area, namely PWS Sleasdaraidh, PWS Reidbreac Croft, and PWS Craigton Farm. All three PWS are located to the south-west of the Site. PWS Sleasdaraidh provides a domestic supply from a spring, whilst PWS Reidbreac Croft and PWS Craigton Farm provide a domestic supply from groundwater spring. As all three PWS are located within the Dornoch Coastal catchment rather than the River Fleet catchment, they are likely to be hydrologically disconnected from the Proposed Development.

Public Water Supplies

9.2.23 Based on an initial, high-level review of SEPA data, there is one Surface Drinking Water Protected Area (DWPA) within the Wider Study Area, Loch a' Ghobhair loctaed approximately 2 km south of the Site. Loch a' Ghobhair is hydrologically disconnected from the Proposed Development by topography and has been scoped out of further assessment. However, the Site is located within a DWPA (Ground). An assessment of the potential effects on the groundwater resource and DWPA (Ground) will be undertaken within the EIA Report.

9.2.24 The public and private water supply baseline is presented in **Appendix A, Figure 9.3**.

GWDTE

9.2.25 The Extended Phase 1 Habitat Survey and corresponding NVC Survey identified areas of Low, Moderate and High potential for GWDTE habitats. Areas of Moderate potential are associated with the rides through the existing forestry, whilst areas of High potential are associated with land between the existing forestry on the Site and Unnamed Watercourse A. Further assessment will be undertaken as part of the EIA.

Designated Hydrological Receptors

9.2.26 A review of NatureScot (formerly Scottish Natural Heritage) GIS datasets available through the Scotland's Environment mapping service[43] was used to identify statutory designated sites related to the water environment within the Wider Study Area.

9.2.27 Statutory designations include those of international importance, e.g., SACs, SPAs and Wetlands of International Importance (Ramsar); those of national importance, such as SSSIs and National Nature Reserves (NNR); and those of local importance, i.e., Local Nature Reserves (LNR).

9.2.28 Statutory designated sites within the Wider Study Area and their hydrological connectivity to the Proposed Development are detailed in **Table 9.1**. There are no Ramsar sites, NNR, or LNR within the Wider Study Area.

Table 9.1: Designated Hydrological Receptors within the Wider Study Area

Designated Receptor	Distance from Proposed Development	Qualifying Interest	Hydrological Connection to Proposed Development
SACs			
River Evelix	200 m south-east	Freshwater pearl mussel	Hydrologically disconnected from the Proposed Development by topography
SPAs			
Strath Carnaig and Strath Fleet Moors	Within the Proposed Development	Hen harrier (Circus cyaneua), breeding	Whilst hydrologically connected to the Proposed Development, breeding hen harriers aren't directly impacted by geology, hydrology, and hydrogeology
SSSIs			
Strath Carnaig and Strath Fleet Moors	Within the Proposed Development	Hen harrier (Circus cyaneus), breeding	Whilst hydrologically connected to the Proposed Development, breeding hen harriers are not directly impacted by geology, hydrology, and hydrogeology

Flood Risk

9.2.29 The Indicative SEPA Flood Map[44] shows areas of Scotland with a 0.1% Annual Exceedance Probability (AEP) or greater chance of flooding. The indicated flood extents are classified into areas of river, surface water and coastal flooding with a risk rating of low (0.1% AEP) to high (10% AEP) applied. This mapping also shows areas which could have a 0.5% AEP chance of flooding from either rivers or the sea by the 2080s.

9.2.30 A preliminary review of the Indicative SEPA Flood Map shows that the Proposed Development is not at risk of coastal flooding or river flooding now or in the future, with a less than 0.1% AEP chance of flooding from the sea in any given year. Loch Buidhe, Alltan Dubh, Allt Garbh-airigh, and Loch an Lagain are shown to have a high risk (10% AEP) of river flooding, however, this is not shown to impact the Site.

9.2.31 Most of the Proposed Development is also shown to remain free from surface water flooding, with no surface water flood flow paths indicated within the Site boundary. Areas of increased surface water flooding are associated with the existing forest rides, whereby linear trackways designed for access have been included between areas of forestry plantation. Surface water flood risk within these areas is likely indicative of artificial

[43] NatureScot. (2023) *SiteLink*, accessed 23/05/2023 [Online], <https://sitelink.nature.scot/map>.
[44] SEPA. (2022) *Flood Maps*, accessed 24/05/2023 [Online}, <https://map.sepa.org.uk/floodmaps>.

drainage channels used to manage surface water within the area of commercial forestry. A site-specific Flood Risk Assessment should not be necessary but should be confirmed with SEPA and THC as part of the Scoping Opinion.

9.2.32 The Proposed Development will likely remove these areas of increased surface water flood risk, however, an outline surface water drainage strategy and outline CEMP should be provided with the ES to ensure the Proposed Development does not increase surface water flood risk as the result of the introduction of impermeable surfaces.

9.3 Sensitive Receptors

9.3.1 The assessment within the EIA chapter will assess effects likely during the construction and operation of the Proposed Development. Key sensitive receptors are likely to be:

- All surface waterbodies immediately downstream of and in hydrological connection to the Site and construction works;
- Potential hydrologically connected private and public water supplies;
- Potential hydrologically connected GWDTEs;
- Peat; and
- The Northern Highlands Groundwater Body.

9.4 Issues Scoped Out

9.4.1 Assessment of potential effects on the following receptors are proposed to be scoped out:

- Receptors at distances greater than 2 km from the Proposed Development, as dilution and attenuation will mitigate pollution and sedimentation effects on the water environment. This includes the River Fleet and Loch Fleet;
- Surface water receptors not hydrologically connected to the Proposed Development as there is no impact pathway. This includes the River Evelix (SEPA ID: 20079);
- All designated receptors, as there are no hydrologically connected and hydrologically dependent designated sites within the Wider Study Area;
- Agricultural land use capability; and
- Transboundary effects.

9.5 Potentially Significant Effects

Construction

9.5.1 The construction of the Proposed Development has the potential to cause the following effects:

- Impediments to near-surface water and drainage to all watercourses as a result of construction;
- Potential chemical pollution and sedimentation of surrounding waterbodies from general construction activities (spillage);
- Acidification of watercourses as a result of construction works and related tree felling;
- Potential effects on the hydrological function of GWDTEs;
- Changes to groundwater interflow patterns from temporary works such as physical cut-offs or dewatering for foundations, affecting the hydrologically connected groundwater bodies and leading to reduced function of or severance of flow to GWDTEs;
- Reduced quality, quantity or continuity of supply for public or private water supplies due to changes in groundwater, near-surface or surface water flow;
- Increase in surface water runoff and flood risk due to increased impermeable hardstanding as part of the Proposed Development;
- The disturbance of deep peat (peat depths greater than 1.0 m) through construction activities;

- The compaction of peat and soils through construction activities;
- The loss of peatland habitat throughout the development;
- Peat slide events that occur as a result of construction activities; and
- Cumulative effects if the potential effects arising from the Proposed Development are in combination with other relevant projects or activities.

Operation and Maintenance

9.5.2 The operation of the Proposed Development has the potential to cause surface water increased run-off from increased hardstanding, if a suitable surface water drainage system is not installed.

Mitigation

9.5.3 Embedded mitigation measures will be developed prior to and during design of the Proposed Development, as well as through best practice guidance and environmental management plans during the construction phase including GEMPs developed for the Applicant During operation, procedures will be carried out in line with the SEPA General Pollution Prevention guidance.

9.5.4 Likely significant effects to be considered in the EIA include:

- Release of chemical pollutants;
- Increased sediment loads;
- Creation of preferential drainage pathways due to increased impermeable surfaces;
- Alteration of sub-surface flows; and
- Effects on GWDTEs.

9.6 Assessment Methodology

9.6.1 The geology, hydrology, hydrogeology, and soils study area (the Core Study Area) is defined by the Proposed Development boundary. A study area of 2 km from the Core Study Area will be defined to assess the potential effects on PWS (the PWS Study Area), and to assess potential effects on the ground and water environment.

9.6.2 The EIA Chapter will describe the potential effects of the Proposed Development including:

- A desk based assessment;
- Details of consultation undertaken;
- Assessment methodologies for the construction phase;
- Hydrological walkover survey details and results;
- Assessment of the operational phase of the Proposed Development to establish the effect on the ground and water resource;
- Identify mitigation measures, where necessary;
- Identify any residual effects following mitigation;
- Cumulative assessment with other developments within 10 km of the Proposed Development; and
- Statement of significance in accordance with the EIA Regulations.

9.6.3 This is based on the source-pathway-receptor approach (i.e., 'pollutant linkages') to identify potential sources of contamination, human and environmental receptors, and the different pathways that connect the source to the receptor.

9.6.4 Effects will be assessed using standard impact assessment methods (receptor value / sensitivity versus magnitude of impact) as outlined in **Chapter 3: EIA Approach and Methodology**.

9.6.5 Where possible, a 50 m watercourse buffer should be maintained between any natural watercourses within the Site and the Proposed Development. A Site visit will be required as part of the EIA process start up works to confirm the location and condition of the existing watercourses at the Site, as they may be already compromised or altered by previous forestry activity at the Site. Where any watercourse requires diversion or

removal to facilitate the Proposed Development, best practice guidance should be followed, and a permit obtained from SEPA. In this instance, as part of the EIA process, an ecologist and WFD specialist will be required to assess the watercourse to determine its value. Subsequently, a pre-application enquiry will be submitted to SEPA to confirm the permitting process and the detail that needs to be submitted; this should be submitted during the EIA process. Providing the watercourse is less than 3 m wide, an application for a simple CAR licence will be submitted to SEPA. The application process should commence following detailed design of the Proposed Development. A CEMP will be provided as part of the submission to outline mitigation measures proposed.

9.6.6 In addition, the following will be provided as a technical appendix to the EIA Report Chapter if required:

- GWDTE assessment;
- Outline Peat Management Plan (oPMP);
- Peat Slide Risk Assessment (PSRA);
- Phase 1 Contaminated Land Risk Assessment;
- PWS Risk Assessment (PWSRA); and
- Outline Surface Water Drainage Strategy.

Desk Study

9.6.7 The desk study will include the following, to inform the geology, hydrology, hydrogeology, and soils assessment:

- Review of relevant legislation, guidance and best practice;
- Review of published data and maps;
- Identification of surface water features and drainage patterns;
- Delineation of surface water catchments;
- Identification of solid, surface (superficial) and subsurface (bedrock) geology units;
- Identification of hydrogeological units and corresponding aquifer productivity classes for water supply;
- Collation of data on public and private water supply abstractions and supplies;
- Identification of wetland habitats with groundwater dependency, including assessment of peat depths and presence of GWDTEs;
- Identification of statutory designated sites related to the hydrological environment; and
- Identification of other similar developments within 10 km.

