Scottish & Southern Electricity Networks

TRANSMISSION

Spittal Substation and HVDC Converter Station

Environmental Impact Assessment

Scoping Request

November 2023

QUALITY MANAGEMENT

Issue/Revision	1	2	3	4
Date	19/10/2023	27/11/2023	28/11/2023	
Remarks				
Prepared by	James Lumsdon	James Lumsdon	James Lumsdon	
Signature				
Checked by	Russell Buckley	Russell Buckley	Russell Buckley	
Signature				
Authorised by	Keith Grant	Keith Grant	Keith Grant	
Signature				
Project number	0697221			
Report number				
File reference				

Scottish Hydro Electric Transmission plc
Inveralmond House
200 Dunkeld Road
Perth PH1 3AQ
Tel: +44 (0)1738 456 000
https://www.sse.com/

Scottish & Southern Electricity Networks
TRANSMISSION

CONTENTS

GLOSSARY

Term	Description
Annex 1 Habitats	Habitats that have been designated as a Special Area of Conservation, to which common EU-wide legislation applies
ALRA - Abnormal Load Route Assessment	Assessment to determine where large vehicles transporting the abnormal loads can safely negotiate the route required
ALVs - Abnormal load vehicles	Vehicles which have a weight of over 44,000kg, an axle load of more than 10,000kg for a single non-driving axle and 11,500kg for a single driving axel, a width more than 2.9 metres or a rigid length of more than 18.65 meters
Baseline	A fixed point of reference that can be used for comparison purposes
BNG – Biodiversity Net Gain	An approach to development and land management that aims to leave the natural environment in a measurably better state than it was before
Canmore	Scottish National Record of the Historic Environment
CEMP - Construction Environmental Management Plan	Plan which sets out the approach to control potentially polluting activities to prevent adverse public health impacts, nuisance and hazards to the natural and human environment
CTMP – Construction Traffic Management Plan	A plan which sets out the commitments of the contractor in order to ensure the safety of those working on the site and the general public
Desk Study Analysis	A method of collecting and analysing information from available secondary sources, such as documents, reports, academic publication and other materials available online
Direct impact	Changes to an asset or environment immediately as a result of the development
ECoW -Ecological Clerk of Works	A role that includes the monitoring of construction site activities to ensure that environmental laws are complied with
EIA - Environmental Impact Assessment	The assessment of the environmental consequences of a plan, policy, program or project prior to the decision to move forward with the proposed action
EMF - Electric and Magnetic Fields	Invisible areas of energy, often referred to as radiation, that are associated with the use of electrical power

Term	Description
GEMP - General Environmental Management Plan	A guidance document to measure and achieve compliance with the environmental mitigation and monitoring to be taken during construction and operation to eliminate adverse environmental and social impacts of an industry
Geophysics	A non-intrusive archaeological survey that uses magnetic interference to detect anomalies below the ground
GI Trial Pitting	Excavation of ground for sub-surface site investigations and examination of the soil, rocks and groundwater
GWDTE - Groundwater dependent Terrestrial Ecosystems	A terrestrial ecosystem of importance at Member State level that is directly dependent on the water level in or flow of water from a groundwater body
HRA – Habitats Risk Assessment	Determines whether or not development plans could negatively impact local plans on the designated features of a recognised protected European site
HRSG – Highland Raptor Study Group	Group who work to monitor birds of prey such as eagles, hawks, and kites
HVDC - High Voltage Direct Current	Direct current electric power transmission usually designed so that the converter at either terminal can be operated as either a rectifier or inverter and so the direction of the power flow can be reversed as required.
Indirect Impact	Occur as a result of an action that occurs later or in a removed location from the action location
LCT – Landscape Character Type	The distinct, recognisable and consistent pattern of elements in the landscape
LGV - Light Goods Vehicles	Commercial motor vehicle with a total gross weight of 3500kg or less
LVIA - Landscape Visual Impact Assessment	Assessment used to assess the landscape or visual effects of a development
LNR - Local Nature Reserve	A protected area of land designated by a local authority because of its special natural interest
NNR National Nature Reserve	A protected area of importance for flora, fauna, or features of geological interest, which is reserved and managed for purposes or conservation
Non-statutory Designation	Areas selected for their nature conservation value, based on important, distinctive and threatened habitats and species

Term	Description
oPMP - Outline Peat Management Plan	A document presenting the estimated peaty soil/ topsoil and peat excavation volumes, and demonstrate that management of these during construction of the Proposed Scheme has been considered.
PRoW - Public Rights of Way	A right by which the public can pass along linear routes over land at all times
Phase 1 Contaminated Land Assessment	An assessment used to evaluate the potential for substances which are potentially hazardous to health or the environment, to cause harm and to consider the level of risk they represent and whether any actions are required to manage the risk
PSRA - Peat Slide Risk Assessment	Provides an overview of peat slide mechanisms, desk study information relating to the site, and survey results to highlight the risk of peat slide within the Proposed Development area
PWS(RA) - Private Water Supplies Risk Assessment	Locates and assesses the risk of the development to the existing private water supplies
RAMSAR	Wetland site designated to be of international importance under the Ramsar Convention
Receptor	A component of the natural or built environment that is affected by an impact of the construction or operation of a proposed development
RSPB - Royal Society for the Protection of Birds	A charitable organisation which sets out to protect bird species
SAC - Special Area of Conservation	Protected areas in the UK designated under the Conservation of Habitats and Species Regulations
SEPA - Scottish Environment Protection Agency	Scotland's principle environmental regulator, protecting and improving Scotland's environment
SPA - Special Protection Area	A protected area selected to conserve one or more rare, threatened or vulnerable bird species, or certain regularly occurring migratory species
SPP - Species Protection Plan	Plan to ensure that works related to a proposal take into account any protected species present on site
SSSI - Special Site of Scientific Interest	A designated area with a particular interest to science due to the rare fauna and flora found within it

Term	Description
Statutory Designation	Apply to areas of land or water and serve to identify local or regional areas of value to the natural heritage and to assist better planning and management of the countryside.
SuDS - Sustainable Drainage Systems	Designed to manage stormwater locally, to mimic natural drainage and encourage its infiltration, attenuation and passive treatment
TPO – Tree Protection Order	Usually made by a local planning authority to protect a specific tree or woodland from deliberate damage or destruction.
Transboundary Effects	Any significant adverse effect on the environment resulting from human activity, the physical origin of which is wholly or in part within an area under the jurisdiction of another state
Trial Trenching	A method of archaeological evaluation used to estimate the archaeological potential of an area
WFD Water Framework Directive	An EU directive which commits European Union member states to achieve good quality and quantitative status of all water bodies
ZTV Zone of Theoretical Theory	A computer-generated tool to identify the likely (or theoretical) extent of visibility of a development

1. INTRODUCTION

1.1 The Proposals

Scottish and Southern Electricity Networks Transmission (herein hereafter referred to as 'SSEN Transmission') operating under licence as Scottish Hydro Electric Transmission plc is a wholly owned subsidiary of the SSE plc group of companies. Scottish Hydo Electric Transmission plc, hereafter referred to as 'the Applicant', owns and maintains the electricity transmission network across the north of Scotland and holds a license under the Electricity Act 1989 to develop and maintain an efficient, co-ordinated and economical system of electricity transmission. The Applicant is proposing to submit an application for detailed planning permission under the Town and Country Planning (Scotland) Act 1997 (as amended) for consent to construct and operate a new strategic transmission hub approximately 12km to the south of Thurso and near the small settlement of Spittal in Caithness, Scotland, hereafter referred to as 'the Proposed Development'. The Proposed Development comprises a new 400kV substation and HVDC Converter Station to connect to the proposed new 400kV overhead line between Spittal and Beauly, the new Spittal to Peterhead HVDC link, and the existing Spittal 275/132kV substation. An overview of the Proposed Development is shown on Figure 1.1: Site Location Plan in **Appendix A**. An overview of environmental features and designations in relation to the Proposed Development site is shown on Figure 2.2: Environmental Constraints Plan in **Appendix C**.

The Proposed Development is part of SSEN Transmission's Pathway to 2030 projects. These projects are part of a proposed major upgrade of the electricity transmission network across Great Britain to help deliver United Kingdom (UK) and Scottish Government climate change and energy security targets. They would connect UK based low carbon renewable electricity generation to areas of demand across the country, with the aim of building a cleaner, more secure and affordable energy system for homes and businesses across Great Britain. Further details on the Pathway to 2030 projects is provided in **Appendix P**.

The Proposed Development is being progressed as a separate project from the proposed new 400kV Spittal to Beauly Overhead Line and the Spittal to Peterhead HVDC subsea link. It should be noted, however, that due to these projects being linked parts of the electricity network that development work and external stakeholder engagement will be undertaken in parallel. For clarity, the Proposed Development comprises only the area within the Red Line Boundary as illustrated in **Figure 2.1** (see **Appendix B**).

1.2 The Regulations

The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2017, hereafter referred to as the "Environmental Impact Assessment (EIA) Regulations", contain two 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'. Given the scale of the project SSEN Transmission have opted to undertake a voluntary EIA for the Proposed Development.

1.3 Purpose of the EIA Scoping Report

The purpose of this EIA Scoping Report is to ensure that the subsequent EIA is focused on the key impacts anticipated to arise from the Proposed Development that are 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. All relevant environmental issues are identified and assessed to confirm that the assessment process described will meet legislative requirements.

In accordance with 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 its possible effects on the environment; and

- Such other information or representations as the Applicant making the request may wish to provide or make.

This EIA Scoping Report has been issued to the Highland Council (THC) to inform the preparation of a Scoping Opinion.

SSEN Transmission invites consultees to comment 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 data 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

This EIA Scoping Report presents the findings of an initial appraisal of the likely environmental effects of the proposed project on the receiving environment. 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 Character and Visual Impact;
- Ecology, Ornithology and Nature Conservation;
- Archaeology and Cultural Heritage;
- Traffic and Transport;
- Hydrology, Hydrogeology, Geology and Soils;
- Noise and Vibration; and
- Land Use, Amenity and Socio- Economics.

1.5 Consultation

1.5.1 Site Selection

During February and March 2023, consultation was undertaken to seek comments from stakeholders and members of the public on the site option studies undertaken, and the rationale for, and approach to, the selection of the preferred site (the location of the Proposed Development as described in this Scoping Report).

A summary of the consultation undertaken to date is provided below:

- Public consultation events (February and March 2023) provided face-to-face public engagement (including a mail drop advertising the events);
- A Consultation Booklet for the public consultation events, providing a summary of the site selection process;
- A Digital Consultation Document presented the key information alongside interactive maps and images, which was presented to statutory consultees during Teams meetings in March 2023;
- Press adverts; and
- Social media streams.

The consultation process and feedback received is being documented in a Report on Consultation and a consultation register remains a live document and will be updated on receipt of any further consultation comments.

Members of the public and other interested stakeholders will be invited to attend an information event during the EIA and Consenting phase of the Proposed Development, and the local community, community councils, elected representatives, statutory and non-statutory stakeholders will continue to be engaged as the project progresses.

1.5.2 Pre-Application Consultation with The Highland Council

A pre-application exercise was undertaken with THC in September 2023, providing the Applicant with an opportunity to present the proposals to the Council, and seek advice on the acceptability of the Proposed Development, and likely requirements and expectations for a future application. Following this meeting, The Highland Council provided a formal pre-application response, detailing their understanding of the Proposed Development, and setting out relevant planning policy and environmental considerations that would need to be addressed as part of the application supporting documents.

1.5.3 Proposal of Application Notice

A Proposal of Application Notice (PAN) will be submitted to notify The Highland Council of the Applicant's intention to submit a National application. It will describe the development and propose further consultation, likely to be public information events scheduled for early 2024.

2. DESCRIPTION OF THE PROPOSED DEVELOPMENT

2.1 Introduction

This chapter provides a description of the main elements of the Proposed Development. The detailed design of the Proposed Development is currently in progress, and for the purposes of EIA scoping the preliminary layout has been assumed as per **Figure 2.1** (see **Appendix B**).

2.2 Proposed Development

The Proposed Development will comprise a new 400kV substation and HVDC Converter Station to connect to the proposed new 400kV overhead line between Spittal and Beauly, the new Spittal to Peterhead HVDC link, and the existing Spittal 275/132kV substation. It will be located on agricultural land approximately 460 m northeast of the existing Spittal substation, and approximately 2.4 km southeast of the nearest settlement of Halkirk at closest approach.

Currently the majority of the site comprises rough grassland used for cattle/ sheep grazing, of Land Capability for Agriculture (LCA) grade 4.2 (Land capable of producing a narrow range of crops, primarily on grassland with short arable breaks of forage crops)[1], with a small (approximately 6 ha) area of coniferous woodland present along the western edge bordering the A9 highway. The position of the Site relative to various environmental constraints is shown on **Figure 2.2** (see **Appendix C**).

The Proposed Development will consist of:

- Creation of a platform and the construction of a new outdoor Air Insulated Switchgear (AIS), 400 kV substation complete with 400 kV double busbar arrangement;
- Creation of a platform and construction of a new 525kV DC 2GW Bi-pole HVDC converter station;
- Installation of two new Super Grid Transformers (SGT);
- New substation control buildings;
- Security fencing;
- Sustainable Drainage Systems (SuDS) for drainage;
- Internal roads for access and maintenance;
- Access points at approximate grid references ND 15490 57270 (primarily for maintenance of landscaping and SuDS in the northern part of the Site), ND 15519 56644 (planned to be the principal Site access), and ND 15651 56311 (planned to be a temporary site access);
- Planting for the purposes of visual screening, landscape improvement and Biodiversity Net Gain (BNG);
- Cut and fill earthworks as required to enable the above; and
- Temporary construction compounds and material storage areas for the duration of the construction phase.

It is assumed for the purposes of this Scoping Report that:

- All built infrastructure is a maximum of 30m height above ground level;
- The new built infrastructure will be located towards the southeast end of the Site (as per **Figure 2.1** (see **Appendix B**), with the northern end reserved primarily for landscape improvements, SuDS and BNG planting; and
- The cable connection to the existing Spittal substation will be constructed at the same time as the Proposed Development, but this will be undertaken with the benefit of permitted development rights and as such does not form part of this scoping assessment.

[1] Scotland's Soils, National scale land capability for agriculture, 2023, accessed at: https://soils.environment.gov.scot/maps/capability-maps/national-scale-land-capability-for-agriculture/

There may be a potential need for compensatory planting to be delivered off-site if there is not adequate space within the site. Any compensatory forest planting, peat restoration or habitat planting 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 the details of these areas are unlikely to be known at the time of the proposed planning application.

2.3 Construction Programme

Subject to consents and approvals being granted, the indicative construction programme for the Proposed Development is as follows:

- Construction start: September 2025;
- Construction end: August 2027; and
- Operation: October 2028, first phase of energisation and fully operational 2030.

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

2.3.1 General Environment Management Plans

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

2.3.2 Species Protection Plans

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

2.4 Construction practices and phasing

2.4.1 Phase 1 - Enabling works

Road improvements and Access

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 combination of:

- Upgrade to existing tracks;
- Installation of temporary new stone tracks;
- Installation of permanent floating stone tracks; and
- Installation of permanent new stone tracks.

At this stage the access strategy has not yet been determined. However, once developed it will be included in the EIA and application for Planning Permission. It is anticipated that the majority of access will be achieved from the existing road network. Floating stone road or trackway panel construction may be installed in sensitive areas, depending on project requirements.

Site Compound

It is currently anticipated that a single main construction compound will be required, the location of which will be confirmed by the Principal Contractor. Plant and materials storage areas will also be confirmed by the Principal Contractor.

Forestry Clearance

Construction would require the removal of some coniferous trees which are believed to be non- commercial. This would be undertaken in consultation with Scottish Forestry and the affected landowner. It is assumed at this stage that all trees on site would be removed to facilitate construction, although opportunities to minimise loss of trees will be sought where possible as the design develops.

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.

2.4.2 Phase 2 – Construction works

This phase would comprise:

- Creation of a level platform;
- Installation of security fencing;
- Laying of foundations, including construction of site drainage;
- Erection of control buildings;
- Installation of electrical plant; and
- Construction of SuDS and planting of screening/ BNG vegetation.

Substations are not generally illuminated, other than sensor-activated security lighting for night-time access. Floodlights would be installed but only used in the event of a fault during the hours of darkness.

2.4.3 Phase 3 - Commissioning

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 fit 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 from the Proposed Development.

2.4.4 Phase 4 - Reinstatement

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, all work sites and the re-vegetation of all construction compounds etc.

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 (**Appendix N**).

Reinstatement of Construction Compound

The construction compound site will be made good at the end of construction with all buildings and materials removed and soils appropriately reinstated.

2.5 Construction Employment and Hours of Work

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

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.

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.

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 Monday to Saturday. Any out of hours working would be agreed in advance with The Highland Council.

2.6 Construction Traffic

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

Vehicle movements to the Site from the local highway network will be required to bring construction plant to the Site and deliver the foundations, buildings, materials and other infrastructure components to site.

2.7 Operation and Management

2.7.1 Lifetime of the Proposed Development

It is anticipated that the Proposed Development will be operational for 40 years. At the end of this period, the Proposed Development could potentially be decommissioned, or the infrastructure upgraded to continue operation.

2.7.2 Maintenance Programme

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

Due to the nature of the Proposed Development, no significant production of residues or emissions are anticipated during the operational phase beyond small amounts of waste e.g. packaging materials and the potential for small spillages of fuel and oils during routine maintenance and repair of the electrical infrastructure and housing. Some operational noise is anticipated from the HVDC converter station and substation, which is assessed in **Chapter 9: Noise and Vibration.**

During construction, residues and emissions are anticipated to be consist primarily of construction noise, and any potential fuels/ oils/ waste generated during construction works. These are assessed in **Chapter 8: Hydrology, Hydrogeology, Geology and Soils** and **Chapter 9: Noise and Vibration** respectively.

2.8 Decommissioning

The Applicant is seeking consent in-perpetuity for the Proposed Development. In the event of decommissioning, or replacement, it is anticipated that the level of effect would be similar but less than during construction. Decommissioning would be undertaken in line with the best practice processes and methods at that time and managed through a Decommissioning Environmental Management Plan. No separate assessment of decommissioning will be presented in the EIA report.

3. METHODOLOGY

3.1 Introduction

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.

The EIA Report will contain the information specified in Part I (where relevant) and Part II of Schedule 4 of the EIA Regulations. The approach to the assessment has been informed by current best practice guidance.

A detailed overview of the guidance and methodology adopted for each technical study is provided within the respective technical chapters of this EIA Scoping Report (Chapters 4 - 10).

3.2 Identification Of Baseline

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.

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

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

Consistent with Part 1 of Schedule 4 of 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

For the purposes of this EIA Scoping 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.*

Where a more appropriate effect duration scale or definition of the above terms is applicable to a technical discipline this will clearly outlined within the technical chapters.

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*.'

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
- Reversibility and duration of the effect

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.

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 have been 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

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.

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.

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

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

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) where applicable, these will be provided in the respective technical chapters.

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

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.

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 Topics scoped out of further consideration in EIA

Some environmental topics are considered to be sufficiently unlikely to have significant effects as a result of the Proposed Development that they have been identified as not requiring further assessment within the EIA and are not considered further in this EIA scoping report. These are described in **Table 3.2** and a justification provided.

Tabel 3.2: Topics scoped out of further consideration

Topic	Justifiication for topic to be Scoped Out
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 and due to the passage of vehicles along public highways and access tracks within the Site and from construction plant exhaust emissions. The potential for and significance of dust generated by construction activities is difficult to estimate at this stage 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 number of construction vehicles is not likely to result in a significant effect on local air quality due to increased exhaust emissions. Standard mitigation measures adopted by SSEN Transmission on all projects and implemented via a Construction Environmental Management Plan (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., with particular focus on ensuring the minimal possible potential for effects on the enarby properties along the A9 highway and north of the Site.
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. 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). 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 Construction Traffic Management Plan (CTMP) will be developed post-submission to reduce the potential for traffic related accidents. No signficant effects are likely due to major accidents and disasters 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)[2]. 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 overhead line or underground cables associated with the substation[3]. All EMF generating infrastructure will be set back from the site boundary and accounting for this, the nearest properties to the Site (those adjacent to the A9 and those located north of the Site) are unlikely to be located within 150- 200m of any electrical infrastructure. 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.
Forestry	Forestry typically involves extended areas of trees grown as a crop and in third party ownership, and impacts are typically assessed against the following criteria: • Effects on commercial viability; • Compromisation of financial returns; or • No effects on forestry. Within the Proposed Development Site boundary woodland accounts for a very small area of land cover. Some of the field margins are planted with confierous trees. However these are not grown as a commercial crop. There are no forestry designations, Tree Protection Orders (TPOs) or commercially viable forestry within the Proposed Development boundary. Therefore, due to the likely minimal impact on forestry it has been scoped out of further assessment in the EIA.

[2] Health Protection Agency. URL: http://www.hpa.org.uk/Topics/Radiation/UnderstandingRadiation/UnderstandingRadiationTopics/ElectromagneticFields/ElectricAndMagneticFields/ExposureGuidelinesForElectricAndMagneticFields/

[3] http://www.emfs.info/Sources+of+EMFs/Substations/National+Grid+substations/

3.6 Cumulative Effects

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.

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 environmental effects and therefore have the greatest potential to result in significant cumulative effects. Current projects to be included in the cumulative assessment include the West of Orkney Wind farm onshore infrastructure and Ayre Offshore Wind Farm.

Exceptions to this rule are other developments proposed by the SSEN Transmission, which are not yet the subject of an application or consent but are foreseeable and relevant to this EIA. These include the Spittal to Beauly 400 kV Overhead Line (OHL), the Spittal to Peterhead HVDC subsea link, and the connection from the Proposed Development to the existing Spittal substation. 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.

It is considered that there would be no potential for transboundary effects associated with the Proposed Development, and therefore no further assessment of transboundary effects is proposed.

3.7 Assumptions and Limitations

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 CHARACTER AND VISUAL IMPACT

4.1 Introduction

This chapter considers the potential effects of the Development on landscape character and on the visual amenity of people during operation. It will also consider the potential effects of the removal of vegetation during construction on both these receptor types.

4.2 Baseline conditions

A 4 km study area is considered appropriate taking into account the maximum height of the Development (up to 30m for the HVDC switching station) and its extent, plus the nature of the landscape baseline. This is based on previous experience of assessing electrical infrastructure developments including substations. There are no national or local landscape designations within the study area. There are two landscape character types within the study area. The predominant one is Farmed Lowland Plain LCT 143 which extends across most of the study area. Sweeping Moorland and Flows LCT 134 extends very marginally into the study area at two locations to the south and to the west.

The visual baseline mainly consists of scattered residential receptors with more sensitive road users limited to the main roads, principally the A9, generally running in a north- south direction across the study area. There is a small settlement at Halkirk to the northwest of the Development. Scattered properties align the main and minor roads and individual properties are often surrounded by vegetation, particularly to the rear. Many of the properties are farmsteads with associated outhouses and large farm buildings. A railway line travels east- west across the study area to the north. There is an area to the north of the site, controlled by Forestry and Land Scotland and called Sibster, which includes a car park and trails within recently planted woodland areas.

There are no long distance trails within the study area, however, there are a number of core paths (see **Figure 4.1** in **Appendix D**). Those with potentially visibility towards the Development include; CA06.07 which is a route to Achanarras Quarry and CA06.05 which runs north to south along the eastern boundary of Halkirk.

4.2.1 Landscape Context

Table 4.1: NatureScot Landscape Character Types

NatureScot LCT	Description
Farmed Lowland Plain LCT 143	• *A generally open, low lying plain, gently undulating to form shallow broad valleys which are often filled with lochs and mosses and subtle low ridges.* • *Occasional smooth hills rise above the more low-lying plain forming local landmarks. (Spittal Hill)* • *Agriculture the predominant land cover.* • *Sparse woodland, mainly comprising small angular coniferous plantations.* • *Larger conifer woodlands located at the transition with the Sweeping Moorland and Flows.* • *Extensive views due to the openess of the landscape and the clarity of northern air and light*
Sweeping Moorland and Flows LCT 134	• *Gently sloping or undulating landform which lies generally below 350 metres.* • *Occasional isolated hills of limited height form local landmark features.* • *Lochs and mature, meandering rivers.*

	• *Very distinct flora, dominated by sphagnum mosses, produced by the wetness and infertility of the flows.* • *Coniferous forest forming a dominant characteristic within some parts of this landscape character type.* • *Very sparsely settled with dispersed crofts, farms and estate buildings largely found on the outer edges of this landscape or near a strath.* • *Wind farms, transmission lines, the A9 and a network of minor roads are key features within the more modified outer fringes within Caithness.* • *Long, low and largely uninterrupted skylines offering extensive views across this landscape and result in a feeling of huge space.*

4.2.2 Designated & Protected Landscapes

There are no national landscape designations within the study area. There may be areas of landscape which have ecological designation or protection and similarly geological areas.

4.2.3 Visual Amenity

Visual amenity relates mainly to the expansive views available across this open, low lying landscape. Access to this landscape and further north to the coast, is gained via the A9 and therefore this is an important tourist route.

4.2.4 Cumulative Assessment

Other similar and relevant developments will be considered in the landscape and visual cumulative baseline where there is likely to be the presence or visibility of the project plus other relevant developments within the project study area.

4.3 Sensitive Receptors

Sensitive receptors include the two LCTs, visual receptors such as residential properties and recreational receptors such as users of core paths and road users including tourists using the A9.

4.3.1 Representative Viewpoints

The following representative viewpoints are proposed for inclusion in the visual baseline and assessment of visual effects. The locations of these viewpoints has been determined using the ZTVs (see **Figures 4.2**: Bare Earth and **4.3**: Screened in **Appendices E and F** respectively) following a site visit but are approximate at this point and exact locations will be determined during site viewpoint photography when micro siting may occur.

VP Number	VP Name	Reason for Selection	Grid Reference (Easting and Northing)
VP1	Core path east edge of Halkirk	Core path to east of Halkirk. Representing recreational receptors.	313596, 958957
VP2	Halkirk	Representing residential receptors on southern edge of Halkirk.	313241, 958830

VP3	Minor road near Yellow Moss	Representing middle distance views for residential receptors to the west of Development	313390, 957195
VP4	CA06.07	Core path route to Achanarras Quarry from carpark. Recreational receptor.	315091, 954434
VP5	A9 alongside Development	Representing residential receptors along A9 opposite the Development. Also representing road users (tourists).	315540, 956569
VP6	Minor road accessing Banniskirk Mains	Representing residential receptors to east of Development.	316817, 957498
VP7	A882	Representing residential receptors along the A882 near Clayock northeast of the Development	316691, 959325

Based on the scale of the development and its relatively wide theoretical visibility across the study area, landscape and visual will be scoped into the EIA.

4.4 Issues Scoped Out

It is suggested that the Sweeping Moorland and Flows LCT should be scoped out of the LVIA due to the very small extent within the study area and which has little or no theoretical visibility of the Development according to the ZTVs (see figs 4.2: Bare Earth and 4.3 Screened in Appendices E and F respectively).

4.5 Assessment Methodology

The LVIA will be carried out in accordance with GLVIA3 (Guidance for Landscape and Visual Impact Assessment, 3rd Edition). The LVIA will identify the sensitivities of landscape and visual receptors via value and susceptibility, within the site and study area and determine the magnitude of landscape or visual change arising from both construction activities and operational components, plus the level of effect and if significant or not significant.

The visibility of the Development will depend on the final height of the project components and their location within the site boundary. In the absence of such finalised detail at the time of writing, an assumption has been made based on the Development being up to 30m high and located anywhere within the southern half of the site boundary, as per **Figures 4.2 and 4.3,** in order to provide a preliminary scoping Zone of Theoretical Visibility (ZTV). This is a worst case assumption for scoping; the total area of the Site occupied by tall infrastructure will be significantly less than this, with this area to be refined during design development.

Two ZTVs have been prepared and submitted with the scoping report, a bare earth ZTV (Fig 4.2) and a screened ZTV (Fig 4.3). The screened ZTV takes into account the screening provided by existing topography, vegetation and buildings within the study area whilst the bare earth is based on screening provided by the existing topography only. The ZTVs have been used to assist the process of selecting representative viewpoints and to determine the potential for scoping out landscape and visual receptors due to a lack of visibility of the Development.

Photomontages will be prepared from Viewpoints 2, 3 and 6 illustrating the Development at Year 1 and Year 10 to illustrate the maturing of proposed planting and its mitigation of landscape and visual effects over time.

5. ECOLOGY, ORNITHOLOGY AND NATURE CONSERVATION

5.1 Introduction

This chapter considers the potential effects of the Proposed Development on habitats and species, including ornithology receptors, within the development and the wider local area. Evaluation of the existing baseline environment will be made through a combination of 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;
- Identifies the potential for significant effects on ecological receptors to arise and makes a recommendation as to the scope of future assessment;
- 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 Environmental Impact Assessment (EIA));
- Outlines the proposed approach to biodiversity net gain (BNG); and

5.2 Baseline Conditions

5.2.1 Desk Study

The following information is based on data collected from the desk-based study which has been used to inform the ecological assessment.

The Proposed Development baseline has been informed by a range of published and publicly available data including:

- NatureScot SiteLink[4]- data on designated sites and notable species in Scotland;
- NatureScot Scottish Biodiversity List (SBL) [5] - a list of species which are important for Scotland's biodiversity;
- Scotland's Environment Web Map [6] - an interactive map which shows biodiversity areas across Scotland;
- National Biodiversity Network (NBN) Atlas [7] - a national interactive map that shows biodiversity areas;
- Highland Botanical Record Centre (HBRG) data on protected species;
- RSPB Bird Species data, for relevant bird species within a 6 km buffer from the Proposed Development; and
- Highland Raptor Study Group (HRSG) data, containing records of Schedule 1 raptors relevant to the Proposed Development area.

5.3 Sensitive Receptors

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.

(4) NatureScot SiteLink. Available at https://www.nature.scot/information-hub/snhi-data-services
(5) NatureScot Scottish Biodiversity List. Available at https://www.nature.scot/scotlands-biodiversity/scottish-biodiversity-strategy/scottish-biodiversity-list
(6) Scotland's Environment Web Map. Available at https://map.environment.gov.scot/sewebmap/
(7) National Biodiversity Network Atlas. Available at https://nbnatlas.org/. Note that CC-BY-NC data was excluded. Data suppliers include NatureScot, Highland Biological Recording Group, Biological Records Centre, and Highland Biological Recording Group.

5.3.1 Designated Sites

The search area for statutory designated sites is 2 km, excepting Special Protection Areas (SPAs), proposed SPAs, and other designations whose qualifying features include bird species. The search areas for these designated sites are informed by the connectivity distances for the designated features, as defined by NatureScot[8]. The connectivity distance is the distance that species are likely to disperse or forage outside of their home range (not including migration). For species not listed in the NatureScot connectivity distance guidance, the search area is 10 km. Any designated sites identified with no connectivity have been screened out and are not considered further.

There are no internationally or locally designated sites within the Proposed Development or within 2 km. There are two geological Sites of Special Scientific Interest within 2 km of the site.

Statutory and non-statutory designated sites within connectivity distance of the Proposed Development are listed in **table 5.1**. Geological natural heritage designations have been included for completeness but are not considered further in this Chapter (see **Chapter 8: Hydrology, Hydrogeology, Geology and Soils**).

Table 5.1. Designated Sites for Nature Conservation relevant to the Proposed Development.

Site Name	Features / Description	Proximity
Banniskirk Quarry Geological SSSI	Geological: • Silurian-Devonian Chordata palaeontology (fossil fish) Biological: • None	100 m
Achanarras Quarry Geological SSSI	Geological: • Silurian-Devonian Chordata palaeontology (fossil fish); and • Non-marine Devonian stratigraphy (rocks that surround the fossil fish). Biological: • None	1.9 km
Caithness Lochs SPA including Loch Scarmclate SSSI, Loch Watten SSSI and Loch Calder SSSI	The SPA is designated for regularly supporting: **Annex 1 species:** • Whooper swan *Cygnus cygnus* (1993/94-1997/98 winter peak mean of 240 representing 4% of GB and 1% of Icelandic population); and • Greenland white-fronted goose *Anser albifrons flavirostris* (1993/94-97/98 winter peak mean of 440 representing 3% of GB and 1% of Greenlandic population). **Waterfowl:** Greylag goose *Anser anser* (1993/94-1997/98 winter peak mean of 7,190 representing 7% of the GB and Icelandic populations).	3.2 km
Caithness and Sutherland Peatlands SPA, SAC, Ramsar, Including Blar nam Faoileag SSSI, Strathmore Peatlands SSSI, Shielton Peatlands	The SPA is designated for regularly supporting: **Annex 1 species:** • Red-throated diver *Gavia stellata* (2006, 46 pairs, 3.5% of the GB population); • Black-throated diver *Gavia arctica* (1994, 26 pairs, 15% of the GB population); • Hen harrier *Circus cyaneus* (1993 to 1997, mean of at least 14 pairs, at least 2.8% of the GB population); • Golden eagle Aquila *chrysaetos* (1992, 5 pairs, 1% of the GB population); • Merlin *Falco columbarius* (1993 and 1994, an estimated 54 pairs, 4% of the GB population);	6.6 km

[8] NatureScot. (2016). *Assessing Connectivity with Special Protection Areas (SPAs) – Guidance.* Version 3 – June 2016. NatureScot, Battleby, Perth.