Consultation

9.6.8 In addition to consultation undertaken as part of the EIA Scoping Report with statutory consultees, consultation with THC Environmental Health Officer (EHO) and SEPA will be sought to obtain information on PWS within the Wider Study Area and hydrologically connected to the Proposed Development. This should confirm the accuracy of the online data and identify any additional PWS within the PWS Study Area. Properties identified to have a potential hydrological connected to the Proposed Development will be contacted via a questionnaire and site visits will verify the information provided, where necessary. Site visits would be carried out following receipt of the scoping opinion, as part of the EIA process in the starting up works. The assessment of PWS will follow a source-pathway-receptor model.

9.6.9 Scottish Water will also be consulted, as part of the EIA process start up works, to determine whether public water supply assets that could be affected by the Proposed Development are within the Site boundary or the Wider Study Area.

9.6.10 As the Site is not indicated to be at high risk of flooding from any sources, a site-specific FRA is not deemed necessary. However, consultation should be held with SEPA to confirm.

9.6.11 Whilst Allt Garbh-airigh, Loch Buidhe, and Abhainn an t-sratha Charnaig are WFD classified surface waterbodies downstream of the Proposed Development and the Site is situated on the Northern Highlands

WFD groundwater body, the Proposed Development is not anticipated to have a detrimental impact on the chemical and/or ecological status of a waterbody or to prevent improvements that may otherwise result in a waterbody meeting its WFD objectives. As such, a WFD compliance assessment is not deemed necessary. However, consultation should be help with SEPA to confirm. Where a WFD compliance assessment is deemed necessary, the methodology outlined in **Section 0** should be applied.

Site-based Survey

Hydrological Surveys

9.6.12 A hydrological walkover survey will be conducted within the Site boundary to:

- Verify and ground-truth watercourse locations and waterbodies, as well as identify any springs;
- Assess the source of waterbodies;
- Identify the location and nature of GWDTEs (e.g., whether ombrotrophic or heavily modified by drainage); and
- Identify nature of watercourses considering watercourse crossings and access track routes.

9.6.13 In addition, if PWS are identified as at risk from works associated with the Proposed Development, the properties which are supplied by the PWS will be visited and the PWS infrastructure and source location surveyed where possible, to inform a PWS risk assessment.

Peat and Soils Surveys

9.6.14 Peat Probing will consist of two phases. Phase 1 peat probing would comprise a 100 m x 100 m grid within forested areas of the Site, where access is anticipated to be limited, and a 50 m x 50 m grid across felled areas of the Site. This will be supplemented by Phase 2 peat probing, undertaken post Scoping to inform the EIA. The Phase 2 probing will be advanced to obtain further data, where applicable, and to focus on any layout variations following design freeze. Phase 2 peat probing will also comprise probing at 50 m centres along any proposed tracks with 10 m - 25 m offsets either side to allow for micro-siting. Phase 2 peat probing will also comprise probing at 50 m centres along any proposed tracks with 10 m - 25 m offsets either side to allow for micro-siting.

9.6.15 This approach is in accordance with Scottish Government guidance Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition)[45]. If required, the information gathered will be utilised in preparation of a Peat Safety Risk Assessment (PSRA) and an outline Peat Management Plan (oPMP) which will accompany any subsequent application.

GWDTE Assessment

9.6.16 The Ecology, Ornithology and Nature Conservation Chapter will identify each NVC community and their potential to be groundwater dependent, making reference to SEPA Guidance Note 31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems[46]. A hydrogeological survey will be undertaken to consider the condition of the GWDTE and determine if it is truly groundwater dependent or ombrotrophic (rainwater fed). Measures to safeguard groundwater fed communities will be compliant with SEPA guidance. The GWDTE assessment will be reported within the Ecology, Ornithology and Nature Conservation Chapter of the ES, with reference made to the Geology, Hydrology, Hydrogeology, and Soils Chapter.

PSRA

9.6.17 Should significant quantities of peat be present within the Site (as determined by the parameters discussed in the bullet points below), a PSRA will be undertaken in accordance with the Scottish Government guidance 'Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation

[45] Scottish Government (2017) *Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition), accessed 07/09/2023* [Online] < https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2017/04/peat-landslide-hazard-risk-assessments-best-practice-guide-proposed-electricity/documents/00517176-pdf/00517176-pdf/govscot%3Adocument/00517176.pdf>

[46] SEPA. (2014) *Land Use Planning System SEPA Guidance Note 31*, accessed 23/05/2023 [Online], <https://www.sepa.org.uk/media/143868/lupsgu31_planning_guidance_on_groundwater_abstractions.pdf>.

Developments (Second Edition)'[47] along with full consultation with the relevant consultees. The presence of significant quantities of peat is determined by:

- Direct observations of peat during a Site walkover;
- Reference to published geology; and
- Site Investigations (peat depths >0.5m on Site).

9.6.18 The PSRA will contain detailed analysis and reporting on the design freeze and will include a hazard and slope stability assessment and preliminary peat management recommendations.

9.6.19 The hazards existing on the Site will be ranked based on factors that influence stability, namely peat depth and slope gradient. In addition, potential receptors exposure to risk will be established and hazard rankings applied across the Site, with management and mitigation measures recommended for an acceptable construction.

oPMP

9.6.20 An oPMP will accompany the EIA Report which will include high level estimation on peat excavation and re-use volumes. This will be based on the approximate infrastructure dimensions and anticipated re-use streams. The oPMP will:

- Define the materials that will be excavated as a result of the Proposed Development, focusing specifically on the excavation of peat;
- Determine volumes of excavated arisings, the cut/fill balance of the Proposed Development and proposals for re-use or reinstatement using excavated materials; and
- Detail management techniques for handling, storing and depositing peat for reinstatement.

WFD Compliance Assessment

9.6.21 If consultation with SEPA confirms that a WFD Compliance Assessment is necessary, the following methodology should be agreed with SEPA and applied during the EIA process.

9.6.22 A WFD compliance assessment considers the effects of a Proposed Development in respect of the European Communities Water Framework Directive 2006/60/EC (WFD), which has been retained in UK law following the UK's exit from the European Union. The WFD is implemented in Scotland under the Water Environment and Water Services (Scotland) Act 2003. Consideration of the WFD is required for projects that have the potential to detrimentally impact the chemical and/or ecological status of a waterbody or to prevent improvements that may otherwise result in a waterbody meeting its WFD objectives. The WFD aim is for all waterbodies to be at good status.

9.6.23 In a WFD compliance assessment consideration must be shown if an activity has the potential to:

- Cause or contribute to deterioration of the status of a surface water or groundwater water body; and
- Prevent the waterbody achieving good status in the future.

9.6.24 There is no specific guidance produced by SEPA for undertaking a WFD assessment in Scotland. Therefore, the assessment will follow the three staged approach in accordance with Environment Agency guidance for completing WFD assessments and the Planning Inspectorate's Advice Note Eighteen published in June 2017:

- Stage 1 (Screening) - Excludes any activities that do not need to go through the scoping or impact assessment stages.
- Stage 2 (Scoping) - Identifies the receptors such as morphology, habitats, fish, invasive non-native species (INNS) and protected areas that are potentially at risk from the activities of the Onshore Scheme and need impact assessment.

[47] Scottish Government (2017) *Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition), accessed 07/09/2023* [Online] < https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2017/04/peat-landslide-hazard-risk-assessments-best-practice-guide-proposed-electricity/documents/00517176-pdf/00517176-pdf/govscot%3Adocument/00517176.pdf>

- Stage 3 (Impact Assessment) - Considers the potential impacts of the activities taking into consideration embedded mitigation, identifies additional mitigation if required, and shows if the activities may cause deterioration or prevent the waterbody achieving good status.

Questions for Consultees

9.6.25 The following consultation questions are suggested for THC to ensure that the proposed methodologies and assessment are carried out in a robust manner and to the satisfaction of the determining authorities:

- Are consultees content with the proposed methodology and scope of the geology, hydrology, hydrogeology, and soils assessment?
- Do SEPA agree that a site-specific Flood Risk Assessment is not required for the Proposed Development?
- Do SEPA agree that a WFD Compliance Assessment is not required for the Proposed Development?
- Does THC, NatureScot, SEPA or other consultees have any information that would be useful in the preparation of the geology, hydrology, hydrogeology, and soils assessment?

9.7 Summary

9.7.1 Impacts on geology, hydrology, hydrogeology, and soils will be assessed using a standard significance matrix. A baseline understanding of the Core Study Area and Wider Study Area will be developed to determine overall sensitivity of hydrological, hydrogeological, and geological receptors in relation to the magnitude of effects.

9.7.2 Effects currently scoped out include designated receptors, agricultural land use capability, transboundary effects, and surface water and groundwater bodies not hydrologically connected to the Proposed Development, or at distances greater than 2 km from the Proposed Development.

10. NOISE AND VIBRATION

10.1 Introduction

10.1.1 This chapter provides a brief overview of the noise and vibration baseline conditions, the potential effects associated with the construction and operation of the Proposed Development and the proposed scope of assessment methodology to be considered in the EIA Report.

10.2 Baseline Conditions

10.2.1 The Proposed Development is located within a predominantly rural area and hosts existing electricity transmission infrastructure. The main settlement within the vicinity of the Proposed Development is a small hamlet of Clashbhan, approximately 400 m south of the Proposed Development.

10.2.2 A survey of the background ($L_{A90,T}$) ambient noise ($L_{Aeq,T}$), and 1/3rd octave band spectrum levels will be conducted to determine the existing noise level in the area and at any nearby noise sensitive receptors (NSRs) likely to be affected by the noise in accordance with BS 4142[48]. To ensure that values are reliable and representative of the outdoor amenity of NSRs, a minimum of 1-week continuous background monitoring must be conducted.

10.2.3 As the survey is based on long-term unattended measurements, a meteorological station will also be set up in the area to monitor for appropriate weather conditions. Meteorological conditions such as wind and rain will affect background noise (BGN) conditions and have possible effects on noise propagation. Measurements will be conducted every 15 minutes to coincide with the measured noise data.

10.2.4 Detailed ordinance survey maps and satellite imagery will be used to identify the potential NSRs. Receptors chosen will be representative of the closest residential properties surrounding the Proposed Development, and measurement locations agreed with the Local Authority prior to measurement.