SSSI and Loch Caluim Flows SSSI	• Golden plover *Pluvialis apricaria* (1993 and 1994, 1,064 pairs, 5% of the GB population); • Wood sandpiper *Tringa glareola* (up to 5 pairs, up to 40% of the GB population); • Short-eared owl *Asio flammeus* (30 pairs, 2% of the GB population); and • Dunlin Calidris A*lpina schinzii* (1993 and 1994, 1,860 pairs, 20% of the GB population). **Migratory birds:** • Common scoter *Melanitta nigra* (2007, at least 21 pairs, at least <0.1% of the Western Siberia/Western & Northern Europe/Northwestern Africa biogeographic population and at least 40.4% of the GB population); • Greenshank *Tringa nebularia* (2009, at least 653 pairs, at least 0.9% of the Europe/Western Africa biogeographic population and at least 59.4% of the GB population); and • Wigeon *Anas penelope* (1993/94, at least 43 pairs, at least <0.1% of the Western Siberia/Northwestern/Northeastern Europe biogeographic population and at least 10.8% of the GB population). The Ramsar site is designated for regularly supporting: **Invertebrates:** • Freshwater pearl mussel *Margaritifera margaritifera* which occurs in the River Naver. **Mammals:** • Otter *Lutra lutra* which are wide ranging throughout the site. **Ramsar Criterion 2:** • Red-throated diver (2006, 46 pairs, 3.5% of the GB population); • Black-throated diver (1994, 26 pairs, 15% of the GB population); • Golden plover (1993 and 1994, 1,064 pairs, 5% of the GB population); • Wood sandpiper (up to 5 pairs, up to 40% of the GB population); and • Dunlin (1993 and 1994, 1,860 pairs, 20% of the GB population). **Ramsar Criterion 4 (waterfowl):** Wigeon (1993/94, at least 43 pairs, at least 10.8% of the GB population); Common scoter (2007, at least 21 pairs, at least 40.4% of the GB population); and Greenshank (2009, at least 653 pairs, at least 59.4% of the GB population).	

Note: Designations are listed in order of importance: Special Protection Area (SPA), Special Area of Conservation (SAC), Ramsar. Sites designated multiple times are combined.

5.3.2 Protected and Priority Species (Non-Avian)

Bats

No records of bats were found within 2 km of the site. Bats are known to occur in the wider area and suitable habitat to support these species occurs within the Proposed Development, therefore they may be present.

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

Otter

Otter (*Lutra lutra*) have previously been recorded within a 2 km radius of the Proposed Development. They are also known to occur in the wider area and suitable habitat to support this species occurs within the Proposed Development, therefore otter may be present.

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

Wild cat

Wild cat (*Felis silvestris*) have previously been recorded within a 2 km radius of the Proposed Development. They are known to occur in the wider area and suitable habitat to support this species occurs within the Proposed Development, therefore they may be present.

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

Water Vole

Water vole (*Arvicola amphibius*) have previously been recorded within a 2 km radius of the Proposed Development. They are known to occur in the wider area and suitable habitat for this species occurs within the Proposed Development, therefore they may be present.

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.

Pine Marten

No records of pine marten (*Martes martes*) were found within 2 km of the site. Pine marten are known to occur in the area and suitable habitat to support this species is present within the Proposed Development, therefore they may be present.

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

Badger

No records of badger (*Meles meles*) were found within 2 km of the site. They are known to occur in the area and suitable habitat for this species occurs within the Proposed Development, therefore they may be present.

Badgers and their setts are protected under the Protection of Badgers Act 1992 (as amended).

Other

Red squirrel (*Sciurus vulgaris,* adder (*Vipera berus*), slow worm (*Anguis fragilis*), common lizard (*Zootoca vivipara*), and common toad (*Bufo bufo*) were not recorded within a 2 km radius. They are known to occur in the area and suitable habitat for these species occurs within the Proposed Development, therefore they may be present. These species are protected under the Wildlife and Countryside Act 1981 (as amended) and are listed on the Scottish Biodiversity List as priority species.

The Scottish Biodiversity List priority species Hedgehog (*Erinaceus europaeus*) has been recorded within 2km of the Proposed Development, and mountain hare (*Lepus timidus*) and brown hare (*Lepus europaeus*), are known to occur in the area. Suitable habitat for these species occurs within the Proposed Development, therefore they may be present.

5.3.3 Ornithology

The proposed development is located approximately 3.2 km from the Caithness Lochs SPA and Ramsar site which is designated for its passage and wintering greylag goose, Greenland white-fronted goose and whooper swan populations. All three species forage widely over grassland and arable habitats and could potentially forage across the Proposed Development. Records from RSPB indicate breeding lapwing (*Vanellus vanellus*), curlew (*Numenius arquata*) and snipe (*Gallinago gallinago*) within 2 km of the proposed development, as well as wintering pink-footed geese (*Anser brachyrhynchus*). No breeding records of Wildlife and Countryside Act 1981 (as amended) Schedule 1 raptor records were identified from the HRSG data within 10 km of the Proposed Development. The habitats within the Proposed Development and its vicinity are suitable to support a range of breeding Birds of Conservation Concern species such as meadow pipit (*Anthus pratensis*) and skylark (*Alauda arvensis*).

5.3.4 Habitats

Habitats within the Proposed Development predominantly comprise neutral grassland, with areas of upland heathland, conifer plantation woodland, and agricultural semi-improved grassland. Watercourses and drainage ditches are also present within the site, as well as several access tracks. Upland heathland is listed as Scottish Biodiversity List priority habitat.

No Annex I habitats or Groundwater Dependent Terrestrial Ecosystems (GWDTE) were identified, however, in the absence of survey there is potential for these to be present.

The Biodiversity Net Gain (BNG) assessment identified no habitats with Very High distinctiveness and no irreplaceable habitats within the Proposed Development. High distinctiveness habitats present comprise grassland and heathland, which are recommended for avoidance, mitigation or compensation. Watercourse habitats mapped as Medium distinctiveness are recommended for mitigation or compensation.

There are two unnamed areas of woodland listed on the Ancient Woodland Inventory (AWI) within 2 km of the Proposed Development.

5.3.5 Invasive Species

No invasive species have been identified, however, there is potential for these to be present and this will be confirmed through surveys.

5.4 Issues Scoped Out

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 Construction Environmental Management Plan (CEMP) will be produced and SSEN Transmission's General Environmental Management Plans (GEMPs) and Species Protection Plans (SPPs) applied. These will capture all mitigation measures required in respect of ecological features, both as a result of the outcome of the EIA and in order to comply with relevant legislation. The implementation and audit of these measures will be overseen by an Environmental Clerk of Works (ECoW). With the adherence to a CEMP and GEMP, as overseen by an ECoW, it is considered that there is no potential for significant impacts. Therefore, no further assessment of lighting, noise, dust, or visual disturbance during construction is proposed.

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

Due to the nature of the works, impacts to Ecology and Nature Conservation via emissions to air are scoped out.

Due to the nature of the Proposed Development, collision risk to birds is not predicted from the construction and operation of the substation and impacts from collision are scoped out. Assessment of potential collision risk impacts from the OHL connection to the substation will be undertaken as part of the Section 37 application for that development.

5.5 Potential Significant Effects

Potential adverse effects include:

- Direct mortality to fauna through traffic collisions, construction and construction related operations (open trenches and woodland felling operations);

- Indirect effects on designated ornithological features or supporting habitats Caithness Lochs SPA and supporting SSSI sites;
- Indirect effects on designated ornithological features or supporting habitats Caithness and Sutherland Peatlands SPA, SAC, Ramsar and supporting SSSI sites;
- Habitat loss both temporary and permanent associated with e.g. temporary and permanent infrastructure;
- Habitat fragmentation and severance e.g. through removal of woodland listed on the AWI creating isolated and fragmented pockets of woodland. Effects may be temporary and permanent associated with e.g. temporary and permanent infrastructure;
- Disturbance from lighting, noise, and human presence;
- 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 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;
- Cumulative effects from other developments, either built or proposed, within the zone of influence for ecological or ornithological features identified as sensitive receptors of the Proposed Development; and
- Effects of decommissioning.

5.6 Assessment Methodology

The ecological impact assessment will be completed in accordance with the Chartered Institute of Ecological and Environmental Management (CIEEM) Ecological Impact Assessment Guidance[9].

The assessment will use the ecological baseline to identify the sensitive ecological receptors that could be geographic level 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).

A Habitats Regulations Screening Assessment (HRA) will be undertaken to identify any Likely Significant Effects (LSE) on the National Site Network.

5.6.1 Proposed Approach to Baseline Data Collection

To inform the assessment of impacts on ecology and ornithology receptors the following surveys are proposed.

- Extended Phase 1 and UK Habitat surveys, including identification of GWDTE.
- Protected species surveys including (as necessary) for red squirrel, bats, pine martin, badger otter, water vole and reptiles.
- Wintering wildfowl surveys.
- Breeding bird surveys were undertaken at Spittal and Banniskirk on 09 June, 10-12 July, and during 24-28 July 2023. Surveys were also undertaken at Sibster, immediately to the north, on 7-8 June 2023.

5.6.2 Proposed Approach to Biodiversity Net Gain

SSEN Transmission has a target for all projects gaining consent to achieve a 10% net gain for biodiversity. This is aligned to the Scottish Government's National Planning Framework 4 (NPF4)[10] 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.

[9] 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.
[10] The Scottish Government (2023) *National Planning Framework 4*, The Scottish Government, Edinburgh. Available at: https://www.gov.scot/publications/national-planning-framework-4/

SSEN Transmission have 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[11]. Area and linear habitats are assessed separately. The Toolkit produces a unit score for three categories of habitat: Biodiversity Units[12], Linear Hedgerow (H) Units and Linear Watercourse (W) Units[13]. The BNG toolkits are used to quantify losses and gains of biodiversity, allowing site locations or design options to be compared and the preconstruction baseline and proposed post-development planting to be assessed. This supports the mitigation hierarchy through project design and development and enables biodiversity units to be calculated and measured against the target of 10% Net Gain.

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 removed from the toolkit and assessed separately. 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.

Consideration should also be given to the foraging habitat of SPA designated feature species, even where this is outwith 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.

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 the proposed planting design 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

Protected and priority species which may potentially be present include water vole, otter, wildcat, bat species, red squirrel, pine marten, badger, adder, slow worm, common lizard, common toad, hedgehog, mountain hare and brown hare.

Habitats recorded within the Proposed Development potentially include Scottish Biodiversity List priority habitats.

For the ornithological baseline, a desk based review identified that the project area may be infrequently used by a small number of sensitive bird receptors including foraging Schedule 1 birds of the Wildlife & Countryside Act 1981, and breeding Birds of Conservation Concern.

At this preliminary stage, possible effects scoped into the EIA include mortality and disturbance of protected and priority species and ornithology receptors, habitat loss and degradation, biosecurity risks, pollution, and changes to hydrology.

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

6. ARCHAEOLOGY AND CULTURAL HERITAGE

6.1 Introduction

This chapter proposes an appropriate baseline and assesses the potential effects and impacts on sites of archaeological and cultural heritage interest resulting from the construction, operation, and decommissioning phase of the Proposed Development, for the purposes of Scoping the topic in or out of further assessment.

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 [14] and non-designated heritage assets;
- To consider the potential for both direct impacts upon heritage assets and indirect impacts upon their settings; and
- To identify any mitigation measures that may be appropriate to either diminish or alleviate predicted significant or, if appropriate, non-significant adverse effects. Any discussion and approval of mitigation approaches will be undertaken in consultation with stakeholders including both Historic Environment Scotland (HES) and the Highland Council Archaeologist.

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 (30 m) and because the landscape is partially screened by plantation forestry.

6.2 Baseline

6.2.1 Methodology

This assessment uses data from the Computer Application for National Monument Record Enquiries (CANMORE) National Record of the Historic Environment (NRHE) and Historic Environment Scotland (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.

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.

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 used. The assessment methodology then followed that described in Chapter 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 project activity and operational processes. These are able to be 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 infrastructure associated with the substation.

[14] 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.

Direct impacts to heritage assets may occur as a result of the following project activities:

- Road Improvements and access creation;
- Site compound and construction/installation;
- Forestry clearance;
- Construction compound installation;
- Creation of level platforms;
- Project infrastructure installation such as security gates, control buildings, electrical plant; and
- Demolition of existing substation assets.

In cultural heritage terms, an indirect impact refers to any change in the baseline condition of a heritage asset resulting from a development beyond the boundaries of the asset. Indirect impacts can have a variety of forms; for instance if a development 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 development.

6.2.2 Background

The Proposed Development is in Caithness in the Highlands of Scotland. Since the Mesolithic period this part of modern Scotland has been inhabited, though evidence from this period is scarce[15]. Early artefactual remains from the Mesolithic and subsequent Neolithic period include stone tools, standing stones, rock-art, and pottery 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.[16] In the northern Highlands the subsequent Iron Age has evidence of several high-status structures at Sinclair Bay approximately 26 km from the Proposed Development. 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 during the period. The Spittal 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. The Banniskirk House (CANMORE ID 184437), a 19th century country house estate, lies 304 m to the north.

6.2.3 Baseline

A full list of designated assets within the study area, including their descriptions, is provided in **Appendix M**. These are shown on **Figure 6.1** in **Appendix G**. No UNESCO World Heritage Sites, protected battlefields, gardens and designed landscapes, historic marine protected areas, or conservation areas were identified within 5 km of the Proposed Development.

A programme of archaeological monitoring of GI trial pitting was undertaken (2nd August 2023 to 18th August 2023), alongside an archaeological walkover of the site. The full findings will be included in the EIA baseline.

Designated Assets

Within Proposed Development Footprint

No designated assets are recorded within the Proposed Development's footprint.

[15] 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

[16] 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

Within 5 km

There are 11 listed buildings within 5 km of the Proposed Development, consisting of:

- Eight category B listed buildings; and
- Three category C listed buildings.

There are no category A listed buildings.

There are 22 scheduled monuments within 5 km of the Proposed Development.

Non-Designated Assets

Within Proposed Development Footprint

There are five non-designated assets, all longhouse-style farm buildings with associated features (i.e. sheepfold enclosures) within the Proposed Development's footprint.

- CANMORE ID 94582 Achalone – Longhouse.
- CANMORE ID 90875 Achalone – Longhouse farm.
- CANMORE ID 90876 Achlone – Unroofed long building
- CANMORE ID 90877 Achalone – Longhouse.
- CANMORE ID 94692 Achalone – Longhouse farm.

The monitoring of the GI trial pitting identified two further non-designated features.

- AOC_01: Linear feature
- AOC_02: Linear feature

The archaeological walkover survey identified five further non-designated features.

- AOC_03: Building - farmstead
- AOC_04: Building - farmstead
- AOC_05: Sheepfold
- AOC_06: Cairn
- AOC_07: Building

Within 500 m

There are seven non-designated assets located within 500 m of the Proposed Development.

6.3 Sensitive Receptors

This assessment reports the potential direct and indirect impacts to heritage receptors.

In addition to the baseline, sensitive receptors are identified and include designated assets that are either directly or indirectly impacted, as well as non-designated assets that are directly impacted (**table 6.1**) are as follows.

- There are 19 scheduled monuments with indirect impacts; and
- There are 13 non-designated assets with direct impacts.
- CANMORE ID 94567 (Achalone – Building), although located 2 m outside the Proposed Development's footprint, this is included as having potential for a direct impact due to proximity.

Table 6.1: Sensitive Receptors

State ID	Title	Designation	Category	Description	Distance	Metres from Proposed Development
SM2400	Achanarras,cairn 800m NW of	Scheduled Monument	--	Prehistoric ritual and funerary: cairn (type uncertain)	Within 5 km	1245
SM2401	Achanarras,cairn 800m NW of	Scheduled Monument	--	Prehistoric ritual and funerary: cairn (type uncertain)	Within 5 km	1313
SM2402	Achanarras,hut circle	Scheduled Monument	--	Prehistoric domestic and defensive: hut circle, roundhouse	Within 5 km	1036
SM450	Gallow Hillock, cairn on Backlass Hill	Scheduled Monument	--	The monument is a prehistoric cairn visible as a grass covered mound. This monument is of national importance because of its potential to contribute to our understanding of prehistoric ritual and funerary practices: it is likely to contain at least one central burial as well as secondary burials dug into the mound. A mound of this size should also cover an area of prehistoric land surface, which would have the potential to enhance considerably our understanding of prehistoric environmental conditions.	Within 5 km	4689
SM494	Tulach an Fhuarain,cairn 310m NW of Bridge of Westerdale	Scheduled Monument	--	Prehistoric ritual and funerary: cairn (type uncertain)	Within 5 km	4942
SM496	Tulach Lochain Bhraseil,cairn 310m WNW of Bridge of Westerdale	Scheduled Monument	--	Prehistoric ritual and funerary: cairn (type uncertain)	Within 5 km	5028
SM545	Dale Farm,broch 800m SE of	Scheduled Monument	--	Prehistoric domestic and defensive: broch	Within 5 km	3422
SM521	Ballone,broch 360m NE of,Spittal	Scheduled Monument	--	Prehistoric domestic and defensive: broch	Within 5 km	3351
SM528	Fairy Hillock,chambered cairn SE of Spittal Mains	Scheduled Monument	--	Prehistoric ritual and funerary: chambered cairn	Within 5 km	1850
SM561	Knockglass,broch E of	Scheduled Monument	--	Prehistoric domestic and defensive: broch	Within 5 km	3401
SM582	Spittal Farm, broch 180m E of	Scheduled Monument	--	Prehistoric domestic and defensive: broch	Within 5 km	2461

SM499	Tulloch of Milton,chambered cairn 640m W of Halkirk	Scheduled Monument	--	Prehistoric ritual and funerary: chambered cairn	Within 5 km	3699
SM509	Achies,broch 180m E of	Scheduled Monument	--	Prehistoric domestic and defensive: broch	Within 5 km	2349
SM475	The Shean, cairn 500m WNW of Achanarras	Scheduled Monument	--	Prehistoric ritual and funerary: cairn (type uncertain)	Within 5 km	1472
SM619	Braal Castle	Scheduled Monument	--	Secular: castle	Within 5 km	3454
SM442	Sordale Hill,Cnoc na Ciste,chambered cairn	Scheduled Monument	--	Prehistoric ritual and funerary: chambered cairn	Within 5 km	4833
SM483	Gallow Hill,long cairns and chambered cairn	Scheduled Monument	--	Prehistoric ritual and funerary: chambered cairn; long cairn	Within 5 km	4536.221082
SM2235	Achies, broch 800m NE of	Scheduled Monument	--	Prehistoric domestic and defensive: broch	Within 5 km	1782
SM468	Mill of Knockdee,chambered cairn SSW of	Scheduled Monument	--	Prehistoric ritual and funerary: chambered cairn	Within 5 km	3682
CANMORE ID 94567	ACHALONE	Non-designated	--	Longhouse (ND 1546 5704). Dimensions: 23 x 8m. Rectangular structure defined by grassy banks 0.3m high, divided into five compartments. Orientation NW-SE. (1995) One roofed building attached to the S side of an enclosure and a smaller enclosure are depicted on the first edition of the OS 6-inch map (Caithness 1877, sheet xviii). The larger enclosure is shown on the current edition of the OS 1:10,560 map (1971).	Within 500 m	2
CANMORE ID 94582	ACHALONE	Non-designated	--	Longhouse. Dimensions: 10.7 x 5.3m. Rectangular structure with opposing fireplaces. An annexe 3.2 x 3.3m is attached to the SSE end. Orientation NNW-SSE., 1995. One building is depicted as roofed on the first edition of the OS 6-inch map (Caithness 1877, sheet xviii) and as unroofed on the current edition of the OS 1:10,560 map (1971).	Within	0
CANMORE ID 90875	ACHALONE	Non-designated	--	Longhouse farm (ND 1565 5658) comprising; A: Longhouse. Dimensions: 26 x 5m. Rectangular structure divided into four units with a circular kiln at the S end. It has two annexes attached to the W long wall, measuring 3 x 2m and 3.2 x 2m. Orientation NW-SE.	Within	0

				B: Longhouse. Dimensions: 7 x 4m. Rectangular structure defined by grass-covered walls 0.4m high. There is no internal division, but the long wall projects for 4.5m from the SE corner. Orientation NW-SE.R J Mercer, NMRS MS/828/19, 1995. A farmstead comprising two unroofed buildings, one of which is a long building with what may be two outshots, and two enclosures is depicted on the 1st edition of the 6-inch map (Caithness 1877, sheet xviii). One unroofed building is shown on the current edition of the OS 1:10560 map (1971).		
CANMORE ID 90876	ACHLONE	Non-designated	--	An unroofed long building is depicted on the 1st edition of the 6-inch map (Caithness 1877, sheet xviii), but it is not shown on the current edition of the OS 1:10560 map (1971).	Within	0
CANMORE ID 90877	ACHALONE	Non-designated	--	Longhouse (ND 1620 5695). Dimensions: 28 x 6m. Rectangular structure defined by grass and reed covered banks 0.45m high. It was apparently divided into five units and is associated with an enclosure 28 x 35m, to the W. Orientation NNE-SSW. R J Mercer, NMRS MS/828/29, 1995.A farmstead comprising one partially roofed long building and one unroofed building attached to an enclosure, is depicted on the 1st edition of the 6-inch map (Caithness 1877, sheet xviii). One unroofed building and an enclosure are shown on the current edition of the OS 1:10560 map (1971).	Within	0
CANMORE ID 94692	ACHALONE	Non-designated	--	Longhouse farm comprising; A: Longhouse. Dimensions: 16 x 4.5m. Rectangular tripartite structure. The SE and central units contain fireplaces. A small annexe 3 x 3m juts from the S long wall. Orientation NW-SE. B: Longhouse. Dimensions: 10 x 4.5m. Rectangular bipartite structure. The entrance has a funnel-shaped arrangement of upright flagstones leading from the entrance 0.9m wide and tapering from there to 0.5m wide. Orientation NE-SW. R J Mercer, NMRS MS/828/19, 1995 A roofed building is depicted on the first edition of the OS 6-inch map (Caithness 1877, sheet xviii). An unroofed building is shown on the OS 1:10,560 map (1971).	Within	0

AOC_01	Linear	Non-designated	--	Linear feature aligned N-S located towards west edge. Measured 0.64m wide. Possible drainage channel.	Within	0
AOC_02	Linear	Non-designated	--	Linear feature aligned E-W located towards north edge. Measured 0.64m wide with steep edge to south.	Within	0
AOC_03	Building - farmstead	Non-designated	--	Under grass and turf is the remains of a stone built double faced building with multiple compartments, the walls measure, 0.6 m wide and stand up to 0.5 m high. There appears to be a green drain, kiln at the south end of the structure. The building measures 28 m long over walls and 3.5 m internally. There are two small square porches is attached to the west side.	Within	0
AOC_04	Building - farmstead	Non-designated	--	Under grass and turf is a stone-built structure with double faced walls measuring 0.7 m wide and standing up to 0.5 m high. It measures 5.5 m by 3m internally and there is a type of wall on the southside.	Within	0
AOC_05	Sheepfold	Non-designated	--	Double-faced drystone circular enclosure measuring c. 19m in diameter and standing up to 1.4m.	Within	0
AOC_06	Cairn	Non-designated	--	Under moss and grass is a stone cairn measuring 4 m by 3 m and up to 0.3 m high. It appears to have been here for quite a while and it's unclear if this is of any particular date or type of cairn.	Within	0
AOC_07	Building	Non-designated	--	Under grass and turf is the remains of a rectangular stone-built structure measuring c. 27.5 m by 6.4 m, standing up to c. 0.35m high. The structure is in a ruinous state, overgrown vegetation in the area makes it difficult to identify internal divisions.	Within	0

6.4 Issues Scoped Out

The Listed buildings (LB589, LB590, LB590, LB7793, LB7794, LB7794, LB7799, LB7800, LB7801, LB14956, and LB7801) and Scheduled Monuments (SM5732 and SM5413) identified within 5 km of the Alignments; and non-designated assets (CANMORE ID 94558, CANMORE ID 94572, CANMORE ID 90873, CANMORE ID 90874, CANMORE ID 94694, and CANMORE ID 184437) all derive their significance solely from their form, material 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.

6.5 Potentially Significant Effects

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

During the construction and decommissioning phases, direct and indirect impacts to assets may 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 - high.

The sensitive receptors (**table 6.1)** range in sensitivity from low to high. Given the potential magnitude of impact as a result of the Proposed Development that may range from negligible to major, there remains the potential to introduce significant adverse effects to these assets.

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

Therefore, cultural heritage and archaeology will be scoped into the EIA for the proposed Development.

6.6 Assessment Methodology

An assessment of direct and indirect impacts will be carried out and included in the EIA Report, with reference to field reports, setting assessments, best practice guidance and methodologies, and in agreement with the Highland Council Archaeology representative or Historic Environment Scotland.

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) will aid the analysis of 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 sitting in the landscape. This assessment will be supported by the works undertaken by the LVIA.

The walkover survey of the site revealed and confirmed the presence of five upstanding sites. It is recommended that the sites are demarcated and safeguarded during development. If this is not possible, mitigation in the form of evaluation and recording is recommended in advance of development in order to record the remains ahead of their removal/loss.

Given the presence of multi-period archaeology within and surrounding the proposed site, a controlled strip archaeological watching brief is recommended during all ground-works.

Avoidance is the preferred method of mitigating adverse impacts to Cultural Heritage assets. In the event that avoidance is not proportionate or possible, an assessment should be made of the impact to asset and a mitigation strategy developed.

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 the local authority archaeologist (The Highland Council) or Historic Environment Scotland as appropriate.

6.7 Summary

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

- There are 19 scheduled monuments with potential for indirect impacts;
- There are six non-designated assets with potential for direct impacts; and
- There remains the potential for unknown buried archaeology within the Proposed Development that may result in direct impacts.

It is recommended that the built heritage sites identified within the site boundary are demarcated and safeguarded during development. If this is not possible, mitigation in the form of evaluation and recording is recommended in advance of development in order to record the remains ahead of their removal/loss.

Given the presence of multi-period archaeology within and surrounding the proposed site, a controlled strip archaeological watching brief is recommended during all groundworks.

All mitigation measures require the endorsement and approval of the local planning authority.

7. TRAFFIC AND TRANSPORT

7.1 Introduction

This chapter assesses the potential for effects relating to traffic and transportation to arise from the construction, operation and decommissioning phases of the Proposed Development and provide a recommendation as to whether or not consideration of these potential effects should be "scoped in" to the future EIA.

Vehicle movements to the Proposed Development site will mostly consist of Heavy Goods Vehicle (HGV), Light Goods Vehicles and private cars. A small number of Abnormal Indivisible Load Vehicles (ALVs) will be required for the transportation of substation components. The traffic, transport and access chapter will:

- Address potential disruption to pedestrians, cyclists and existing road users during the construction phase;
- Assess changes to local traffic flows during the construction phase;
- 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 policy.

7.2 Baseline

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

The main roads identified within the study area are as follows;

- A-Roads: A9(T), A882 and the A99; and
- B-Roads: the B870.

Three points of access have been proposed to allow for vehicular access into the Site from off the A9 during construction, the location, and details of which have been summarised below;

- Grid Reference ND 15490 57270 – To be retained following the commencement of construction, to provide maintenance access to the anticipated SuDS area;
- Grid Reference ND 15519 56644 - To be retained following the commencement of construction, to be the principal Site access; and
- Grid Reference ND 15651 56311 – Temporary site access during the construction phase only.

All new access junctions will be designed in accordance with the Design Manual for Roads and Bridges, and where necessary for the abnormal load route, would meet abnormal load geometric requirements. The finalised study area will also be confirmed once the initial access assessment has been completed but it is unlikely to any additional roads beyond the ones listed above.

7.3 Sensitive Receptors

The following sensitive receptors have been identified and will be considered in the EIA:

- Motorised users of the surrounding highway network, including vehicle drivers and public transport users;
- Non-motorised users of the surrounding highway network, Public Right of Way (PRoW) and non-designated public routes, including pedestrians, cyclists, and vulnerable groups; and
- Residents within the settlements distributed throughout the routes identified within the study area, which are likely to be the A9, A99, B870, and the A882.

7.4 Issues Scoped Out

Potential effects which have been scoped out of the EIA assessment include;

- Operational Traffic – As the site will be manned only to a low level (anticipated to be two to three car/ van movements per day), it is expected that the amount of traffic related to the Proposed Development's operational phase will be low. Vehicle movements associated with the operational phase will only be required during routine maintenance visits using cars or LGVs at a maximum of 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 warranted.
- Decommissioning – Traffic levels associated with the decommissioning phase will be less than those associated with the construction phase as some elements such as access roads would be left in place on the site. The construction phase is considered the worst case assessment to review the impact on the study area. It is impossible to predict baseline traffic flow levels 40 years in advance. Therefore, further assessment would be conducted prior to decommissioning to assess whether any significant transport effects would occur.
- Noise and Vibration – Impacts relating to noise and vibration as a result of increased HGV movements within the study area will be temporary and will only occur during the construction phase, therefore would have a negligible impact. It should be noted that the need for an assessment of the noise and vibration impacts of construction traffic will be considered as part of the noise and vibration assessment (see Chapter 9 of this Scoping Report). It is proposed that assessment of construction noise, as a result of road traffic, is scoped out of the assessment.
- Air Quality – The IEMA (2023) Guidelines for the Environmental Assessment of Road Traffic advice 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 - 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. The assessment of visual effects has therefore been scoped out of this assessment.

7.5 Potentially Significant Effects

The precise details of the construction programme, including required items of plant, are unknown at this stage. However, the impacts of construction traffic have the potential to result in significant effects at nearby receptors, and therefore the likely effects for traffic and transport associated with the construction phase which will be 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.

7.6 Assessment Methodology

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.

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

- The Transport Assessment Guidance[17] (Scottish Government, 2012);
- Guidelines for the Environmental Assessment of Traffic and Movement[18] (Institute of Environmental Management and Assessment (IEMA, 2023));
- National Planning Framework 4[19] (Scottish Government, 2023) Part 2, Policy 13 on Sustainable Transport; and
- Planning Advice Note (PAN) 75[20]: Planning for Transport (Scottish Government, 2005).

The scope of assessment will be agreed with Transport Scotland and The Highland Council once the estimated trip generation during construction have been finalised.

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

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.

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.

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.

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

17 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)
18 Institute of Environmental Management and Assessment (IEMA) (2023). IEMA Guidelines: Environmental Assessment of Traffic and Movement
19 The 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)
20 The Scottish Government (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)

Transport Scotland and THC in order to agree detailed traffic management proposals for implementation during the construction phase.

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 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, best practice guidance (IEMA (2023)) and legislation.

A combination of the sensitivity of the receptor and the magnitude of effect are then used to inform the significance of the effect as outlined in (Chapter 3). 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.

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.

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

7.7 Summary

Effects from traffic would only occur during construction and this is the only phase that the traffic and transport assessment will consider. Once the trip generation numbers are confirmed, the final scope of the assessment including plans for baseline data collection, will be discussed with Transport Scotland and THC.

8. HYDROLOGY, HYDROGEOLOGY, GEOLOGY AND SOILS

8.1 Introduction

This chapter assesses the potential effects relating to hydrology, hydrogeology, geology, and soils in relation to the construction, operation, and decommissioning phases of the Proposed Development, including impacts on surface water and groundwater resources, and flood risk.

The assessment within this chapter determines the baseline conditions and establishes the potential effects associated with the Proposed Development.

8.1.1 Study Areas

The following study areas will be considered as part of the assessment:

- Core Study Area: outlined by the Site boundary.
- Wider Study Area: a 10 km buffer zone around the Site boundary. The Proposed Development is not expected to impact the hydrological or hydrogeological environment outside of the Wider Study Area due to dilution and attenuation of potential pollutants.
- Private Water Supply (PWS) Study area: PWS will be identified within 2 km of the Site boundary. Beyond 2 km it is considered that potential for hydrological connectivity with PWS is limited.

The hydrology, hydrogeology, geology, and soils study areas are presented in **Figure 8.1** in **Appendix H**.

8.2 Baseline

An initial desk-based baseline review was undertaken to obtain information on current hydrological, hydrogeological and geological 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[21];
- Scottish Environment Protection Agency's (SEPA) Online Water Classification Hub[22];
- SEPA Flood Maps[23];
- NatureScot's Environmental Designations Map[24];
- The national soil map of Scotland[25];
- The British Geological Survey (BGS) 1:625,000 hydrogeology maps[26];
- The BGS 1:50,000 geology map[27];
- BGS GeoIndex Onshore mapping portal[28];
- The Coal Authority Interactive Map Viewer[29];

[21] The Scottish Government. (2023) *Scotland's Environment Map*, accessed 23/05/2023 [Online], <https://map.environment.gov.scot/sewebmap/>.
[22] SEPA. (2015) *Online Water Classification Hub*, accessed 23/05/2023 [Online], <https://www.sepa.org.uk/data-visualisation/water-classification-hub>.
[23] SEPA. (2022) *Flood Maps*, accessed 23/05/2023 [Online}, <https://map.sepa.org.uk/floodmaps>.
[24] NatureScot. (2023) *Environmental Designations Map*, accessed 23/05/2023 [Online], < https://sitelink.nature.scot/map>.
[25] Scotland's soils. (2013) *National soil map of Scotland*, accessed 01/08/2023 [Online], <https://map.environment.gov.scot/Soil_maps/?layer=1>.
[26] 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>.
[27] 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>.
[28] 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>.
[29] The Coal Authority (2023) *Interactive Map Viewer*, accessed 07/09/2023 [Online], <https://mapapps2.bgs.ac.uk/coalauthority/home.html>.

- Zetica UXO Risk Maps[30];
- Meteorological Office Rainfall Data[31];
- The National River Flow Archive (NRFA)[32];
- Ordnance Survey (OS) 1:50,000 (Digital); and
- OS 1:25,000 Map (Digital).

8.2.1 Site Context

The Site is located on the north-western slope of Spittal Hill, approximately 520 m to the northeast of the existing Spittal Substation located on the opposite side of the A9. The Site lies within the hamlet of Banniskirk, in the Highland Council district of Scotland, centred on Ordnance Survey National Grid Reference (OSNGR) 316033 E, 956747 N.

Currently, the Site comprises mainly arable land, with areas of woodland to the east and northwest. Several surface water drainage ditches are present across the Site; generally, water drains in a north-westerly direction towards the Halkirk Burn.

Existing ground levels at the Site comprise an overall fall from approximately 90 metres Above Ordnance Datum (m AOD) in the southeast to approximately 65 m AOD in the northwest. A minor ridge is present across the centre of the Site, from southeast to northwest, with levels falling away towards two main drainage lines, one to the east and another to the west. The network of drainage ditches on the Site generally drains towards one of these main drainage lines.

8.2.2 Surface Hydrology

The Site is located within the Scotland WFD River Basin District (RBD); the main river catchment of the River Thurso, and two nested catchments:

- River Thurso – Loch More to sea river catchment; and
- Halkirk Burn river catchment.