10.3 Sensitive Receptors

10.3.1 NSRs are defined in the context of this assessment as residential properties located within 1.5 km of a nominal centre of the Proposed Development, which is a typical distance beyond which the noise impact of the Proposed Development is deemed unlikely due to the typical sound levels of sources. Where properties lie in groups rather than alone, one location may be chosen as being representative of several properties that would produce duplicate readings. The noise assessment conducted for these properties will be based on the predicted highest (worst case) noise impact from the Proposed Development, and therefore if the chosen properties meet noise criteria, then any property at greater distances will also pass the criteria. The noise assessment conducted for these properties will have the highest noise impact from the Proposed Development, and therefore if the chosen properties meet noise criteria, then any property at greater distances will also pass the criteria.

10.4 Issues Scoped Out

10.4.1 There are no known vibrational noise issues associated with the operation of the Proposed Development at nearby NSRs. Therefore, it is proposed that operational vibration is scoped out of the EIA assessment.

10.5 Potentially Significant Effects

10.5.1 At this preliminary stage, it is anticipated that possible effects associated with construction and operation of the Proposed Development include:

- noise and vibration during the construction phase; and
- operational effects of noise from the substation including but not limited to transformers, reactors, capacitors, cooling, and air handling units.

[48] British Standard 4142: Methods for rating and assessing industrial and commercial sound (BS 4142), BSI, 2014, Amended 2019

Construction Noise

10.5.2 There is the potential for construction noise impacts from static, quasi static and mobile plant items including;

- potential for crushing of rock;
- potential for peat removal and/or rotary piling during the construction of foundations;
- excavators, delivery of materials with lorries/dumper trucks, delivery and pumping of concrete; and
- installation of electrical infrastructure equipment.

Operational Noise

10.5.3 Transformers and other electrical equipment associated with substation developments emit noise at frequencies of twice the normal operating current frequency due to magnetostriction of the transformer core. In the UK the supply current frequency is 50 Hertz (Hz), which results in 100 Hz and harmonics thereof being produced by the transformer. The nature of the noise generation mechanism results in tonal noise being emitted. The noise is continuous and consistent depending on the electrical load of the equipment, and therefore is not expected to have any impulsive characteristics.

10.6 Assessment Methodology

10.6.1 The methodology of assessment is identified below, for consideration by the Local Authority Environmental Health Officer (EHO). If acceptable to the EHO, then, following adoption of the scoping opinion, the methodology will be implemented and reported on within the EIA report.

Construction Noise and Vibration

The assessment of construction noise will comply with the following standards and guidance.

British Standard 5228-1/2:2009 +A1:2014 (BS5228), Code of Practice for Noise and Vibration Control on Construction and Open Sites

10.6.2 Guidance on the prediction and assessment of noise and vibration from construction sites is provided in British Standard (BS) 5228 2009 +A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites.

10.6.3 Part 1: Noise. BS5228-1 provides recommended limits for noise from construction sites.

10.6.4 The construction noise impact assessment (CNIA) would be carried out according to the ABC method specified in Table E.1 of BS5228-1, in which noise sensitive receptors (NSRs) are classified in categories A, B or C according to their measured or estimated background noise level.

10.6.5 In line with best practice (BS 5228-1), a Construction Noise Management Plan (CNMP) will be developed by the principal contractor prior to starting construction works. The details of the CNMP will be agreed with The Highland Council and is expected to be secured by an appropriately worded planning condition.

10.6.6 Part 2: Vibration. BS5228-2 provides recommended limits for vibration from construction sites.

10.6.7 The construction vibration impact assessment (CVIA) will be carried out against the guidance on effects of vibration levels specified in Table B.1 of BS5228-2. The level of vibration ranging from 0.14 $mm.s^{-1}$ to 10 $mm.s^{-1}$ indicates where vibration may be perceptible however acceptable, or intolerable.

10.6.8 Construction activities that induce vibration are likely to be limited to potential piling activities.

10.6.9 Potential of heavy goods vehicle (HGV) vibration on receptors along haul roads will be predicted using the procedures in Transport and Road Research Laboratory (TRL) Research Report 246 – Traffic Induced Vibrations in Buildings.

Operational Noise

10.6.10 The assessment of operational noise will comply with the following standards and guidance.

Planning Advice Note (PAN) 1/2011: 'Planning and Noise'

10.6.11 Published in March 2011, this document provides advice on the role of the planning system in helping to prevent and limit adverse effects of noise (Scottish Government, 2011). Information and advice on noise assessment methods are provided in the accompanying Technical Advice Note (TAN): Assessment of Noise. Included within the PAN document and the accompanying TAN are details of the legislation, technical standards, and codes of practice for specific noise issues.

10.6.12 Neither PAN 1/2011 nor the associated TAN provides specific guidance on the assessment of noise from fixed plant, but the TAN includes an example assessment scenario for 'New noisy development (incl. commercial and recreation) affecting a noise sensitive building', which is based on BS 4142:1997: Method for rating industrial noise affecting mixed residential and industrial areas. This British Standard has been replaced with BS 4142:2014: Methods for rating and assessing industrial and commercial sound.

British Standard 4142:2014+A1:2019: Methods for rating and assessing industrial and commercial sound (BS 4142)

10.6.13 British Standard 4142 describes methods for rating and assessing the following:

- Sound from industrial and manufacturing processes.
- Sound from fixed installations which comprise mechanical and electrical plant and equipment.
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises.
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train movements on or around an industrial and/or commercial site.

10.6.14 The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

10.6.15 In accordance with the assessment methodology, the specific sound level (LAeq,T) of the noise source being assessed is corrected, by the application corrections for acoustic features, such as tonal qualities and/or distinct impulses, to give a "rating level" (LAr,Tr).The British Standard effectively compares and rates the difference between the rating level and the typical background sound level (LA90,T) in the absence of the noise source being assessed.

10.6.16 The British Standard advises that the time interval ('T') of the background sound measurement should be sufficient to obtain a representative or typical value of the background sound level at the time(s) when the noise source in question is likely to operate or is proposed to operate in the future.

10.6.17 Comparing the rating level with the background sound level, BS 4142 states:

- "Typically, the greater this difference, the greater the magnitude of impact.
- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."

Noise Rating Curves and BS8233:2014

10.6.18 The Noise Rating - NR - curve is developed by the International Organization for Standardization (ISO 1973) to determine the acceptable indoor environment for hearing preservation, speech communication and annoyance.

10.6.19 The noise rating graphs for different sound pressure levels are plotted as acceptable sound pressure levels at different frequencies. Acceptable sound pressure level varies with the room and the use of it. Different curves are obtained for each type of use. Each curve is referenced by a NR number (see **Table 10.1**).

Table 10.1: Noise Rating

Noise Rating	Application
NR 20	Quite rural area (council defined) for protection of amenity
NR 25	Concert halls, broadcasting and recording studios, churches
NR 30	Private dwellings, hospitals, theatres, cinemas, conference rooms
NR 35	Libraries, museums, court rooms, schools, hospitals operating theatres and wards, flats, hotels, executive offices
NR 40	Halls, corridors, cloakrooms, restaurants, night clubs, offices, shops
NR 45	Department stores, supermarkets, canteens, general offices
NR 50	Typing pools, offices with business machines
NR 60	Light engineering works
NR 70	Foundries, heavy engineering works

10.6.20 British Standard 8233:2014: Guidance on sound insulation and noise reduction for buildings provides guidance for the control of noise in and around buildings. The guidance provided within the document is applicable to the design of new buildings, or refurbished buildings undergoing a change of use, but does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building.

10.6.21 The guidance provided includes appropriate internal and external noise level criteria which are applicable to dwellings exposed to steady-state external noise sources. It is stated in the British Standard that it is desirable for internal ambient noise level not to exceed the criteria set out in **Table 10.2**.

Table 10.2: Summary of internal ambient noise level criteria for dwellings from with BS 8233:2014

Activity	Location	Period	
		07:00 to 23:00 Hours, i.e. Daytime	**23:00 to 07:00 Hours, i.e. Night-time**
Resting	Living Room	35 dB LAeq,16 hour	-
Dining	Dining Room/Area	40 dB LAeq,16 hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16 hour	30 dB LAeq,8 hour

10.7 Mitigation

10.7.1 As part of the impact assessment process, mitigation measures will, where possible, be identified within the EIA Report that would reduce the level of predicted noise impacts, particularly where this is necessary to avoid significant adverse effects. Two types of measure can be distinguished, as follows:

- mitigation measures, aimed at managing potential impacts of moderate or major significance to reduce residual effects to an acceptable level; and

- measures including adoption of good practice aimed at managing potential effects of minor significance.

Construction Noise

10.7.2 A full noise impact assessment will be performed for construction noise associated with the Proposed Development. *British Standard (BS) 5228 2009 +A1:2014* provides recommended limits for noise from construction sites to meet a maximum 65 dB limit at receptors.

10.7.3 Construction noise due to traffic also has a potential to cause impact. Vehicle movements of the construction equipment on the access tracks and main roads will be estimated to find the noise impact on nearby noise sensitive receptors. These will be summed with the activity of onsite noise.

10.7.4 Even if the construction noise limit is met, it is best practice that construction noise should continue to be controlled with a Construction Noise Management Plan (CNMP), in accordance with the guidance and procedures outlined in BS 5228-1. Procedures which will be elaborated upon further in the EIA Report, will include:

- minimising the noise as much as is reasonably practicable at source;
- attenuation of noise propagation;
- carrying out identified high noise level activities at a time when they are least likely to cause a nuisance to residents; and
- providing advance notice of unavoidable periods of high noise levels to residents.

10.7.5 In order to maintain low impact on the noise environment, consideration will be given to attenuation of construction noise at source by means of the following:

- giving due consideration to the effect of noise, in selection of construction methods;
- avoidance of vehicles waiting or queuing, particularly on public highways or in residential areas with their engines running;
- scheduling of deliveries to arrive during daytime hours only. Care should be taken to minimise noise while unloading delivery vehicles.
- ensure plant and equipment are regularly and properly maintained. All plant should be situated to sufficiently minimise noise impact at nearby properties;
- fit and maintain silencers to plant, machinery, and vehicles where appropriate and necessary;
- operate plant and equipment in modes of operation that minimise noise, and power down plant when not in use;
- use electrically powered plant rather than diesel or petrol driven, where this is practicable; and
- working typically will not take place outside of hours defined in the construction schedule.

10.7.6 Consideration will be given to the attenuation of construction noise in the sound transmission path by means of the following:

- locate plant and equipment liable to create noise as far from noise sensitive receptors as is reasonably practicable or use natural land topography to reduce line of sight noise transmission;
- noise screens, hoardings and barriers should be erected where appropriate and necessary to shield high-noise level activities; and
- provide lined acoustic enclosures for equipment such as static generators and when applicable portable generators, compressors and pumps.

10.7.7 In setting working hours, consideration is given to the fact that the level of noise through the normal working day is more easily tolerated than during the evening and night-time.

10.7.8 Best practice measures will be put in place during Construction to mitigate impacts from noise and vibration. The measures will be included in the CEMP, to be agreed with Highland Council and secured by an appropriately worded planning condition and will include best practice measures as outlined in BS 5228 such as:

- Avoiding undertaking noisy activities at the weekends or outside of daytime defined hours where possible. In setting working hours, consideration is given to the fact that the level of noise through the normal working day is more easily tolerated than during the evening and night-time. Selecting quiet working methods, including the use of inherently quiet plant/equipment, reasonable working hours for noisy operations, and economy and speed of operations. Site work continuing throughout at 24-hour period should be programmed, where appropriate, including scheduling of haulage vehicles during the working day;
- Avoidance of vehicles waiting or queuing, particularly on public highways or in residential areas with their engines running; and
- Ensuring plant and equipment are regularly and properly maintained. All plant should be situated to sufficiently minimise noise impact at nearby properties.

Operational Noise

10.7.9 A detailed noise impact assessment is required to determine the extent of mitigation required for the site to reduce the impact on NSRs. If a noise impact assessment finds that mitigation is required, it will likely be around the externally housed equipment of the Proposed Development to curtail the noise impact on the critical receptors. The most effective mitigation is to procure low noise equipment at source. If noise impacts remain then additional mitigation may be required, which may come in the form of barriers within the site, bunds around the site, or building at lower platform heights, effectively “sinking” the site to reduce direct noise propagation to NSRs. Further modelling will be conducted to investigate the impact of bunding around the site, platform height reduction and acoustic barriers.

10.8 Summary

10.8.1 This chapter outlines the tasks to be undertaken during the EIA with regards to Noise and Vibration. Any potential impacts likely to have a significant effect on the NSRs with respect to operational noise and construction noise of the Proposed Development, will be evaluated within the EIA Report.

10.8.2 Mitigation measures will be proposed, where required, for likely significant effects.

10.8.3 Operational noise limits (in line with best practice guidance) will be agreed with The Highland Council (THC). Appropriate mitigation measures will be implemented to ensure these limits will be met and that the noise impact of the Proposed Development is low.

11. LAND USE, AMENITY AND SOCIO-ECONOMICS

11.1 Introduction

11.1.1 This chapter will assess the potential effects and impacts on sensitive receptors resulting from the construction and operation phases of the Proposed Development. The local conditions relating to socio-economics, land use and recreation will be assessed, particularly those directly within and adjacent to the Proposed Development. A desk study has been undertaken to gather socio-economic data (population characteristics, employment, etc) and tourism industry related data. Further data will be added throughout the EIA process to ensure a robust baseline is developed.

11.1.2 The study area for socio-economic impacts includes counties of Caithness and Sutherland as well as THC area and Scotland as a whole. In the case of tourism and community facilities, Loch Buidhe, Loch an Lagain, Loch Laro, and the village of Bonar Bridge will be considered as part of the assessment.

11.2 Baseline Conditions

11.2.1 **Table 11.1** summarises key socio-economic, tourism and recreation related literature and data sources used to define the baseline environment and inform this chapter.

Table 11.1: Socio-economic, tourism and recreation data sources

Source	Summary	Coverage
Population Estimates	Total population and demographic structure by council.	Council / Scotland
Population Projections	Populations projections.	Council / Scotland
Estimated Population Aged 15 Years and Over	Data on the number of people who are unemployed and in employment at council level.	Council / Scotland
Household Income	Estimates of income per person by council.	Council / Scotland
Cost of Housing	Median price of housing sales by county over time.	Council / Scotland
Housing Stock	Housing stock by council.	Council / Scotland
Pupil-Teacher Ratio	National level data for first and second level institutions on number of pupils and teachers.	Scotland
Business Demography	Information on employees, active enterprises and persons engaged by sector and council.	Council / Scotland
Labour Market Statistics	Information on employment levels throughout Scotland.	Council / Scotland
Gross Value Added (GVA)	Changes in gross domestic product (GVA) over time.	Scotland
Tourism Employment	Estimates of the employment supported by tourism in Scotland.	Scotland
Tourism Spending	Spending by visitors to Scotland and Scottish regions.	Scotland
Tourism Volume	Number of visitors to Scotland and Scottish regions.	Scotland
Patients per Doctor	National data from the Department for Health on patients per doctor.	Scotland
Tourism attraction	Tourism attractions across Scotland.	Scotland

Socio-economics

11.2.2 A socio-economic profile was developed for Caithness and Sutherland in 2020. At the time, the area had a population of 38,246 people but the population had declined by 3.9% between 2011 and 2020. This is in contrast to a population increase of 0.5% and 3.1% for the Highlands and Scotland over the same period, respectively.

11.2.3 When looking at each county individually, Caithness had a population of 25,347 in 2021 while Sutherland had a population of 13,142. The population of Caithness is expected to further decline by 21% by 2041 with Sutherland expected to have a population decline of 12% by 2041. Sutherland is also regarded as the most sparsely populated area of Scotland with a reported population density of 2.2 people per km^2 in 2014. Overall, the combined area of Caithness and Sutherland had a population density of 5.1 people per km^2 in 2014 compared to 67.4 people per km^2 for Scotland.

11.2.4 The declining population in the study area is coupled with an older age profile than the regional and national averages. For instance, those aged between 65-74 and over 75 were 14% and 12% respectively of the total population in Caithness and Sutherland. This shows it has an older population than Scotland overall which has 11% of people aged between 65-74 and only 9% aged over 75. Additionally, 20% of the Caithness and Sutherland population is aged 25-44 compared to 26% for Scotland. The dependency ratio, which is a measure of the number of people aged 0-15 and over 65 per 100 people of working age, is 69.4 for Caithness and Sutherland, 65.5 for THC and 56.2 for Scotland. This illustrates that both at the regional and local level the area surrounding the Proposed Development has an older and more dependant population than Scotland.

11.2.5 In 2020, the employment rate for Caithness and Sutherland was 73% which is lower than the rate for the Highlands region of 77.5% but similar to the employment rate nationally of 73.8%. The overall economic activity rate for the local area is 77.4% which is higher than the national rate of 76.5% but lower than the regional rate of 79.4%. The area also has slightly more self-employed people at 8.6% than at the national level at 8.4% but notably less than at the regional level at 11.6%.

11.2.6 Likely due to the impacts of the Coronavirus pandemic, there was a significant increase in the unemployment rate in Caithness and Sutherland of 1.8% between December 2019 and December 2020. The overall unemployment rate was recorded at 5.3% equating to 1,190 people. This was a marginal improvement from July 2020 when unemployment peaked at 6.1%. However, unemployment grew at a slower rate than regionally (2.4% increase) and nationally (2.7% increase) during the same period.

11.2.7 Across the study area, youth unemployment has risen. In December 2020, youth unemployment in Caithness and Sutherland was recorded at 9%, higher than the 7.8% recorded for the Highlands and the 8.3% unemployment seen nationally.

11.2.8 Employment in Caithness and Sutherland is concentrated in key sectors including human health and social work, accommodation and food services, and wholesale, retail and repairs with employment percentages by sector detailed in **Table 11.2** below. The three largest sectors accounted for 7,500 jobs across Caithness and Sutherland in 2020.

Table 11.2: Employment by Sector (%) in Caithness and Sutherland 2020

Sector	Percentage
Accommodation and food services	15.6%
Administration and support services	2.5%
Agriculture, forestry and fishing	2.8%
Arts and entertainment	5%
Construction	6.3%
Education	7.8%
Financial services	2%
Human health and social work	18.8%
Information technology and communications	1.9%
Manufacturing	3.8%
Professional, scientific and technical activities	6.3%

Sector	Percentage
Public administration and defence	5%
Transport and storage	3.8%
Utilities	9.4%
Wholesale, retail and repairs	12.5%

Tourism and Recreation

11.2.9 Tourism is a key feature of the economy of the Caithness and Sutherland region and it supports rural communities. It does this by providing a range of employment opportunities within the sector and the associated supply chain however, the impact of the coronavirus pandemic severely hampered the sector. Within the Highlands area, the accommodation and food services sector saw a fall in turnover of £160.7 million in 2020 which disproportionately affected Caithness and Sutherland. The Highlands and Islands Enterprise estimated that visitor spend in the Highlands region decreased by between £370 - £584 million in the 2020/21 period[49]. To rectify the adverse impacts of the Coronavirus pandemic, the Caithness and Sutherland Tourism Destination Recovery Strategy 2021-2024 was developed by Venture North (Cooperative Tourism Body)[50].

11.2.10 Caithness and Sutherland are home to tourist attractions including the North Coast (NC) 500 (driving route) and John O'Groats as well as Dunrobin Castle, the Glenmorangie Distillery, Balblair Distillery and museums. Tourist attractions include historical sites and natural landscape features which have tourism amenity, these include Loch Buidhe, Loch an Lagain and Loch Laro.

11.2.11 In 2019, spending from both domestic and international tourists in the Highlands region was over £1.5 billion, with most of this revenue from domestic tourism. In total, 2.9 million overnight tourist stays were recorded for the Highlands region in 2019, predominantly domestic. Domestic overnight tourism visits and spend are detailed in **Table 11.3** below.

Table 11.3: Domestic Overnight Tourism 2019

Indicators	Scotland	Highlands
Visits (1000s)	13,810	2,448
Spend (£M)	3,200	575
Nights (000s)	46,413	9,487
Average Length of Stay	3.4 nights	3.9 nights
Average Spend per Day	£69	£61
Average Spend per Visit	£232	£235

11.2.12 Tourist accommodation in the area immediately surrounding the Proposed Development (including near Bonar Bridge) is detailed in **Table 11.4**. Distances provided are approximate at this stage until the Proposed Development design is finalised.

Table 11.4: Tourism Accommodation

Accommodation	Distance from Proposed Development
Achue Croft Cottage	4 km
Highland Glen Lodges	6.3 km
Invershin Hotel	7.3 km
Sleeperzzz Hostel	7.6 km

[49] Highland and Islands Enterprise (2022) Tourism | Highlands and Islands Enterprise | HIE

[50] Venture North (2021) Caithness and Sutherland Tourism Destination Recovery Strategy 2021-2024. caithness_and_sutherland_-_tourism_destination_recovery_strategy_2021-24_1.pdf (venture-north.co.uk)

Accommodation	Distance from Proposed Development
The Barn Cottage	8.8 km
Ardgay Glamping	8.9 km

Community Facilities

11.2.13 Community facilities include, but are not limited to, recreation sites, green spaces, educational institutions, and healthcare facilities. These amenities play an important role in a community's health and wellbeing.