Based on an initial, high-level review of SEPA and Ordnance Survey Data, the main WFD surface water bodies that are hydrologically connected to the Site are:

- Halkirk Burn (SEPA ID: 20642) located approximately 786 m to the west of the Site and has an overall WFD waterbody classification of “Moderate”. Halkirk Burn is a tributary of the River Thurso.
- The River Thurso – Loch More to sea (SEPA ID: 20637) located approximately 2.8 km to the northwest of the Site and has an overall WFD waterbody classification of “Good”.

Approximately 11.5 km to the north of the Site, the River Thurso outfalls into Thurso Bay (SEPA ID: 200218) a coastal waterbody with an overall WFD waterbody classification of “Good”. Due to the distance between this waterbody and the Site, it has been scoped out of further assessment.

There are several other WFD surface water bodies within the vicinity of the Site, however, these fall within the catchment of Wick River and are therefore not hydrologically connected to the Proposed Development. These waterbodies are scoped out of further assessment.

Based on a high-level review of Ordnance Survey data and information contained within the UK Centre for Ecology & Hydrology (UKCEH) Flood Estimate Handbook (FEH) web service mapping, further non-WFD

[30] Zetica (2023) UXO Risk Map, accessed 07/09/2023 [Online] ,< https://zeticauxo.com/downloads-and-resources/risk-maps/>.
[31] Meteorological Office. *UK Climate Averages* accessed 23/05/2023 [Online], <http://www.metoffice.gov.uk/public/weather/climate>.
[32] National River Flow Archive. (2023) Accessed 23/04/2024 [Online], <https://nrfa.ceh.ac.uk/>.

surface water features have been identified within the Wider Study Area, with those hydrologically connected to the Site listed below:

- A branch off Halkirk Burn is present adjacent to the northern and eastern boundary of the Site. This watercourse drains in a general north-westerly direction towards the main Halkirk Burn channel.
- A network of field drainage ditches is present across the Site and surrounding area. The ditches are generally located at the edges of the existing fields, draining surface water from the agricultural land to the northwest. A number of these drainage ditches are shown to drain under the A9 and ultimately into the main channel of Halkirk Burn.

The surface water baseline is presented in **Figure 8.2** and **Figure 8.3** (see **Appendices I and J** respectively).

8.2.3 Designated Hydrological Receptors

A review of Nature Scot (formerly Scottish Natural Heritage) GIS datasets available through the Scotland's Environment mapping service[33] was used to identify statutory designated sites related to the water environment within the Wider Study Area.

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

Statutory designated sites within the Wider Study Area and their hydrological connectivity to the Development are detailed in **table 8.1**. Designated sites that are hydrologically connected to the development are highlighted in blue.

Table 8.1: Designated Hydrological Receptors within the Wider Study Area

Designated Receptor	Distance from Site	Qualifying Interest	Hydrological Connection to Site
Special Areas of Conservation (SACs)			
River Thurso	1.9 km northwest	Atlantic Salmon	Hydrologically connected
Loch Watten	4.6 km east	Naturally nutrient-rich lakes or lochs which are often dominated by pondweed	Hydrologically disconnected by topography and existing drainage ditches
Caithness and Sutherland Peatlands	5.1 km south	Acid peat-stained lakes and ponds, Blanket bog, Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels, and Depressions on peat substrates	Hydrologically disconnected by topography
Special Protection Areas (SPAs)			
Caithness Lochs	3.2 km northeast	Greenland white-fronted goose, non-breeding, Greylag goose, non-breeding, and Whooper swan, non-breeding	Hydrologically disconnected by topography and existing drainage ditches
	4.6 km east		
	7.5 km northwest		Hydrologically disconnected by topography and the River Thurso
Caithness and Sutherland Peatlands	5.1 km south	Black-throated diver, breeding, Common scoter, breeding, Dunlin, breeding, and Golden Eagle, breeding	Hydrologically disconnected by topography
Wetlands of International Importance (Ramsar)			
Caithness Lochs	3.2 km northeast	Greenland white-fronted goose, non-breeding, Greylag goose, non-breeding, and Whooper swan, non-breeding	Hydrologically disconnected by topography and existing drainage ditches
	4.6 km east		

[33] NatureScot. (2023) *SiteLink*, accessed 23/05/2023 [Online], <https://sitelink.nature.scot/map>.

	7.5 km northwest		Hydrologically disconnected by topography and the River Thurso
Caithness and Sutherland Peatlands	5.1 km south	Blanket bog, Breeding bird assemblage, Dunlin, breeding, and Greylag goose, breeding.	Hydrologically disconnected by topography
Sites of Special Scientific Interest (SSSIs)			
Banniskirk Quarry	Adjacent to the east	Silurian – Devonian Chordata	Hydrologically disconnected by topography and existing drainage ditches
Loch Scarmclate	3.2 km northeast	Base-rich loch and Greylag goose, non-breeding	Hydrologically disconnected by topography and existing drainage ditches
Loch Watten	4.6 km east	Base-rich loch, Greylag goose, non-breeding, and Open water transition fen	Hydrologically disconnected by topography and existing drainage ditches
Spittal Quarry	2.3 km southeast	Silurain – Devonian Chordata	Hydrologically disconnected by topography
Shielton Peatlands	5.1 km south	Blanket bog and Breeding bird assemblage	Hydrologically disconnected by topography
Blar nam Faoileag	8.8 km south	Blanket bog	Hydrologically disconnected by topography
Leavad	9.5 km south	Quaternary of Scotland	Hydrologically disconnected by topography
Achanarras Quarry	1. 5 km southwest	Non-marine Devonian and Silurian – Devonian Chordata	Hydrologically disconnected by topography
Westerdale Quarry	5.8 km southwest	Silurian – Devonian Chordata	Hydrologically disconnected by topography
National Nature Reserves (NNR)			
No NNR Sites withing 10 km of the Site.			
Local Nature Reserves (LNR)			
No LNR Sites withing 10 km of the Site.			

8.2.4 Flood Risk

The Indicative SEPA Flood Map[34] 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.

A preliminary review of SEPA's flood extent map shows that the Site is not at risk of coastal flooding or river flooding both now and in the future, with a less than 0.1% AEP chance of flooding in any given year. Halkirk Burn to the west is shown to have a high risk (10% AEP) of river flooding, however this is not shown to impact the Site.

The Site is also shown to remain free from surface water flooding, with no surface water flood flow paths indicated within the Site boundary.

As such, a site-specific Flood Risk Assessment is not proposed, to be confirmed with SEPA.

8.2.5 Geology

The British Geological Survey (BGS) GeoIndex Onshore mapping portal[35] includes general geological map data for the United Kingdom.

[34] SEPA. (2022) *Flood Maps*, accessed 24/05/2023 [Online}, <https://map.sepa.org.uk/floodmaps>.
[35] 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>.

The BGS 1:50,000 bedrock geology map shows that the Site is underlain by the Spittal Flagstone Formation comprising Siltstone, Mudstone, and Sandstone.

The BGS 1:50,000 superficial deposits map indicates that the Site is situated on superficial deposits comprising Till, Devensian – Diamicton.

The portal also includes records of boreholes, shafts, and wells from all forms of drilling and ground investigation work. Two borehole logs are recorded approximately 85 m to the north of the Site, at Georgemas Station, ND15NE1 and ND15NE2. Natural strata at ND15NE1 were recorded to comprise hard grey slatey rock overlain by stiff grey clay, then gravel, brown sandy clay & stones, and finally surface soils. Strata within borehole ND15NE2 was recorded to comprise of hard grey slatey rock overlain by stiff grey clay, then grey sandy clay & stone and surface soils.

8.2.6 Contaminated Land

Activities associated with the Site's use as agricultural land may have resulted in contamination associated with fuel, oils, and substances such as fertilisers. Construction of the A9, which runs along the western Site boundary, may have also resulted in contamination of the soils at the Site. A disused quarry area is also present at the south of the site which may be a potential source of contamination.

The Coal Authority Interactive Map Viewer[36] indicates that the Site does not lie in an area that has been affected by coal mining, which can be a source of contamination.

8.2.7 Unexploded Ordnance (UXO)

The Zetica UXO (Unexploded Ordinance) Risk Map[37] indicates that the Site lies entirely within an area of low risk for UXO, indicating that UXO and associated contaminants are unlikely to be present.

8.2.8 Hydrogeology

The BGS 1:625,000 hydrogeology map shows the bedrock unit is part of the Middle Old Red Sandstone rock unit, which is characterised as 'moderately productivity aquifers' whereby sandstones, in places flaggy, with siltstones, mudstones and conglomerates and interbedded lavas, locally yield small amounts of groundwater.

The Site is shown to be situated on the Caithness groundwater body (SEPA ID: 150692), which has an overall WFD classification of "Good".

The two available borehole logs from Georgemas Station record that whilst no water was encountered within either borehole, the rest level of water below the top of the well was recorded to be 2 m.

8.2.9 Soils

The national soil map of Scotland[38] indicates that the Site is situated on component soils comprising noncalcareous gleys (soils which are part of the gleys major soil group and noncalcareous gleys major soil subgroup).

The Carbon and Peatland Map 2016[39] details that most of the Site is underlain by Mineral Soils, with substantial areas of Class 3 peat also present as well as two small areas of Class 4 peat. These are not designated as high priority peatland habitats and are classified as follows:

[36] The Coal Authority (2023) Interactive Map Viewer, accessed 15/11/2023 [Online] < https://mapapps2.bgs.ac.uk/coalauthority/home.html>
[37] Zetica (2023) UXO Risk Map, accessed 15/11/2023 [Online] < https://zeticauxo.com/downloads-and-resources/risk-maps/>
[38] Scotland's soils. (2013) *National soil map of Scotland*, accessed 15/11/2023 [Online], <https://map.environment.gov.scot/Soil_maps/?layer=1>.
[39] Scotland's Environment, Carbon & Peatland 2016, accessed 15/11/2023 [Online] <https://soils.environment.gov.scot/maps/thematic-maps/carbon-and-peatland-2016-map/>.

Class 3 Peat: "*Dominant vegetation cover is not priority peatland habitat but is associated with wet and acidic type. Occasional peatland habitats can be found. Most soils are carbon-rich soils, with some areas of deep peat.*"

Class 4 Peat: *"Area unlikely to be associated with peatland habitats or wet and acidic type. Area unlikely to include carbon-rich soils."*

Mineral Soils: *"Peatland habitats are not typically found on such soils"*

The preliminary Ground Investigation (GI) report shows that the soil materials consist of topsoil and peat below the excavation area. The platform area shows peat, Rockfill, Topsoil, Sandy Clay, Silt, Made Ground, and Gravelly Sandy Silt. The Southwest, West, East, and Southeast areas of the Site show Topsoil and isolated occurrences of peat. The North of the Site indicates Topsoil and Made Ground.

8.2.10 Groundwater Dependent Terrestrial Ecosystems (GWDTEs)

Due to the existing land use, it is unlikely that there are GWDTEs present at the Site, however, this is currently unknown.

8.2.11 Private Water Supplies

Publicly available mapping provided by the Highland Council indicates that there are no known PWS within 2 km of the Site.

8.2.12 Public Water Supplies

There is no publicly available mapping that shows the location of public water supplies. As such, it is currently unknown if there are any public water supplies within 2 km of the Site which could be affected by the Development.

The water supply baseline is presented in **Figure 8.4** (see **Appendix K**).

8.3 Sensitive Receptors

The assessment within the EIA chapter will assess effects likely during the construction, operation, and decommissioning of the Development. Key sensitive receptors include:

- All waterbodies downstream of and in hydrological connection to the Site and construction works;
- Hydrologically connected statutory designated receptors including the River Thurso SAC;
- Potential hydrologically connected private and public water supplies;
- Potential hydrologically connected GWDTEs;
- Peat; and
- The Caithness groundwater body.

8.4 Issues Scoped Out

Assessment of potential effects on the following receptors will be scoped out:

- Designated receptors, surface water bodies and groundwater bodies not hydrologically connected to the Proposed Development, as there is no potential for effects on these receptors.
- Receptors at distances greater than 10 km from the Proposed Development, as dilution and attenuation will mitigate pollution and sedimentation effects on the water environment.

8.5 Potentially Significant Effects

8.5.1 Construction

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).
- Potential effects on Designated Sites in terms of decrease in condition of qualifying interests.
- Potential effects on the hydrological function of Groundwater Dependent Terrestrial Ecosystems (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 construction phase.
- Peat slide events that occur as a result of construction activities.
- Cumulative effects if the potential effects arising from the Proposed Development are in combination with other relevant projects or activities.

8.5.2 Operation and Maintenance

The operation of the Proposed Development has the potential to cause increased runoff from increased hardstanding.

8.5.3 Decommissioning

The Proposed Development will have a design lifetime of 40 years, however as the Applicant is seeking consent in perpetuity for the Proposed Development, decommissioning is unlikely. If decommissioning, or replacement, is required, it is anticipated that the level of effect would be of lesser magnitude than during construction.

8.5.4 Mitigation

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. During operation, procedures will be carried out in line with the SEPA General Pollution Prevention guidance.

8.5.5 Likely significant effects to be considered in the EIA are:

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

8.6 Assessment Methodology

The hydrology, hydrogeology, geology, and soils study area (the Core Study Area) is defined by the Site boundary. A study area of 10 km from the Core Study Area will be defined to assess potential effects on the downstream water environment.

The EIA Report Chapter will describe the potential effects of the Proposed Development through the following structure:

- Details of consultation undertaken with statutory and non-statutory bodies.
- Assessment methodologies for construction, operational, and decommissioning phases of the Proposed Development to establish the effect on the hydrological, hydrogeological, and groundwater resource.
- Hydrological walkover survey details and results.
- Identification of mitigation measures, where necessary.
- Identification of any residual effects following mitigation.
- Cumulative assessment with other developments within 10 km of the Development.
- Statement of significance in accordance with the EIA Regulations.

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.

Effects will be assessed using standard impact assessment methods (receptor value / sensitivity versus magnitude of impact) as outlined in Section 3.

As the Proposed Development will involve the introduction of impermeable surfaces, and is over a network of field drainage ditches, an outline Surface Water Drainage Strategy will be submitted with the EIA, detailing how surface water runoff will be managed on-site, ensuring upstream to downstream connectivity is maintained and surface water flood risk is not increased at the Site or downstream.

A Construction Environmental Management Plan (CEMP) will be provided as part of the submission to outline mitigation measures proposed.

In addition, the following will be provided as a Technical Appendix to the EIA Report Chapter if required:

- Outline Peat Management Plan (oPMP).
- Peat Slide Risk Assessment (PSRA).
- Phase 1 Contaminated Land Risk Assessment.
- Flood Risk Assessment.
- Outline Surface Water Drainage Strategy.

Consultation with The Highland Council, SEPA and other relevant statutory and non-statutory organisations will be undertaken as necessary.

8.6.1 Desk Study

The desk study will include the following, to inform the hydrology, hydrogeology, geology, 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 where necessary, and presence of GWDTEs.
- Identification of statutory designated sites related to the hydrological environment.
- Identification of other similar developments within 10 km of the Proposed Development.

8.6.2 Consultation

In addition to Scoping consultation with statutory consultees, consultation with the Highland Council's Environmental Health Officer (EHO) and SEPA will be sought to obtain information on PWS within the PWS Study Area. Data requests will be sent requesting information on PWS within 2 km of the Development. This should confirm the accuracy of the online data and identify any unknown PWS within the PWS Study Area. Properties identified will be contacted via a letter / questionnaire and where necessary, site visits will verify the information provided. The assessment of PWS will follow a source-pathway-receptor model.

Scottish Water will be consulted to determine whether public water supply assets which could be affected by the Proposed Development are within the Site boundary or the Wider Study Area.

Consultation should also be held with SEPA to confirm if a site-specific Flood Risk Assessment is required.

8.6.3 Site-based Survey

Hydrological Surveys

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 and watercourses.
- Identify the location and nature of GWDTEs (e.g., whether ombrotrophic or heavily modified by drainage).
- Identify nature of watercourses considering any proposed watercourse crossings and access track routes.

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

An Extended Phase 1 Habitat Survey and corresponding National Vegetation Classification (NVC) Survey will also be undertaken as part of the EIA. The location, type, and extent of the GWDTEs will be determined through the NVC survey, which will inform the assessment of the hydrological function of the GWDTEs, in accordance with SEPA Land Use Planning System Guidance Note 31[40].

An assessment of GWDTEs will be included within the EIA Ecology Chapter and will be informed by both NVC data and a hydrogeological assessment. The assessment will 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.

Geology and Soils Surveys

A Ground Investigation (GI) consisting of boreholes and trial pits was undertaken across the site between July and August 2023. The GI comprised a grid layout across the proposed infrastructure areas and a majority of the surrounding site area at intervals of approximately 100 m. Peat was recorded at only ten of the 87 exploratory

[40] SEPA. (2014) *Land Use Planning System SEPA Guidance Note 31*, accessed 15/11/2023 [Online], https://www.sepa.org.uk/media/143868/lupsgu31_planning_guidance_on_groundwater_abstractions.pdf

hole locations with a maximum recorded peat depth of 0.65 m and only two locations where peat depth is 0.5 m or greater.

Given that a GI has already been undertaken at the site providing good coverage, especially in areas of proposed infrastructure, it is proposed that peat probing will not be required at the site. Findings from the GI indicate that peat is absent from a large majority of the site with it comprising peaty soil (<0.5 m) in next to all cases when peat is encountered with no deep peat (>1.0 m) recorded at the site. In light of this, it is suggested that, Phase 2 peat probing in the form of an intensive 10 m x 10 m grid across areas of proposed infrastructure, as in accordance with Scottish Government Peatland Survey Guidance on Developments on Peatland[41] would be excessive given the lack of peat recorded at the site.

If required, the information from the GI will be utilised in preparation of a Peat Slide Risk Assessment (PSRA) and an outline Peat Management Plan (oPMP) which would accompany any subsequent application; however, given the general absence of peat at the site, it is suggested that neither these technical assessments nor any peat probing are required for the Proposed Development.

8.6.4 Peat Slide Risk Assessment

If required, 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 Developments (Second Edition)[42] along with full consultation with the relevant consultees.

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.

The hazards existing at the Site will be ranked based on factors that influence stability, namely peat depth and slope gradient. In addition to this, 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.

8.6.5 Outline Peat Management Plan

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. The oPMP will:

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

[41] Scottish Government, Scottish Natural Heritage, SEPA (2017) Peatland Survey. Guidance on Developments on Peatland, on-line version only, accessed 15/11/2023 https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/12/peatland-survey-guidance/documents/peatland-survey-guidance-2017/peatland-survey-guidance-2017/govscot%3Adocument/Guidance%2Bon%2Bdevelopments%2Bon%2Bpeatland%2B-%2Bpeatland%2Bsurvey%2B-%2B2017.pdf

[42] Scottish Government (2017) *Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Second Edition), accessed157/11/2023* [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>

8.6.6 Questions for Consultees

The following questions have been designed 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 hydrology, hydrogeology, geology, and soils assessment?
- Does the Council, NatureScot, SEPA or other consultees have any information that would be useful in the preparation of the hydrology, hydrogeology, geology, and soils assessment?

8.7 Summary

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

Effects currently scoped out include designated receptors, and surface water and groundwater bodies not hydrologically connected to the Proposed Development, or at distances greater than 10 km from the Proposed Development. Transboundary effects have also been scoped out at this stage.

9. NOISE AND VIBRATION

9.1 Introduction

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.

9.2 Baseline Conditions

A survey of the background ($L_{A90,T}$) ambient noise ($L_{Aeq,T}$), and 1/3rd octave band spectrum levels were 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[43]. To ensure that values are reliable and representative of the outdoor amenity of NSRs, a minimum of 1-week continuous background monitoring was conducted. Measurements at four properties took place from 4th July to 19th July 2023.

The sound level meters were calibrated to traceable standards within the preceding two years and the portable calibrators within the preceding 12 months. The sound level meters were spot calibrated both prior to and upon completion of the survey. No significant drift was noted to have occurred during the measurement campaign.

As the survey is based on long-term unattended measurements, a meteorological station (Vantage Vue) was also 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 were conducted every 15 minutes to coincide with the measured noise data.

Detailed ordinance survey maps and satellite imagery have been used to identify the potential NSRs. Identified relevant properties are detailed in **Table 9.1**. A satellite image to show the Proposed Development in the wider environment and identified NSRs is presented in **Figure 9.1** (see **Appendix L**). Measurements were conducted at NSRs 1, 3, 5, and 6. The area of the Proposed Development is rural, with land consisting of mainly agriculture and some forestry.

Table 9.1: NSRs near the Proposed Development

NSR	Coordinate (X)	Coordinate (Y)
NSR 1 – Mossgiel	315579	956433
NSR 2 – Achalone	315525	956568
NSR 3 – Reveltone	315489	957181
NSR 4 – Achalone Croft	315478	957370
NSR 5 – Banniskirk House	316070	957458
NSR 6 – Banniskirk Mains	316911	957362

Baseline noise measurements were filtered for daytime and night time conditions (night time defined as between 23:00 and 07:00) where noise is shown to be at its lowest.

Periods of rain or windspeeds of 5 m/s or above are removed from the analysis as per BS 4142:2014. A statistical analysis of night time noise levels was conducted of the histogram distribution of L_{A90} (15 minute) levels. This statistical analysis was conducted for all four long-term measured NSRs to define a representative background noise level at each location. These measurement positions were deemed to represent the background noise conditions for external amenity for the surrounding NSRs therefore NSRs 2 and 4 will assume the background noise level of NSR 1 and 3 respectively.

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

The modal value has been considered alongside the skew of the data set to select the appropriate representative level. **Table 9.2** provides the night-time and daytime representative L_{A90} results of the baseline noise survey.

Table 9.2: Representative Background Noise Levels

NSR	LA90 (dB(A)) (Night time)	LA90 (dB(A)) (Daytime)
NSR 1 – Mossgiel	32	33
NSR 2 – Achalone	32	33
NSR 3 – Reveltone	26	31
NSR 4 – Achalone Croft	26	31
NSR 5 – Banniskirk House	21	27
NSR 6 – Banniskirk Mains	17	31

The results of baseline noise survey show that NSRs in vicinity of the Proposed Development have a noise environment quantified between 19 – 32 dB LA90 during night periods and 27 – 33 dB during the day. Given the rural area, the acoustic environment is generally quiet. At NSRs 1, 2, 3, and 4, the proximity to the A9 results in similar levels during the day and night. Noise at NSRs 5 and 6 are particularly low compared to the other NSRs due to lack of road traffic impact from the A9.

9.3 Potentially Significant Effects

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 HVDC converter station[44] and substation.

9.3.1 Construction Noise

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

- crushing of rock
- 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.

A construction noise impact assessment will be conducted according to BS 5228[45]. Initially, as a worst-case assumption at this stage, the phases will be assessed simultaneously, where all the equipment is assumed to be operational for all stages. If it is known what equipment will be used at specific locations and times throughout construction, then a more in-depth construction noise impact assessment can be conducted. If crushing it to take place, the platform works stage has the potential to cause significant noise effects during construction.

[44] HVDC Converter stations contain similar equipment to substations.
[45] British Standard 5228: Code of practice for noise and vibration control on construction and open sites (BS 5228), BSI, 2009, amended 2014

9.3.2 Operational Noise

With respect to operational noise, the most significant sources of environmental noise in HVDC converter stations and substations are valve coolers, reactors, transformers and associated cooling equipment.

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.

A noise propagation model will be constructed for the Proposed Development, with equipment and noise emission levels assumed from similar projects. A BS 4142:2014 assessment will be performed for the Proposed Development to indicate the potential noise impact. The magnitude of the impact will help inform mitigation measures which may be required.

Noise limits are assumed to relate to BS 4142, however due to the low night time noise levels (below 30 dB(A) LA90), these measurements are outside the validity range of BS4142. Consideration should be had for internal noise levels during night time periods.

9.4 Mitigation

9.4.1 Construction Noise

If crushing should take place, it should be as far from the NSRs as possible, which will be to the southeast of the overall site. The construction noise will be assessed to a 65 dB limit for Daytime and Saturdays.

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 The Highland Council and secured by an appropriately worded planning condition. and will include best practice measures as outline in BS 5228 such as:

- Avoiding undertaking noisy activities at the weekends or outside of daytime defined hours as necessary. 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.

9.4.2 Operational Noise

A detailed noise impact assessment is required to determine the extent of mitigation required for the site to reduce the impact on NSRs. The substation and HVDC converter station are likely to share a contribution to high noise impact at various NSRs. If mitigation is required, it may be around the externally housed equipment of the proposed HVDC site to curtail the noise impact on the critical receptors. This 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 can be conducted to investigate the impact of bunding around the site, platform height reduction and acoustic barriers.

9.5 Proposed Scope of Assessment

The Proposed Development and methodology of assessment has not as yet been discussed with The Highland Council's environmental health officer (EHO), but they will be consulted to confirm that the following methodology of assessment is appropriate.

9.5.1 Construction Noise

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

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

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

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.

For best practice, a Construction Noise Management Plan (CNMP) will be detailed regardless of if limits are met or not according to BS 5228-1. The principal contractor should develop a CNMP prior to starting construction works.

9.5.2 Operational Noise

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

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

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.

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)

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.

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.

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.

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.

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

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.

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.

Table 9.3: 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

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.

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 9.4**.

Table 9.4: 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

9.6 Issues Scoped Out

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

9.7 Summary

The above section 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 noise sensitive receptors with respect to operational noise and construction noise of the Proposed Development, will be evaluated within the EIA Report.

Mitigation measures will be proposed, where required, for likely significant effects. In this case, it is anticipated the main issues will be operational noise from cooling equipment and air handling units. It is anticipated that the main issues from construction noise will be crushing activities.

10. LAND USE, AMENITY AND SOCIO- ECONOMICS

10.1 Introduction

This chapter assesses the potential effects and impacts on sensitive land use and amenity receptors resulting from the construction, operation and decommissioning phase of the Proposed Development to identify whether these are likely to be significant, and provides a recommendation as to whether or not consideration of these potential effects should be "scoped in" to the future EIA. 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 will be undertaken to gather socio-economic data (population characteristics, employment, etc) and tourism industry related data (existing infrastructure, housing, recreation, services, transport, etc).

10.2 Study Area

The study area for socio-economic and tourism impacts will be inclusive of the historical counties of Caithness and Sutherland as well as the Highland Council area and Scotland as a whole. The development will be taking place near the village of Halkirk. In the case of tourism assets and community facilities the local area around the Proposed Development will be considered in greater detail. This will be inclusive of the settlements of Halkirk, Spittal, Banniskirk, Georgemas, Olgrinmore and areas surrounding Loch Watten.

10.3 Baseline Conditions

Table 10.1 summarises key socio-economic, tourism and recreation related literature and data sources used to define the baseline environment and inform this EIA scoping assessment.

Table 10.5: Scoping baseline data sources

Source	Summary	Coverage
Population Estimates	Total population and demographic structure by council.	Scotland
Population Projections	Populations projections.	Scotland
Estimated Population Aged 15 Years and Over	Data on the number of people who are unemployed and in employment at council level.	Scotland
Household Income	Estimates of income per person by council Scotland.	Scotland
Cost of Housing	Median price of housing sales by county over time.	Scotland
Housing Stock	Housing stock by 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 county/council.	Scotland
Labour Market Statistics	Information on employment levels throughout Scotland	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

10.3.1 Socio-economics

Demographics

A socio-economic profile was developed for Caithness and Sutherland in 2020. At the time the area had a population of 38,246 people. The population has declined by 3.9% since 2011. This is in contrast to the population increase of 0.5% and 3.1% for the Highlands and Scotland over the same period, respectively[46].

The population in Caithness, specifically, is expected to decline by a further 21% by 2041. Sutherland is marginally less affected with an expected population decline of 12% by 2041. Sutherland is 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 for Scotland[47]. It would be expected that the observed population decline in the study area will have resulted in a slightly reduced population density in more recent times.

The declining population in the Study Area is coupled with an older age profile than 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 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 the Highlands region and 56.2 nationally. This illustrates that both at the regional and local level the area surrounding the Proposed Development has a substantially older and more dependant population than Scotland.

Labour Market

In 2020 the employment rate for Caithness and Sutherland was 73% which is notably lower than the rate for the Highlands region (77.5%). However, this rate is similar to the employment rate nationally (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 (8.6%) than nationally (8.4%) but notably less than at the regional level (11.6%).

Owing 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, the growth in unemployment still occurred at lower levels than those seen regionally (2.4% increase) and nationally (2.7% increase) during the same period.

[46] THE IMPACT OF COVID-19 (hie.co.uk)
[47] Highland Council Caithness and Sutherland Local Development Plan Monitoring Statement 2014

Across the Study Area, youth unemployment has risen substantially. In December 2020 youth unemployment in Caithness and Sutherland was recorded at 9%, notably higher than the 7.8% recorded for the Highlands region and the 8.3% unemployment seen nationally. This may indicate that there are barriers for youth entering employment within the Caithness and Sutherland area that are not experienced at a national or regional scale.

Employment in Caithness and Sutherland was dominated by numerous sectors including human health and social work, accommodation and food services, and wholesale, retail and repairs. Employment by sector is detailed in **Table 10.2** below. The top three sectors accounted for 7,500 jobs across Caithness and Sutherland in 2020.

Table 10.2: 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%
Public administration and defence	5%
Transport and storage	3.8%
Utilities	9.4%
Wholesale, retail and repairs	12.5%

Tourism

The economy of the Caithness and Sutherland region is underpinned by tourism which supports many of the rural communities through 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 Highland council area, the accommodation and food services sector saw a fall in turnover of £160.7 million in 2020[48]. This disproportionately affected Caithness and Sutherland where 15.6% of the jobs fall into this sector

[48] caithness_and_sutherland_-_tourism_destination_recovery_strategy_2021-24_1.pdf (venture-north.co.uk)

(**table 10.2** above). It was estimated by the Highlands and Islands Enterprise that visitor spend in the Highlands region decreased by between £370 - £584 million in the 2020/21 period. To rectify the adverse impacts of the pandemic, The Caithness and Sutherland Tourism Destination Recovery Strategy 2021-2024 has been developed by Venture North (a Cooperative Tourism Body).

Caithness and Sutherland are home to the North Coast 500 (driving route) and John O'Groats. Other tourism attractions in the local area include Dunrobin Castle, Castle of Mey, Geise Farm Thurso, Smoo Cave, Duncansby Stacks, Whaligoe Steps, The Flow Country, Camster Cairns, Castle Sinclair Girnigoe, Handa Island and numerous museums. Tourist attractions include historical sites and natural landscape features.

In 2019, spending from both domestic and international tourists in the Highlands region was over £1.5 billion, with most of this revenue coming from domestic tourism. In total, 2.9 million overnight tourist stays were recorded for the Highlands region in 2019, predominantly domestic.

Table 10.3: Domestic Overnight Tourism 2019

Indicators	Scotland	Highland
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

Tourist accommodation in the local area (as described above) surrounding the Proposed Development is detailed in **table 10.4**. Distances provided are approximate at this stage until the development design is finalised.

Table 10.4: Tourist Accommodation

Accommodation	Distance from Proposed Development
Auld Post Office B&B	2.5 km
Kinross Holiday Cottage	3.4 km
Ulbster Arms Hotel	4 km
St Duthus B&B	4 km
Stemster School House	4.1 km
Sordale House	5.3 km

Numerous other accommodation facilities are located in nearby Thurso.

10.3.2 Community Facilities

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.

Key social/recreational infrastructure (core paths, schools, healthcare and community facilities) identified in the immediate areas surrounding the Proposed Development include:

- Halkirk Primary School
- Watten primary School
- Thurso High School
- Mount Pleasant Primary School
- Halkirk Surgery
- Dunbar Hospital
- Sibster Walk park and garden
- Achalone Activities Horse Riding School
- Halkirk railside to river link (CA06.10)
- Lane along east edge of Halkirk village (CA06.05)
- Brawl Castle and pond (CA06.01)
- Brawl Castle riverside link (CA06.11)
- Halkirk riverside (CA06.02)
- The old quarry (CA06.08)
- Archanarras Quarry (CA06.07)
- Sports pitch path (CA14.03)
- Watten Riverside Link (CA14.05)
- Causeymire Wind Farm (CA06.04)

10.4 Sensitive Receptors

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

- local businesses;
- any local areas of tourism or high amenity value that may be affected temporary or permanently; resulting in a loss of use;
- any local community facilities (schools, healthcare) that may experience community severance issues during the construction phase; and
- any land identified for development that may be affected by temporary or permanent land-take required for the construction and/or operation of the substation.

10.5 Issues Scoped Out

Human health has been scoped out of this assessment as it will be indirectly covered in other chapters of the EIA such as Landscape and Visual Impact, Traffic and Transport, and Noise and Vibration.

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 this assessment.

10.6 Potential Significant Effects

Potential effects may include:

- Effects on the local and national economy through job creation and investment throughout construction, operation and decommissioning 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.

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

Construction / Decommissioning

- Gross Value Added (GVA) supported by the construction/decommissioning of the substation;
- Employment supported by the construction/decommissioning of the substation;
- Changes in population because of an influx of migrant workers during the construction/ decommissioning of the substation;
- Pressures to the local social infrastructure (health care, educational provision, and housing) resulting from temporary migration associated with construction/ decommissioning of the substation;
- Disruption to tourism and recreation assets associated with the economic activity from the construction/decommissioning of the substation;
- Potential disruption to existing business associated with the economic activity from the construction/decommissioning of the substation; and,
- Potential disruption to existing residential or agricultural land holdings associated with construction/ decommissioning for the substation.

Operation

- GVA supported by operations and maintenance activity;
- Employment supported by the operations and maintenance of the substation;
- Permanent changes in population because of the creation of long-term employment opportunities;
- Pressures to the local social infrastructure (health care, educational provision, and housing) resulting from changes in population associated with the operations and maintenance of the substation;
- Potential disruption to existing business associated with the economic activity from the operations and maintenance of the substation;
- Disruption to tourism and recreation assets associated with the operations of the substation; and,
- Potential disruption to existing residential or agricultural land holdings associated with operation of the substation.