11.2.14 Key social infrastructure identified in the areas surrounding the Proposed Development include:

- Bonar Bridge Primary School;
- Gledfield Primary School;
- Dornoch Primary School;
- Dornoch Academy;
- Creich Surgery;
- Migdale Hospital;
- Dornoch Medical Practice;
- Church Hill Woodland;
- Loch Fleet National Nature Reserve;
- Migdale Playing Field; and
- Camore Woods.

11.2.15 Core paths and the Far North Way national cycle route will also be considered in the development of the EIA.

Land Use

Forestry

11.2.16 The Site is an area of commercial forestry. Although, already partially cleared the potential loss of commercially viable woodland may have an adverse effect. According to Scottish Forestry, the forestry sector contributes close to £1 billion GVA to the economy of Scotland each year. The majority of this value comes from timber processing while forest-based recreation and tourism also contribute. It was reported in 2015 that the forestry sector employed a total of 25,000 people in Scotland with 19,555 FTE jobs just in forestry timber processing. A further 6,312 FTE jobs are supported in the forest-based recreation and tourism sector[51].

11.2.17 The forest area adjacent to the Proposed Development is publicly owned and forms part of the National Forest Estate which is managed by the National Forestry Commission. The entirety of this forested area, known as Achormlarie, covers 2046.44 hectares.

Agriculture

11.2.18 The Proposed Development is within an area with a Land Capability for Agriculture (LCA) classification of 5.3 (land capable of supporting improved grassland). Land in this class has the potential for use as grassland and is largely unsuitable for cultivation.

11.3 Sensitive Receptors

11.3.1 The assessment will map and consider potential effects on the following potential sensitive receptors or facilities:

- Local businesses;
- Local areas of tourism or high amenity value that may be affected temporary or permanently; resulting in a loss of use;

[51] Forestry Commission Scotland (2015) Timber Development Programme 2014-2015.

- Local community facilities (schools, healthcare) that may experience community severance issues during the construction phase; and
- Land identified for development that may be affected by temporary or permanent land-take required for the construction and/or operation of the substation.

11.4 Issues Scoped Out

11.4.1 It is proposed that human health is scoped out of this assessment as it will be indirectly covered in other chapters of the EIA such as Landscape Character and Visual Impact, Traffic and Transport, and Noise and Vibration.

11.4.2 Transboundary effects will be scoped out as the only effects on other countries expected will come from the award of some of the construction contracts to companies based outside of Scotland. As these effects are considered beneficial, they will not be covered through this assessment.

11.5 Potential Significant Effects

11.5.1 Potential effects may include the following (and are also summarised in **Table 11.5**):

- Effects on the local and national economy through job creation and investment throughout construction and operation of the Proposed Development;
- Effects on the local tourism industry and recreation activities including walking, cycling and angling; and
- Effects related to the alteration of land use within the Proposed Development area.

11.5.2 Activities associated with the construction and operation of the Proposed Development considered to interact and potentially affect socio-economics, land use, recreation and tourism include:

- Construction
  - GVA supported by the construction of the Proposed Development;
  - Employment supported by the construction of the Proposed Development;
  - Changes in the population because of an influx of migrant workers during the construction of the Proposed Development;
  - Pressure on the local social infrastructure (healthcare, education provision, and housing) resulting from temporary migration associated with construction of the Proposed Development;
  - Disruption to tourism and recreation assets associated with the economic activity from the construction of the Proposed Development;
  - Potential disruption to existing businesses associated with the economic activity from the construction the Proposed Development; and
  - Potential disruption to existing residential or agricultural land holdings associated with construction of the Proposed Development.
- Operation
  - GVA supported by operation and maintenance of the Proposed Development;
  - Employment supported by the operations and maintenance of the Proposed Development;
  - Permanent changes in population because of the creation of long-term employment opportunities;
  - Pressure on the local social infrastructure (healthcare, education provision, and housing) resulting from changes in population associated with the operations and maintenance of the Proposed Development;
  - Potential disruption to existing businesses with the economic activity from the operation and maintenance of the Proposed Development;
  - Disruption to tourism and recreation assets associated with the operation of the Proposed Development; and

– Potential disruption to existing residential or agricultural land holdings associated with operation of the Proposed Development.

Table 11.5: Potential Effects Summary and Proposal for Scoping Opinion

Project Activity and Potential Effect	Phase Construction (C) Operational (O)	Scoping Assessment Summary	Scoped In/Out
Impact on GVA	C, O	The spending from the primary contractors and supply chain businesses delivering the Proposed Development will result in an increase in GVA across the study area considered. This will have a long-term beneficial effect expected to last throughout the project life cycle. Therefore, this potential effect has been scoped in for the EIA.	In
Impact on employment	C, O	Temporary and permanent employment opportunities will arise throughout the supply chain to support construction and operational activities. This will have a long-term beneficial effect expected to last throughout the project life cycle. Therefore, this potential effect has been scoped in for the EIA.	In
Impact on demographics	C	Construction activity could result in temporary migration into the study area, which could increase the local/ regional population within a short period of time. As such, this has been scoped in for the EIA.	In
Impact on demographics	O	The scale of employment required to fulfil operations and maintenance contracts is likely to be smaller in scale than during the construction period. Whilst this suggests smaller impacts on demography, this potential effect is scoped in.	In
Impact on social infrastructure	C	Construction activity may result in temporary pressures and/or disruption to social infrastructure in the local/ regional area. Assets that may be affected include housing, the health service, and schools. Given the relatively large scale of works associated with construction activity, this effect has been scoped in for the EIA.	In
Impact on social infrastructure	O	The level of employment supported by operations and maintenance is likely to be more limited in scale than during the construction phase. This effect has been scoped in for the EIA.	In
Impact on tourism and recreational assets	C, O	The Proposed Development may result in long term and short-term impacts on tourism and recreation assets from a series of sources including traffic, landscape character and visual impacts, noise, and air quality, which are assessed separately in the relevant chapters of this EIA Scoping Report. Therefore, this has been scoped in for the EIA.	In
Impact on agricultural/ forestry holdings	C, O	The Proposed Development may have adverse economic impacts on agricultural and forestry land holdings that may be disrupted by construction and operational phases. Sources of impacts may include traffic, noise, and air quality, which are assessed separately in the relevant chapters of this EIA Scoping Report. This has been scoped in for the EIA.	In
Impact on private residential land	C, O	The Proposed Development may have adverse economic impacts on private residential land that may be disrupted by construction and operational phases. Sources of impacts may include traffic, landscape character and visual impacts, land use, noise, and air quality, which are assessed separately in the relevant chapters of this EIA Scoping Report. This has been scoped in for the EIA.	In
Impact on community facilities	C, O	The Proposed Development may have adverse impacts through severance from community facilities for local populations. This is particularly relevant for schools and healthcare facilities during the construction phase. This has been scoped in for the EIA.	In
Impact on human health	C, O	The Proposed Development may have adverse impacts on human health. This will be indirectly assessed in other chapters such as landscape character and visual impacts, traffic and transport and noise. As such, it is scoped out of the land use and amenity assessment.	Out
Cumulative Effects	C, O	The construction and operation of other developments could amplify the impacts from the Proposed Development. As such, cumulative effects have been scoped into the EIA.	In

Project Activity and Potential Effect	Phase Construction (C) Operational (O)	Scoping Assessment Summary	Scoped In/Out
Transboundary Effects	C, O	The only effects on other countries expected will come from the award of some of the construction contracts to companies based outside of Scotland. As these effects are considered beneficial, it is suggested transboundary impacts are scoped out of the assessment.	Out

11.6 Assessment Methodology

11.6.1 The following section outlines the proposed assessment methodology that will be used within the EIA to assess potential effects of the Proposed Development on the population (through analysis of socio-economics, land use recreation and tourism receptors). There is no definitive guidance or methodology for defining the significance criteria for socio-economic effects.

11.6.2 The assessment will define magnitude of the effect and receptor sensitivity to determine the significance of effects. The magnitude of the effect will be based on the level of impact to economic, recreation, and tourism receptors (i.e. an effect of major magnitude could result in business or recreational amenity closures and permanent alteration of tourism receptors), whilst the sensitivity of the socio-economics, recreation and tourism will be dependent on each receptors ability to respond to potential changes that may result from the Proposed Development. For example, a highly sensitive receptor could include a nationally important recreational trail where there are little to no alternatives or a major local employer who's operations are exclusively contained to the study area.

11.6.3 Terminology used to describe potential effects identified and their significance will be in accordance with the terminology and assessment detailed below.

Economic Impact Assessment

11.6.4 The focus of the assessment of economic impacts will be the direct and indirect (supply chain) effects. The analysis will also model the effects of staff spending and the economic impact that this subsequent increase in demand stimulates (the induced effect).

11.6.5 The analysis will cover the construction and operation phases. The potential effects during the development and construction phases will be based on the actual expenditure that has occurred to date as well as the planned expenditure associated with these stages. The potential effects during the operational phase for the Proposed Development will be based on projected operational expenditure.

11.6.6 Effects will be reported in terms of:

- Gross Value Added (GVA) – this is a measure of economic productivity added by an organisation or industry; and
- Years of Employment – this is a measure of employment which is equivalent to one person being employed full time for an entire year and is typically used when considering short term employment impacts, such as those associated with the development and construction phase of the Proposed Development.

Demographic and Social Infrastructure Impact Assessment

11.6.7 The demographic and social infrastructure impact assessment will follow from the economic impact assessment and the implications of the employment supported during each phase. The potential change in population arising from the creation of new employment opportunities will be put into the context of an annual change in population typical for the study area. This will be used to determine the magnitude of effect.

11.6.8 The capacity of the study areas to absorb and adapt to this change in population will be determined by the relative sensitivity of elements of social infrastructure in each of the study areas, for example;

- Housing – housing supply;

- Healthcare – the relative capacity of healthcare provision within the study area to accommodate changes in population will be determined by metrics such as the ratio of patients per GP; and
- Education – the relative capacity of education provision within the study area to accommodate changes in population, determined by metrics such as the number of school places available.

Determination of Significance of Effects

11.6.9 To enable the potential impact of the Proposed Development to be assessed, a description of the existing socio-economic, land use recreation and tourism, focusing particularly on demographics, employment structure, and tourism and recreation activities will be produced to provide a robust baseline to underpin the assessment. The assessment will determine the

- Sensitivity of receptors;
- Magnitude of impacts; and
- Significance of effects.

11.6.10 The assessment of the significance of effects is based on the potential changes to baseline conditions associated with the Proposed Development. There is no legislation relevant to the assessment of socio-economic effects. As a result, the methodology for this assessment of socio-economic effects has been developed with reference to best practice EIA guidance, such as that published by IEMA[52] and from considerable experience of socio-economic impact assessment of similar developments.

11.6.11 The definitions of receptor sensitivity, magnitude, and significance presented **Tables 11.6 and 11.7** are based on professional judgement and best practice examples from similar assessments.

11.6.12 For economic effects (including employment), the availability of labour and skills is critical in accommodating the demands, needs and requirements of the Proposed Development. Adequate capacity, i.e. a sufficient labour supply in an area, results in a low sensitivity; while limited capacity results in a high sensitivity. For social effects, receptor sensitivity is principally defined by the ability of the social receptor to absorb or adapt to change and the level of usage by sensitive or vulnerable social groups. These are defined in **Table 11.6**.

Table 11.6: Sensitivity of Receptors

Sensitivity	Description
High	There is no or low availability of labour and skills in the local authority area workforce, for example as a result of very low unemployment rates. The Proposed Development would lead to labour market pressure and distortions (i.e. skills and capacity shortages, import of labour, wage inflation). The receptor is of international or national importance and/or has little or no ability to absorb change or recover/adapt and/or is solely used by sensitive groups such as older people, children, and people of poor health.
Medium	The area has a constrained supply of labour and skills. The Proposed Development may lead to labour market pressure and distortions. The receptor is of regional or local importance and/or has medium ability to absorb change or recover/adapt and/or is principally used by sensitive groups such as older people, children, and people of poor health.
Low	The area has a readily available labour force with some skill deficits. The Proposed Development is unlikely to lead to labour market pressure and distortions. The receptor is of local importance and/or has ability to absorb change or recover. It may also be used by sensitive groups such as older people, children, and people of poor health.
Very Low/ Negligible	An effect would not be discernible in the context of the number of jobs created or lost within the local authority area and the capacity of that area to accommodate the change. The receptor is of local importance and/or is able to absorb change and/or recover or adapt to the change and is not specifically for use by sensitive groups such as older people, children, and people of poor health.

11.6.13 The magnitude of impacts is determined by the extent of the change and the scale of the impact. A level of impact magnitude (see **Table 11.7**) will be assigned taking into consideration the following:

[52] IEMA (2016) Environmental Impact Assessment Guide to: Delivering Quality Development.

- extent of change – taking account of the number of people affected and the size of the area impacted upon; and
- scale of the impact – whether permanent during operation or temporary/short-term during construction.

Table 11.7: Magnitude of Effect

Impact Magnitude	Description
Large	The impact would dominate over baseline conditions. Effects would be experienced at an international or national scale. Constitutes a long-term change to baseline. Effects would be of long-term duration (continuous i.e. permanent and irreversible) Major effect on large numbers of businesses, employment creation or well-being of receptors/local people (with number depending on the local context).
Medium	A medium-term impact on the baseline conditions (i.e. 3-5 years). Effects would be experienced at a regional, or sub-regional scale. Moderate effect on businesses, employment creation or well-being of receptors/local people (with number depending on the local context).
Small	A short-term impact on the baseline conditions (i.e. 1-2 years). Effects would be experienced at a local level. Minor effect on businesses, employment creation or well-being of receptors/local people (with number depending on the local context).
Very Small/Negligible	A very short-term/temporary change to the baseline (i.e. < 1 year). Any impacts would be experienced at a local level. Slight/no impact on businesses, employment creation or well-being of receptors/local people (with number depending on the local context).

11.6.14 The level of significance is determined by the sensitivity of the receptor and magnitude of the impacts upon them (see **Table 3.1**). For the purposes of the assessment and the EIA Regulations, 'significant effects' are those identified as being moderate or major (adverse or beneficial). Minor effects are not considered to be 'significant'.

11.6.15 The significance of effects will be assessed relative to the baseline. The effects are qualified as being:

- Beneficial – advantageous or beneficial on an impact area/defined receptors; and
- Adverse – disadvantageous or negative effect on an impact area/defined receptors.

11.6.16 The relevance of these potential effects will be considered against the baseline conditions, which would be expected to occur if no development took place. Potential impacts that may affect socio-economics, land use recreation and tourism will be identified as a result of the key Proposed Development phases of:

- Construction; and
- Operation.

11.6.17 The approach will follow the general EIA guidelines produced by the Environmental Protection Agency (EPA, 2022)[53], and as described in **Chapter 3: EIA Approach and Methodology** where sensitivity of a receptor to an individual impact, and the impact magnitude is determined for the assessment.

11.7 Summary

11.7.1 Adverse and beneficial effects on socio-economics, land use, recreation, tourism, and community facilities will be assessed using a standard significance matrix. A baseline of the study area will be further developed to determine overall sensitivity which will be assessed in relation to the magnitude of effects. Baseline conditions to be established include a socio-economic profile of the Caithness and Sutherland Historical Counties and THC area. This socio-economic profile will also be examined in relation to Scotland.

[53] Environmental Protection Agency (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports. Available at: https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf [Accessed at 29/082023]

11.7.2 A tourism assets baseline will also be developed to determine the value of attractions within the study area. A more in-depth assessment of assets (attractions, accommodation) in close proximity to the Proposed Development will be undertaken as the design develops through the EIA process.

11.7.3 The baseline of potentially effected community facilities will be refined as the design of the Proposed Development develops through the EIA process. The magnitude of effects will be informed once employment numbers through construction and operation phases are decided.

11.7.4 Effects proposed to be scoped out of this assessment include effects on demographics and social infrastructure during the operation phase as well as impacts on human health through all Proposed Development phases. Transboundary effects would also be scoped out at this stage.

12. TOPICS “SCOPED OUT”

12.1.1 As explained above, a number of topics are considered to be not significant and it is therefore proposed that they are scoped out from further consideration within the EIA process. **Table 12.1** below lists each topic and the elements scoped out from further assessment; with a summary of the justification for doing so.

Table 12.1 Issues Scoped Out

Topic	Scoped Out
Landscape Character and Visual Impact	Landscape character and designations outwith the 2 km study area of the Proposed Development due to the low height of the Proposed Development, landform undulations and the resulting constrained visual envelope. Effects on visual receptors outwith the 1 km study area and with limited or no visibility of the Proposed Development as demonstrated by the 'Bare Earth' ZTV. A preliminary assessment will accompany the LVIA to ascertain which visual receptors will be assessed in detail. Meaningful effects are unlikely beyond the 1 km study area.
Ecology, Ornithology and Nature Conservation	Wetland habitats identified as potential GWDTE to be considered as part of the appraisal will be defined on the basis of hydrogeological conductivity calculations. This approach will result in some areas of potential GWDTE within 250 m of the Proposed Development being scoped out of the assessment. Due to the nature of the works, impacts to protected sites designated only for habitat interest features at distances more than 250 m from the Proposed Development have been scoped out for construction and operation. Due to the nature of the Proposed Development, impacts to ecology, ornithology and nature conservation via emissions to air have been scoped out for construction and operation.
Forestry	The Proposed Development boundary defines the limit for which the Applicant is seeking consent under the provisions of the Town and Country Planning (Scotland) act 1997 (as amended). As such, the Forest Impact Assessment will not provide an assessment of any felling or restocking requirements outwith this. These works are the responsibility of the landowner and will be undertaken in accordance with the requirements set out within the Forestry and Land Management (Scotland) Act 2018. Secondary effects resulting from forestry activities including effects on habitats and species, ornithology, hydrology and landscape and visual effects are considered within their respective chapters of this EIA Scoping Report and therefore would be scope out of the Forest Impact Assessment.
Cultural Heritage	The non-designated asset (CANMORE ID 348673 TORBRECK, LOCH BUIDHET)) has been previously excavated and therefore has been wholly or partially removed from the landscape. Additionally, Blackhouses generally derive their significance solely from their form, material, folkloric cultural associations, and historic function, not their setting or siting within the wider landscape. Therefore, no setting assessment will be required for these assets and indirect impacts for them are scoped out for further assessment.
Traffic and Transport	As the Proposed Development would not be manned, it is expected that the amount of traffic related to the operational phase of the Proposed Development would be low. Vehicle movements associated with the operational phase will only be required during routine maintenance visits using cars or LGVs on average four times per calendar month (once per week). Therefore, it is believed that the operational traffic's effects would be minimal, and no further assessment is required. The IEMA (2023) guidelines for the environmental assessment of road traffic advise that significant impacts to local air quality may occur if changes to LGVs are more than 100 AADT within or adjacent to an AQMA and more than 500 AADT elsewhere. For HGVs, the criteria are more than 25 AADT within or adjacent to an AQMA, and more that 100 AADT elsewhere. Based on the expected volume of construction traffic, none of the above criteria will be met or exceeded. In addition, the Proposed Development is not located within an AQMA and due to the temporary nature of the increase in vehicles using the proposed access route, any effects on local air quality will be short term and reversible. The movements of abnormally loaded vehicles could be considered visually intrusive. This effect would be short-term and would only occur during the movement of abnormal loads. the movements of HGVs are not considered visually intrusive as it is an everyday occurrence. Any likely significant environmental effects relating to

Topic	Scoped Out
	visual effects due to traffic generated during the construction phase of the Proposed Development will be considered within the landscape and visual amenity assessment in the EIA (see **Chapter 4: Landscape and Visual Impact**). The assessment of visual effects has therefore been scoped out of this assessment.
Geology, Hydrology, Hydrogeology and Soils	• Receptors at distances greater than 2 km from the Proposed Development, as dilution and attenuation will mitigate pollution and sedimentation effects on the water environment. This includes the River Fleet and Loch Fleet; • Surface water receptors not hydrologically connected to the Proposed Development as there is no impact pathway. This includes the River Evelix (SEPA ID: 20079); • All designated receptors, as there are no hydrologically connected and hydrologically dependent designated sites within the Wider Study Area; • Agricultural land use capability; and • Transboundary effects.
Noise and Vibration	There are no known vibrational noise issues associated with the operation of the Proposed Development at nearby NSRs. Therefore, it is proposed that operational vibration is scoped out of the EIA assessment.
Land Use, Amenity and Socio-economics	The Proposed Development may have adverse impacts on human health however this will be indirectly assessed in other chapters of the EIA such as landscape character and visual impacts, traffic and transport and noise and vibration. As such, it is scoped out of the land use, amenity and socio-economic assessment. Transboundary effects have also been scoped out as the only effects on other countries expected will come from the award of some of the construction contracts to companies based outside of Scotland. As these effects are considered beneficial, they will not be covered through the assessment.
Air Quality	The Proposed Development has limited potential to result in significant effects on air quality and receptors. Any air quality impact will be localised and temporary during construction and result from dust generated during construction, the passage of vehicles along access tracks and from construction plant exhaust emissions. The occurrence and significance of dust generated by construction activities is extremely difficult to estimate and depends on meteorological and ground conditions at the time and location of earthwork. The nature of the construction activities, the type of soil at the Site and the limited receptors in the surrounding area are such that significant effects are not likely. The IEMA (2023) Guidelines for the Environmental Assessment of Road Traffic advise that significant impacts to local air quality may occur if changes to LGVs are more than 100 AADT within or adjacent to an AQMA and more than 500 AADT elsewhere. For HGVs, the criteria are more than 25 AADT within or adjacent to an AQMA, and more that 100 AADT elsewhere. Based on the expected volume of construction traffic, none of the above criteria will be met or exceeded. In addition, the Proposed Development is not located within an AQMA and due to the temporary nature of the increase in vehicles using the proposed access route, any effects on local air quality will be short term and reversible. Standard mitigation measures adopted by the Applicant on all projects and implemented via a CEMP will control impacts to a level that are not significant e.g. dust suppression measures, engines of stationary vehicles to be turned off, etc to receptors including the nearest residential receptors 750 m south-west of the Proposed Development.