Table 10.5: Potential Effects Summary

Project Activity and Potential Effect	Phase Construction (C) Operational (O) Decommissioning (D)	Scoping Assessment Summary	Scoped In/Out
Impact on Gross Value Added (GVA)	C, O & D	The spending from the primary contractors and supply chain businesses delivering the substation and cable infrastructure will result in an increase in GVA across the study area considered. This will have a long-term beneficial effect expected to last	In

		throughout the project life cycle. Therefore, this potential effect has been scoped in for the EIA.	
Impact on employment	C, O, D	Temporary and permanent employment opportunities will arise throughout the supply chain to support construction, operation, and decommissioning 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 is likely to 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, D	The scale of employment required to fulfil operations and maintenance, and decommissioning contracts is likely to be smaller in scale than during the construction period. This suggests smaller impacts on demography, which, in the case of operations and maintenance, are likely sustained over time, and likely offset by higher tax revenue. Therefore, this has been scoped out of the EIA.	Out
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	C, O & D	The level of employment supported by operations and maintenance and decommissioning is likely to be more limited in scale than during the construction phase. In addition, long-term effects on demographics with implications on social services will be accommodated by the increase in local tax revenue associated with the Project. As such, this has been scoped out of the EIA.	Out
Impact on tourism and recreation assets	C, O & D	The Project may result in long term and short-term impacts on tourism and recreation assets from a series of sources including traffic, landscape 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 agricultural holdings	C, O & D	The Proposed Development may have adverse economic impacts on agricultural land holdings that may be disrupted by construction and operational phases. Sources of impacts may include traffic, landscape 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 private residential land	C, O & D	The Proposed Development may have adverse economic impacts on private residential / property that may be disrupted by construction and operational phases. Sources of impacts may include traffic, landscape 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	The Proposed Development may have adverse impacts through severance from community facilities for local populations. This is particularly relevant for schools and healthcare facilities. This has been scoped in for the EIA.	In
Impact on human health	C, O & D	The Proposed Development may have adverse impacts on human health. This will be indirectly	Out

		assessed in other chapters such as air quality and traffic and transport. As such, it is scoped out of the land use and amenity assessment	
Cumulative Effects	C, O & D	The construction and operation of other developments could amplify the impacts from the Project. This could be the case, for instance, if the opportunities from a series of projects attract investment locally resulting in higher levels of local content achieved by the Project. In accordance with the IEMA EIA guidelines, cumulative effects have been scoped into the EIA.	In
Transboundary Effects	C, O & D	The only effects on other countries expected will come from the potential 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

10.7 Assessment Methodology

The following section outlines the proposed assessment methodology that will be used within the EIA to assess potential effects of the Project on socio-economics, recreation, and tourism receptors. There is no definitive guidance or methodology for defining the significance criteria for socio-economic effects.

The assessment will define the magnitude of the effect and receptor sensitivity to determine the significance of effects. The magnitude of the effect will be based on level of impact to economic, recreation, and tourism (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 Project. 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 whose operations are exclusively contained to the study area[49]. The study area will be inclusive of the historical counties of Caithness and Sutherland as well as the Highland Council area and Scotland as a whole. In the case of tourism assets and community facilities the local area around the Proposed Development will be considered in greater detail. This will be inclusive of the settlements of Halkirk, Spittal, Banniskirk, Georgemas, Olgrinmore and areas surrounding Loch Watten.

Terminology used to describe potential effects identified and their significance will be in accordance with the terminology and assessment matrix methodology detailed in IEMA guidance.

10.7.1 Economic Impact Assessment

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).

The analysis will cover the construction, operation, and decommissioning 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, supplemented by information on what has been required for similar projects. The potential effects during the operational phase for the Project will be based on projected operational expenditure.

Effects will be reported in terms of:

[49] Highways England (2020). Standard for Highways Design Manual for Roads and Bridges' (DMRB) 'LA 112: Population and Human Health). Available online at: https://www.standardsforhighways.co.uk/tses/attachments/1e13d6ac-755e-4d60-9735-f976bf64580a?inline=true [Accessed June 2023]

- GVA – this is a measure of economic value added by an organisation or industry and is typically estimated by subtracting the non-staff operational costs from the revenues of an organisation;
- 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 Project; and
- Jobs – this is a measure of employment which considers the headcount employment in an organisation or industry. This measure is used when considering long term impacts such as the jobs supported during the operational phase of the Project.

10.7.2 Demographic and Social Infrastructure Impact Assessment

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 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.

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 – the relative availability within the housing market will be determined by relative increases in house prices over a period, as this will be determined by the potential scarcity of supply and insufficient ability to increase the supply of housing;
- Healthcare – the relative capacity of healthcare provision within each of the study areas to accommodate changes in population will be determined by metrics such as the number of patients per GP in each area; and,
- Education – the relative capacity of education provision within each of the study areas to accommodate changes in population will be determined by metrics such as the typical class sizes in primary and secondary schools.

To enable the potential impact of the Spittal substation to be assessed, a description of the existing socio-economic, recreation and tourism, focusing particularly on demographics, employment structure, and tourism and recreation activities will be produced to provide a robust baseline for which to underpin the assessment.

The assessment of socio-economic effects will determine the:

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

The evaluation of the significance of effects will involve an assessment of how socio-economic effects may result from the potential changes to baseline conditions associated with the Project. 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 and from considerable experience of socio-economic impact assessment of similar developments.

The definitions of receptor sensitivity, magnitude, and significance presented **table 10.6**, **table 10.7** and **table 10.8** are based on professional judgement and best practice examples from similar assessments.

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 10.6**.

Table 10.6: 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.

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 10.7**) will be assigned taking into consideration the following:

- 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 10.7: Effect Magnitude

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).

The level of significance is determined by the sensitivity of the receptor and magnitude of the impacts upon them (see **table 10.8**). 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'.

Table 10.8: Significance of Effect

		Sensitivity of Receptors			
		High	**Medium**	**Low**	**Very Low/ Negligible**
Magnitude of Impact	**Large**	Major	Major	Moderate	Minor
	Medium	Major	Moderate	Minor	Not Significant
	Small	Moderate	Minor	Not Significant	Not Significant
	Very Small/ Negligible	Minor	Not Significant	Not Significant	Not Significant

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.

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, recreation and tourism will be identified as a result of the key Project phases of:

- Construction;
- Operation; and
- Decommissioning.

The approach will follow the general EIA guidelines and as described in Chapter 3 where sensitivity of a receptor to an individual impact, and the impact magnitude is determined for the assessment.

10.8 Summary

Adverse and beneficial effects on socio-economics, recreation, tourism, and community facilities will be assessed using a standard significance matrix. A baseline of the Study Area will be 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 the Highland Council area. This socio-economic profile will also be examined in relation to Scotland.

A tourism assets baseline will also be developed to determine the value of attractions within the Study Area. Once the final design of the Proposed Development has been decided a more in-depth assessment of assets (attractions, accommodation) in close proximity to the development can be performed.

The baseline of potential effected community facilities will be refined as the project design is finalised. The magnitude of effects will be informed once employment numbers through construction, operation and decommissioning phases are decided.

Effects currently scoped out of this assessment include effects on demographics and social infrastructure during the operation and decommissioning phases as well as impacts on human health through all project phases. Transboundary effects have also been scoped out at this stage.

11. TOPICS “SCOPED OUT”

As explained above, a number of topics are considered to be not significant and will be scoped out from further consideration within the EIA process. **Table 11.1** below lists each topic and the elements scoped in and out from further assessment, with a summary of the justification for doing so.

Table 11.1: Issues Scoped Out

Topic	Justifiication for topic to be Scoped Out
Landscape Character and Visual Impact	It is suggested that the Sweeping Moorland and Flows LCT should be scoped out of the LVIA due to the very small extent present within the study area, and which has little or no theoretical visibility of the Development according to the ZTVs.
Ecology, Ornithology and Nature Conservation	Any designated sites identified with no connectivity to the Proposed Development have been screened out and are not considered further. The connectivity distance is the distance that species are likely to disperse or forage outside of their home range (not including migration). It is considered that all ecological features identified within this report could be affected by inappropriate 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 Construction Environmental Management Plan (CEMP) will be produced and SSEN Transmission's General Environmental Management Plans (GEMPs) and Species Protection Plans (SPPs) applied. These will capture all mitigation measures required in respect of ecological features, both as a result of the outcome of the EIA and in order to comply with relevant legislation. The implementation and audit of these measures will be overseen by an Environmental Clerk of Works (ECoW). With the adherence to a CEMP and GEMP, as overseen by an ECoW, it is considered that there is no potential for significant impacts. Therefore, no further assessment of lighting, noise, dust, or visual disturbance during construction is proposed. Wetland habitats identified as potential GWDTE to be considered as part of the appraisal will be defined on the basis of the hydrogeological conductivity calculations. This approach will result in some areas of potential GWDTE within 250 m 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 are scoped out. Due to the nature of the works, impacts to Ecology and Nature Conservation via emissions to air are scoped out. Due to the nature of the Proposed Development, collision risk to birds is not predicted from the construction and operation of the substation and impacts from collision are scoped out. Assessment of potential collision risk impacts from the associated OHL and connection to the substation will be undertaken as part of a separate Section 37 application for that development and will take into consideration NatureScot guidance on the assessment and mitigation of impacts of powerlines and guyed meteorological masts on birds.
Archaeology and Cultural Heritage	The Listed buildings (LB589, LB590, LB590, LB7793, LB7794, LB7794, LB7799, LB7800, LB7801, LB14956, and LB7801) and Scheduled Monuments (SM5732 and SM5413) identified within 5 km of the Alignments; and non-designated assets (CANMORE ID 94558, CANMORE ID 94572, CANMORE ID 90873, CANMORE ID 90874, CANMORE ID 94694, and CANMORE ID 184437) all derive their significance solely from their form, material and historic function, not their setting or

Topic	Justifiication for topic to be Scoped Out
	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	Potential effects which have been scoped out of the EIA assessment include; • Operational Traffic – As the site will be largely unmanned, it's expected that the amount of traffic related to the Proposed Development's operational phase will be low. Vehicle movements associated with the operational phase will only be required during routine maintenance visits using cars or LGVs at a maximum of 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 warranted. • Decommissioning – Traffic levels associated with the decommissioning phase will be less than those associated with the construction phase as some elements such as access roads would be left in place on the site. Therefore, the construction phase is considered the worst case assessment to review the impact on the study area. It is impossible to predict baseline traffic flow levels 40 years in advance. Therefore, further assessment would be conducted prior to decommissioning to assess whether any significant transport effects would occur. • Noise and Vibration – Impacts relating to noise and vibration as a result of increased HGV movements within the study area will be temporary and will only occur during the construction phase, therefore would have a negligible impact. It should be noted that the need for an assessment of the noise and vibration impacts of construction traffic will be considered as part of the noise and vibration assessment (see Chapter 9 of this Scoping Report). It is proposed that assessment of construction noise, as a result of road traffic, is scoped out of the assessment. • Air Quality – The IEMA (2023) Guidelines for the Environmental Assessment of Road Traffic advice 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 - 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 visual effects due to traffic generated during the construction phase is considered within Chapter 4 of this EIA Report. The assessment of visual effects has therefore been scoped out of this assessment.
Hydrology, Hydrogeology, Geology, and Soils	Assessment of potential effects on the following receptors will be scoped out:

Topic	Justifiication for topic to be Scoped Out
	• Designated receptors, surface water bodies and groundwater bodies not hydrologically connected to the Proposed Development, as there is no potential for effects on these receptors. • Receptors at distances greater than 10 km from the Proposed Development, as dilution and attenuation will mitigate pollution and sedimentation effects on the water environment.
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 vibration is scoped out of the EIA assessment.
Land Use, Amenity and Socio- Economics	Human health has been scoped out of this assessment as it will be indirectly covered in other chapters of the EIA such as Landscape and Visual Impact, Traffic and Transport, and Noise and Vibration. 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 this 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 and due to the passage of vehicles along public highways and access tracks within the Site (the former of which is tarmaced and the latter the receptors for the majority of dust emissions from vehicle movements), 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 number of construction vehicles is not likely to result in a significant effect on local air quality due to increased exhaust emissions. Standard mitigation measures adopted by SSEN Transmission on all projects and implemented via a Construction Environmental Management Plan (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., with particular focus on ensuring the minimal possible potential for effects on the nearby properties along the A9 highway and north of the Site.
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

Topic	Justifiication for topic to be Scoped Out
	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. 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). 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 Construction Traffic Management Plan (CTMP) will be developed post-submission to reduce the potential for traffic related accidents. No significant effects are likely due to major accidents and disasters 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 overhead line or underground cables associated with the substation. All EMF generating infrastructure will be set back from the site boundary and accounting for this, the nearest properties to the Site (those adjacent to the A9 and those located north of the Site) are unlikely to be located within 150- 200m of any electrical infrastructure. It is therefore anticipated that EMF would be at, or close

Topic	Justifiication for topic to be Scoped Out
	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.
Forestry	Forestry typically involves extended areas of trees grown as a crop and in third party ownership, and impacts are typically assessed against the following criteria: • Effects on commercial viability; • Compromisation of financial returns; or • No effects on forestry. Within the Proposed Development Site boundary woodland accounts for a very small area of land cover. Some of the field margins are planted with confierous trees. However these are not grown as a commercial crop. There are no forestry designations, Tree Protection Orders (TPOs) or commercially viable forestry within the Proposed Development boundary. Therefore, due to the likely minimal impact on forestry it has been scoped out of further assessment in the EIA.

12. NEXT STEPS

The Applicant invites consultees to comment 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?

All responses should be addressed to:

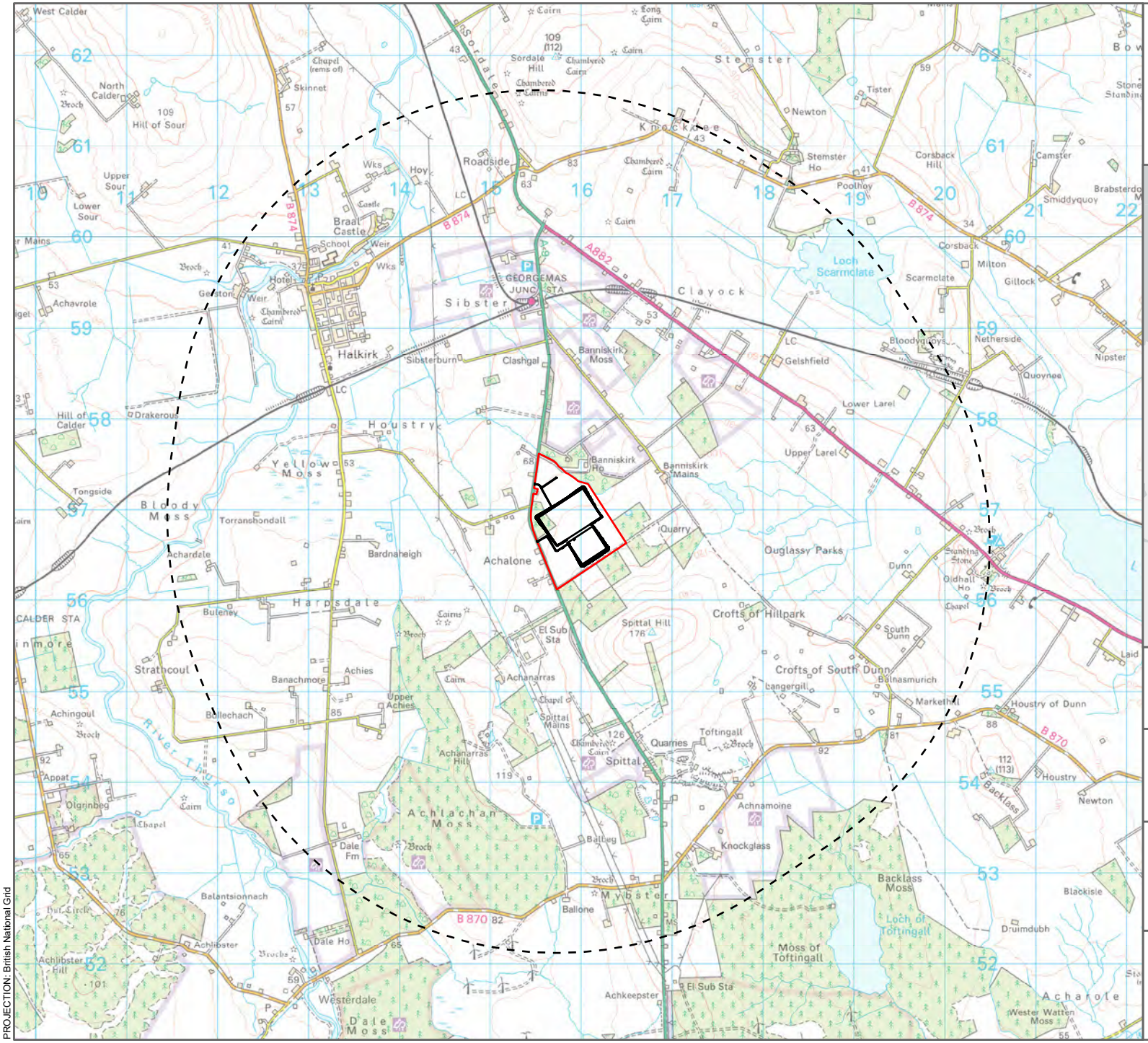
The Highland Council Headquarters
Glenurquhart Road
Inverness
IV3 5NX

When submitting a response to the Scoping Report, the Applicant would be grateful if you could also send a copy of your response to the address below: Email to: charlene.baker@sse.com