Topic	Scoped Out
Climate Change	In the context of the EIA process, climate change is considered both in relation to the contribution of the Proposed Development to increasing or decreasing gaseous emissions with global warming potential (GWP), and in relation to climate change resilience and adaptation. Emissions associated with the Proposed Development will be limited to temporary and short-term emissions of exhaust gases from vehicles and construction plant, and the potential for the release of carbon dioxide as a result of dewatering and exposing peat and peat soils during construction. Neither source is considered likely to be significant in terms of GWP. If required, an oPMP will accompany the EIA Report which will include high level estimation on peat excavation and re-use volumes. This will be based on the approximate infrastructure dimensions and anticipated re-use streams. With regard to resilience and adaptation to climate change, consideration will be given to these factors during the design of the Proposed Development (e.g. design for increased flood risk and adverse weather). A preliminary review of the Indicative SEPA Flood Map shows that the Site is not at risk of coastal flooding or river flooding now or in the future, with a less than 0.1% AEP chance of flooding from the sea in any given year. Loch Buidhe, Alltan Dubh, and Allt Garbh-airigh are shown to have a high risk (10% AEP) of river flooding, however, this is not shown to impact the Site. Most of the Site is also shown to remain free from surface water flooding, with no surface water flood flow paths indicated within the Site boundary. Areas of increased surface water flooding are associated with the existing forest rides, whereby linear trackways designed for access have been included between areas of forestry plantation. Surface water flood risk within these areas is likely indicative of artificial drainage channels used to manage surface water within the area of commercial forestry. The environmental team will support the consideration of climate change design through the hydrology assessment. No significant effects are considered likely and climate change is scoped out of further assessment.
Major Accident and Disasters (MAAD)	Relevant types of accident / disaster, given the rural context of the Proposed Development, include: • Severe weather events, including high winds, high rainfall leading to flooding, or extreme cold leading to heavy snow and ice loading; • Wildfire; • Traffic related accidents; and • Mass movement associated with ground instability. Severe weather resilience is a core component to the network design and includes consideration of flooding resilience and vegetation management to reduce the risk of unplanned power cuts and wildfires. In the event of an unplanned power cut, effects are likely to be short term and essential services e.g. medical facilities, are likely to have some form of backup generation. A CTMP will be developed post-submission to reduce the potential for traffic related accidents. No significant effects are likely due to MAAD and it is proposed that this topic is scoped out of further assessment.
Electric and Magnetic Fields (EMF) and Radio Frequency Interference (RFI)	The UK Health Protection Agency (HPA) is the government body responsible for policy and guidance on Electric and Magnetic Fields (EMF) . Exposure guidelines have been developed by the International Commission on Non-Ionising Radiation Protection (ICNIRP) to ensure protection of human health in different situations, occupational exposure and public exposure, which have been adopted by the HPA for application in the UK. Whilst substation equipment is known to generate EMFs, these have been observed to drop away to background levels quickly with distance from source. In addition, EMF generated by substation infrastructure has been consistently recorded to be lower than that associated with incoming/outgoing OHL or underground cables associated with the substation.

Topic	Scoped Out
	All EMF generating infrastructure will be set back from the site boundary. In addition, the closest residential receptors are 750 m distant. It is therefore anticipated that EMF would be at, or close to background levels at the Project site boundary. The Proposed Development will adhere to the relevant regulations and guidance relating to EMF and no significant effects are likely. It is proposed that EMF is scoped out of further assessment in the EIA.

13. NEXT STEPS

13.1.1 The following consultation questions are suggested for THC to gain responses on the following:

- What environmental information do you hold or are aware of that will assist in the EIA described here?
- Do you agree with the proposed approach for baseline collection, prediction and significance assessment?
- Are there any key issues or possible effects which have been omitted?
- Do you agree with the list of issues to be scoped out, and the rationale behind the decision?
- Of those issues identified for assessment, which do you consider the most important/material and which the least?

13.1.2 All responses should be addressed to:

Scottish Hydro Electric Transmission plc
Inveralmond House
200 Dunkeld Road
Perth PH1 3AQ
Tel: +44 (0)1738 456 000
www.ssepd.co.uk

13.1.3 The Scoping Opinion provided will be used to finalise the terms of the EIA and the specific approach to the individual assessments.

13.1.4 All comments received will be included in the EIA Report for reference, unless consultees request otherwise.

APPENDIX A FIGURES

Proposed Development Boundary

0 100 200 300 400 500

Metres

N

SCALE: 1:3,500	VERSION: A01
SIZE: A3	DRAWN: DN
PROJECT: 0699566	CHECKED: ES
DATE: 25/01/2024	APPROVED:

Figure 2.1 Proposed Development Location

ERM

Scottish & Southern Electricity Networks TRANSMISSION

PROJECTION: British National Grid

Maxar, Microsoft

Path: \\uksprdgisfs01\Data\London\Projects\0699566 - SSE Loch Buidhe Substation\MAPS\0699566 - SSE Loch Buidhe Substation.aprx

Proposed Development Boundary

1 km Study Area

2 km Study Area

5 km Study Area

Cumulative Wind Farms

- Operational
- Application

Ancient Woodland Inventory

National Scenic Areas

NatureScot Landscape Character Types

135 Rounded Hills - Caithness & Sutherland

145 Farmed and Forested Slopes with Crofting

0 1 2

Kilometers

N

SCALE: 1:50,000	VERSION: A01
SIZE: A3	DRAWN: WM
PROJECT: 0652629	CHECKED: DN
DATE: 25/01/2024	APPROVED: NO

Figure 4.1
Landscape Character and Designations

ERM

Scottish & Southern Electricity Networks TRANSMISSION

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0699566 - SSE Loch Buidhe Substation\MAPS\0699566 - SSE Loch Buidhe Substation.aprx

VP1
VP2
VP3
VP4

Proposed Development Boundary
1 km Study Area
2 km Study Area
5 km Study Area
Viewpoint Location

Cumulative Wind Farms
Operational
Application

Core Paths
A Class Road
B Class Road
Minor Road
Railway Line

0 1 2
Kilometers

N

SCALE: 1:50,000	VERSION: A01
SIZE: A3	DRAWN: WM
PROJECT: 0652629	CHECKED: DN
DATE: 25/01/2024	APPROVED: NO

Figure 4.2
Visual Receptors

ERM

Scottish & Southern Electricity Networks TRANSMISSION

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0699566 - SSE Loch Buidhe Substation\MAPS\0699566 - SSE Loch Buidhe Substation.aprx

VP1
VP2
VP3
VP4
135
145
A836
A837
A839
B864
A949
Dornoch Firth
Migdale Road
Church Street
Manse Road
Cadh' An Tartair

Proposed Development Boundary
1 km Study Area
2 km Study Area
5 km Study Area
Viewpoint Location

Cumulative Wind Farms
- Operational
- Application

Core Paths
A Class Road
B Class Road
Minor Road
Railway Line
Ancient Woodland Inventory
National Scenic Areas

NatureScot Landscape Character Types
- 135 Rounded Hills - Caithness & Sutherland
- 145 Farmed and Forested Slopes with Crofting

Location Assessed for Visibility

Zone of Theoretical Visibility
- 1-20% Proposed Development may be visible
- 21-40% Proposed Development may be visible
- 41-60% Proposed Development may be visible
- 61-80% Proposed Development may be visible
- 81-100% Proposed Development may be visible

0 1 2
Kilometers

N

SCALE: 1:50,000	VERSION: A01
SIZE: A3	DRAWN: WM
PROJECT: 0652629	CHECKED: DN
DATE: 25/01/2024	APPROVED: NO

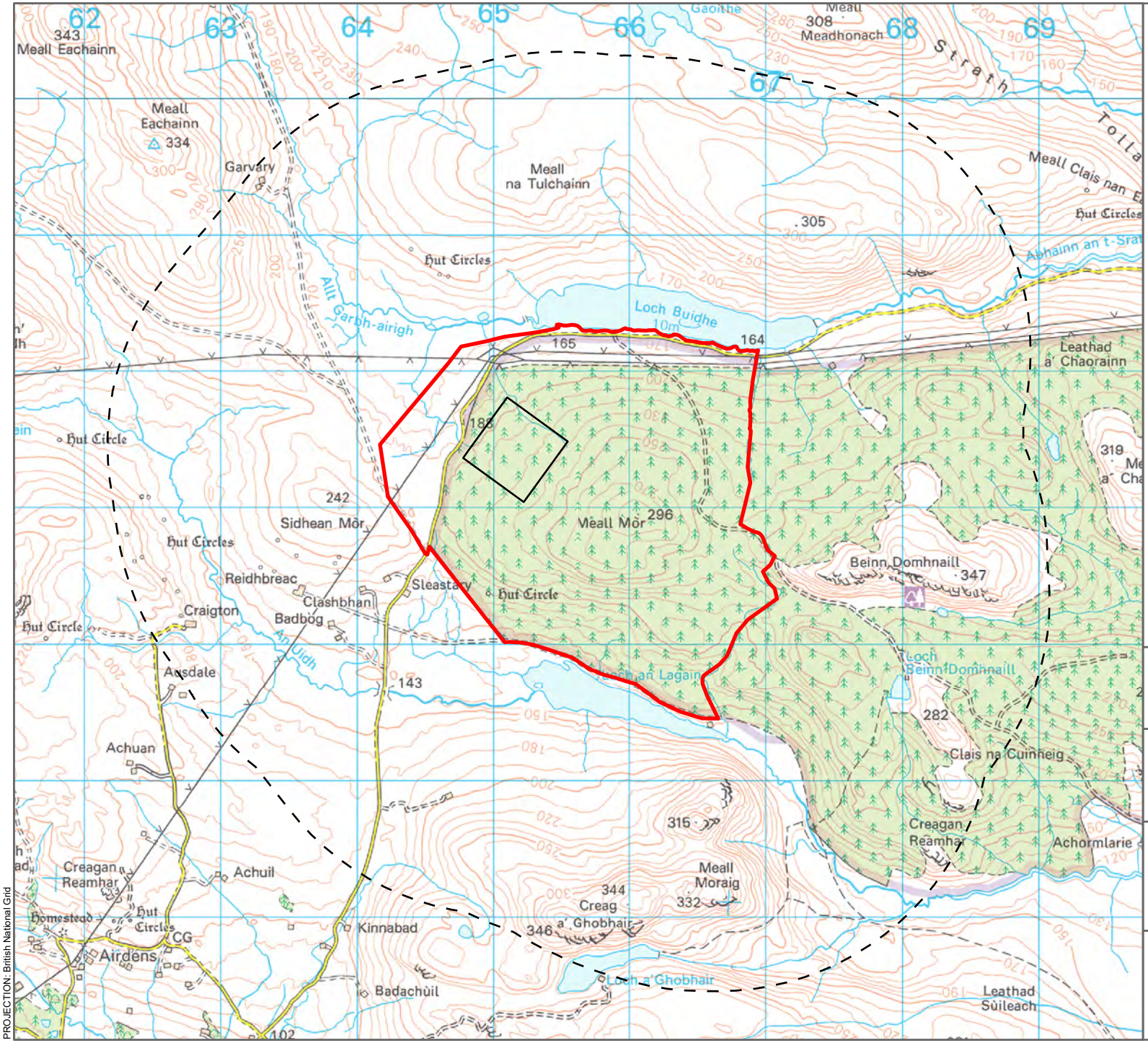
Figure 4.3
Zone of Theoretical Visibility

ERM

Scottish & Southern Electricity Networks TRANSMISSION

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0699566 - SSE Loch Buidhe Substation\MAPS\0699566 - SSE Loch Buidhe Substation.aprx



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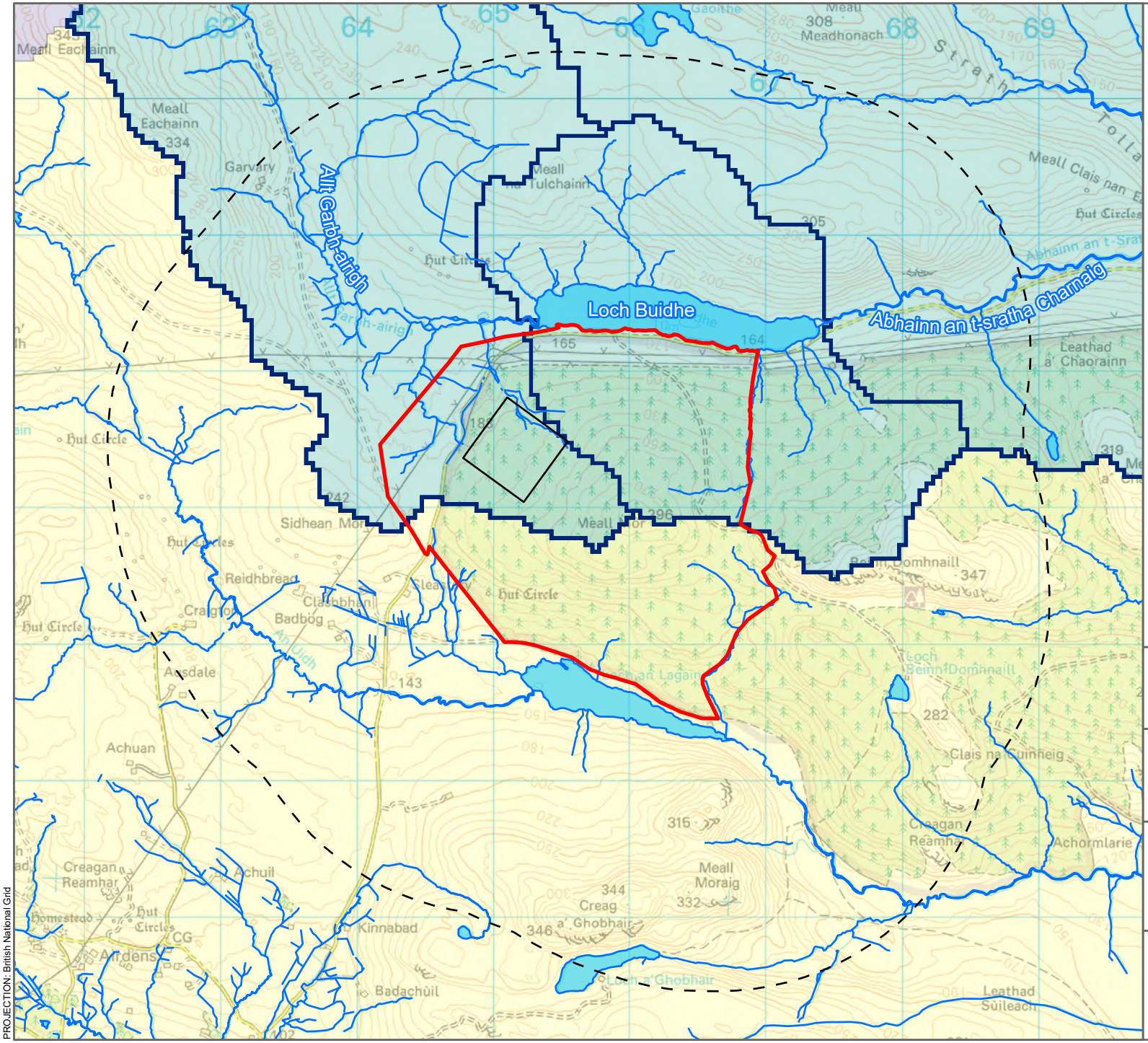


Proposed Development Boundary

Site Boundary

Wider Study Area (2 km Buffer of the Proposed Development Boundary)

Surface Water Area

Surface Water Line

Nested Catchments - SEPA

SEPA Main River Catchments:

River Fleet

Dornoch Coastal

River Shin

River Carron (Sutherland)

Dornoch Firth

0 250 500 750 1,000

Metres

N

SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: DN
PROJECT: 0697221	CHECKED: AS
DATE: 25/01/2024	APPROVED: ES

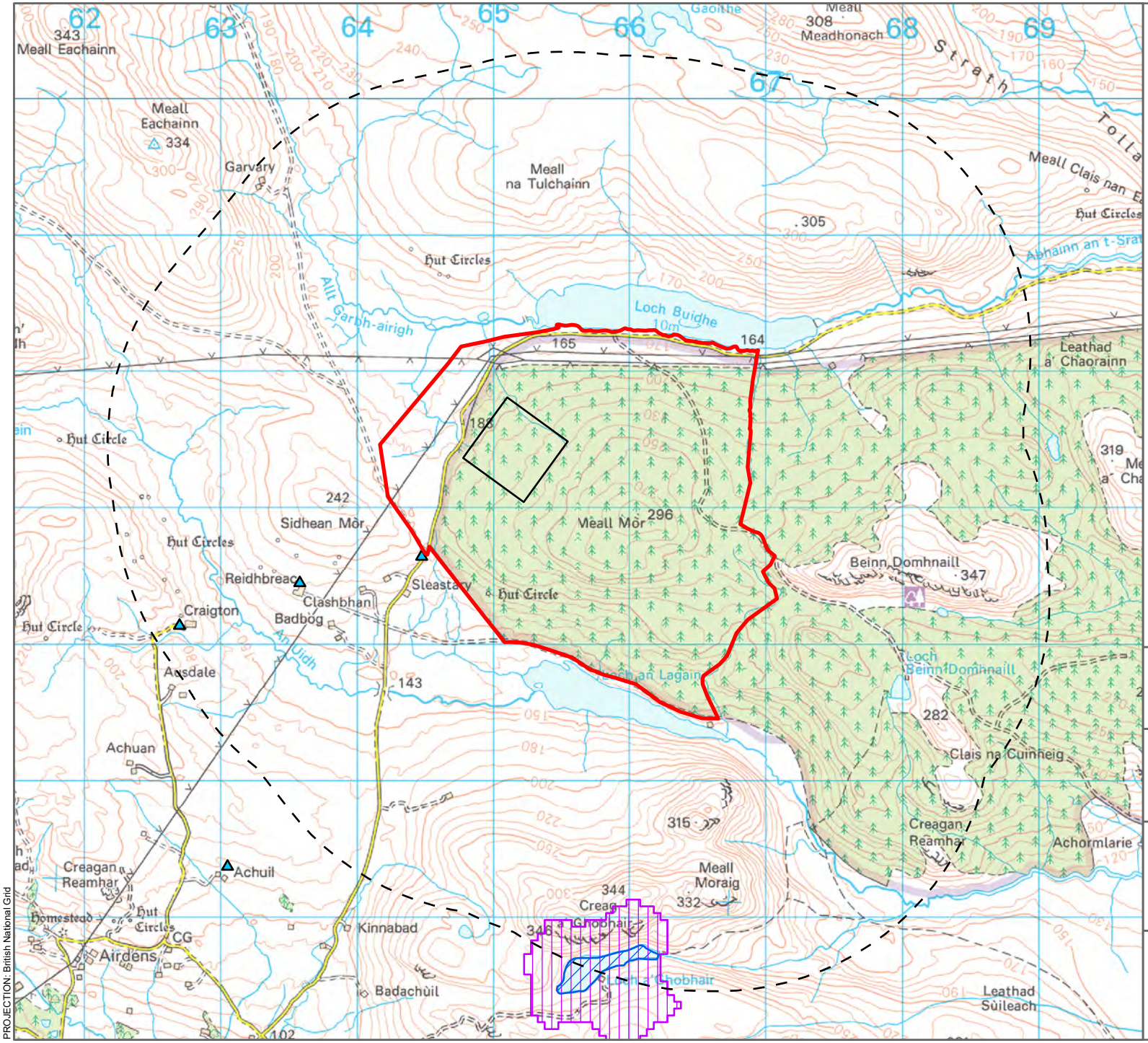
Figure 9.2
Surface Hydrology Baseline

ERM

Scottish & Southern Electricity Networks TRANSMISSION

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0699566 - SSE Loch Buidhe Substation\MAPS\0699566 - SSE Loch Buidhe Substation.aprx\0699566 - Loch Buidhe Substation Surface Water Baseline - SW Features and Catchments - A01



PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0699566 - SSE Loch Buidhe Substation\MAPS\0699566 - SSE Loch Buidhe Substation.aprx\0699566 - Loch Buidhe Substation Water Supply Baseline - A02

APPENDIX B GENERAL ENVIRONMENTAL MANAGEMENT PLANS

APPENDIX C SPECIES PROTECTION PLANS