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

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

APPENDIX A. FIGURE 1.1: SITE LOCATION



SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: RW
PROJECT: 0697221	CHECKED: WB
DATE: 08/11/2023	APPROVED: JL

Figure 1.1
Site Location

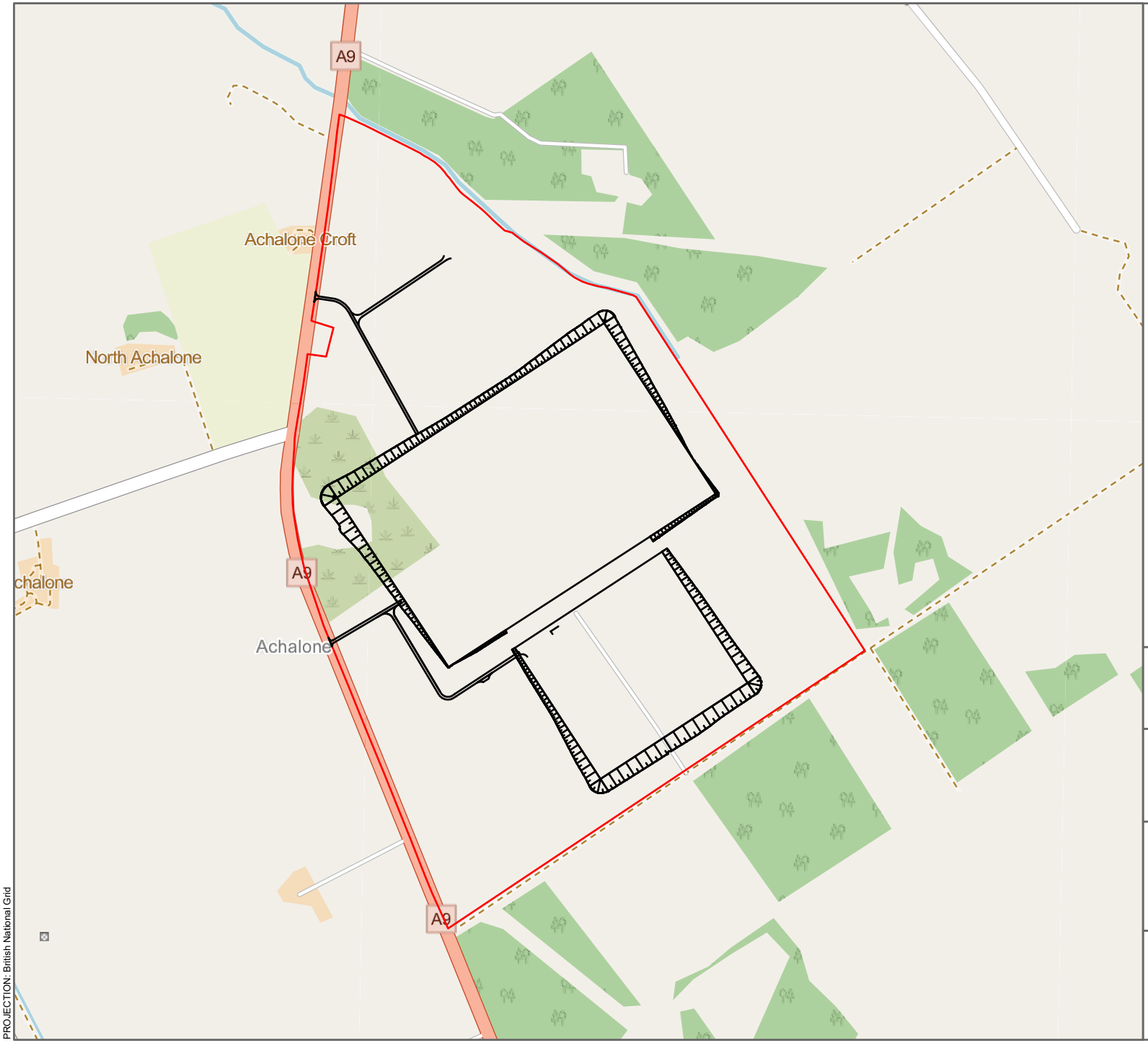
ERM

Scottish & Southern Electricity Networks TRANSMISSION

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0697221 - SSE Spittal Hub\MAPS\0697221 - SSE Spittal Hub.aprx\0697221 - 01.01 - Spittal Hub Site Location

APPENDIX B. FIGURE 2.1: SITE LAYOUT



Site Layout
Site Boundary

0 100 200 300 400
Metres

N

SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: RW
PROJECT: 0697221	CHECKED: JL
DATE: 08/11/2023	APPROVED: JL

Figure 2.1
Site Layout Plan

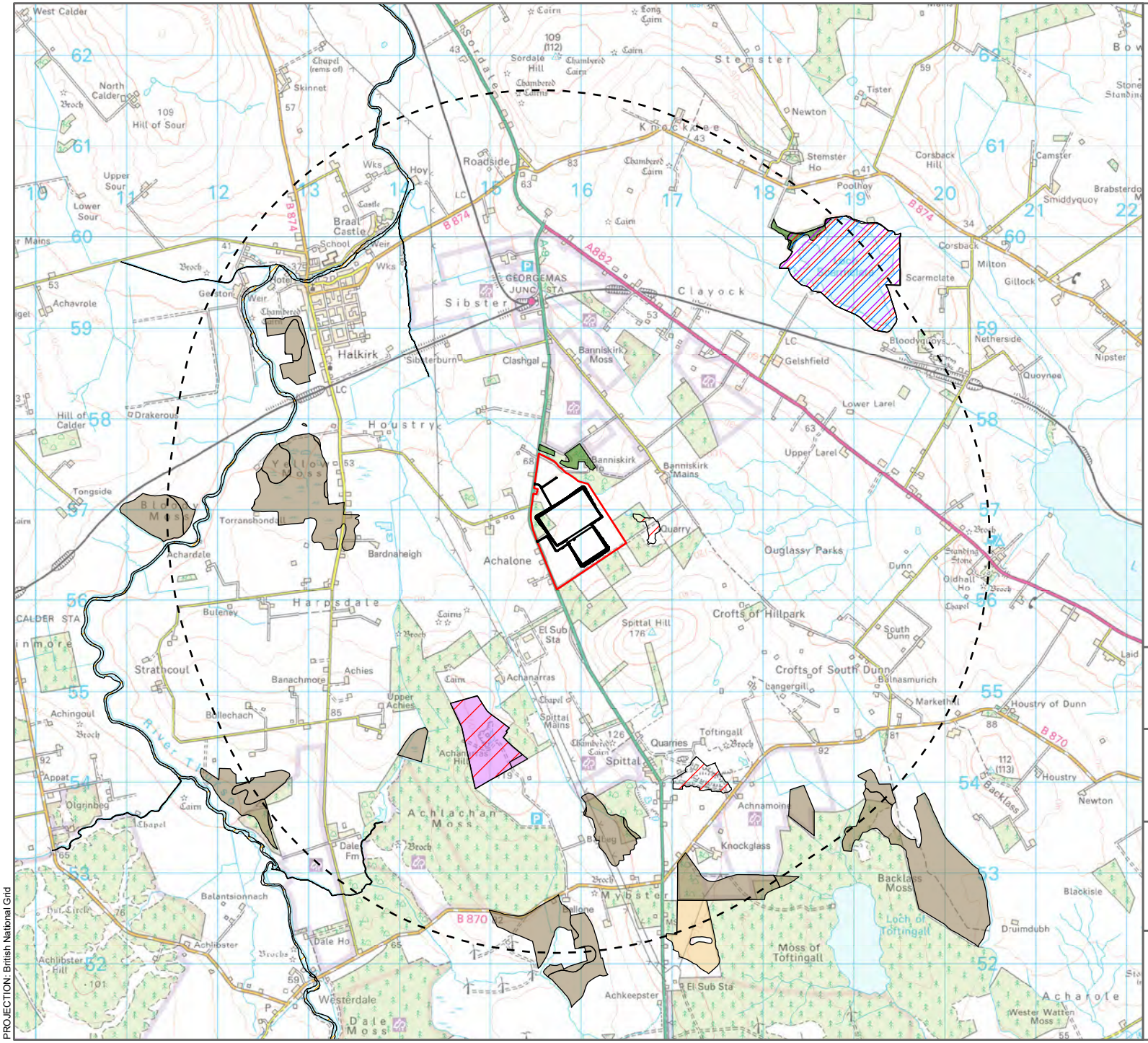
ERM

Scottish & Southern Electricity Networks
TRANSMISSION

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0697221 - SSE Spittal Hub\MAPS\0697221 - SSE Spittal Hub.aprx\0697221 - 02.01 - Spittal Hub Site Layout

APPENDIX C. FIGURE 2.2: ENVIRONMENTAL CONSTRAINTS



SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: RW
PROJECT: 0697221	CHECKED: WB
DATE: 08/11/2023	APPROVED: JL

Figure 2.2
Environmental Constraints

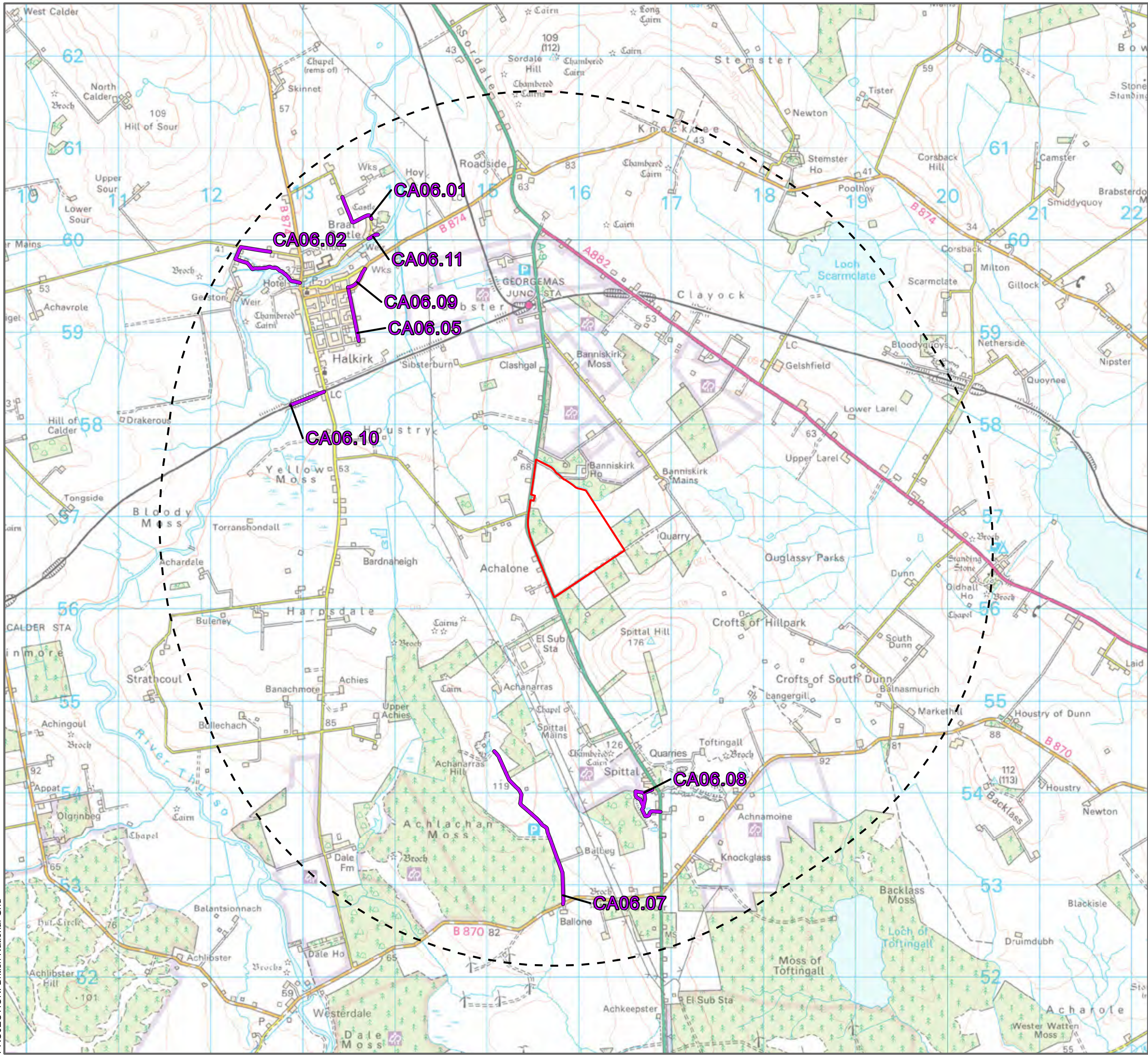
ERM

Scottish & Southern Electricity Networks TRANSMISSION

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0697221 - SSE Spittal Hub\MAPS\0697221 - SSE Spittal Hub.aprx\0697221 - 02.02 - Spittal Hub Environmental Constraints

APPENDIX D. FIGURE 4.1: SITE LOCATION IN RELATION TO CORE PATHS



Site Boundary
4 km Buffer of Site Boundary
Highland Council Core Paths

0 500 1,000 1,500 2,000
Metres

N

SCALE: See Scale Bar	VERSION: A03
SIZE: A4	DRAWN: RW
PROJECT: 0697221	CHECKED: WB
DATE: 08/11/2023	APPROVED: JL

Figure 4.1
Core Paths

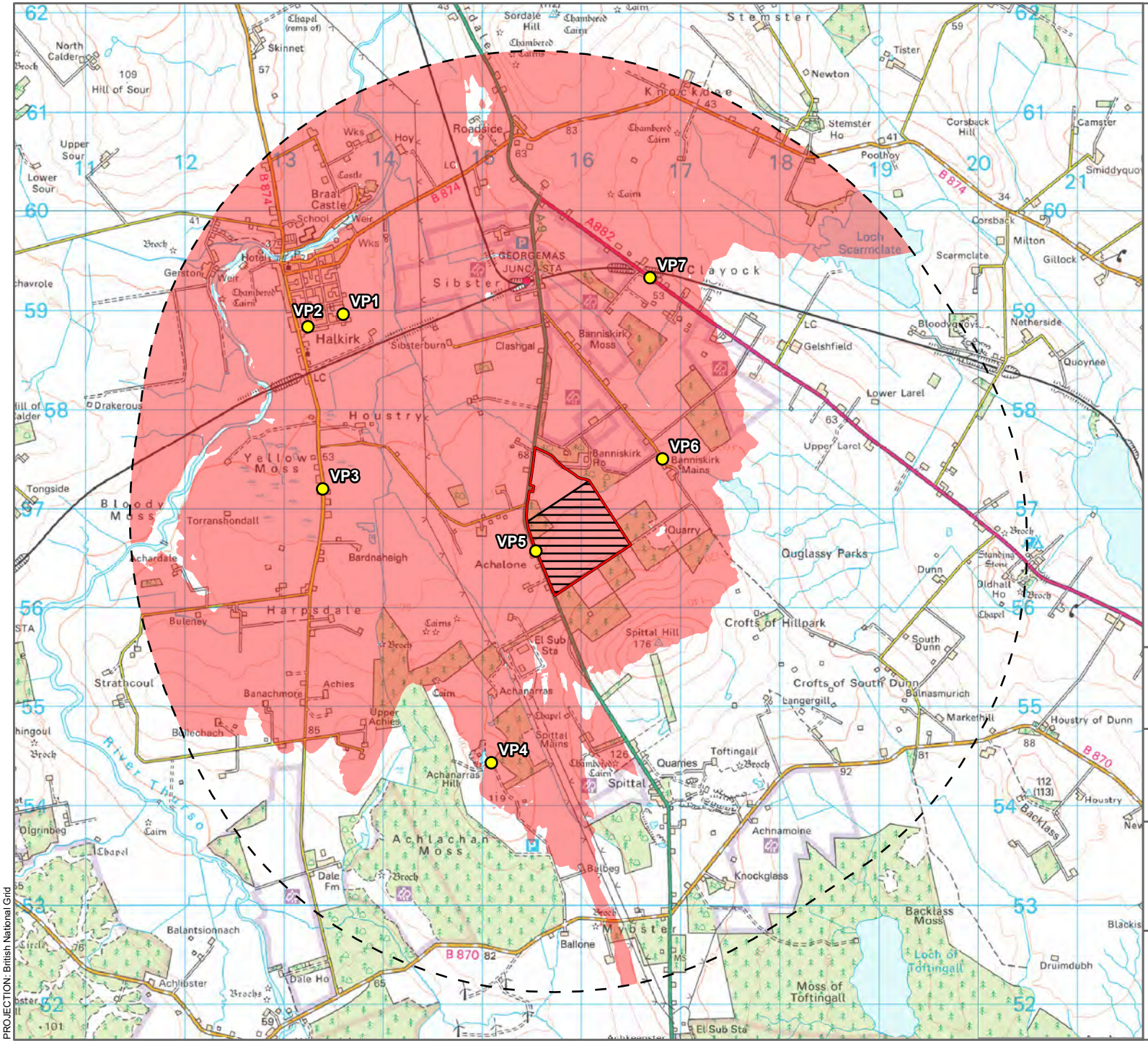
ERM

Scottish & Southern Electricity Networks
TRANSMISSION

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0697221 - SSE Spittal Hub\MAPS\0697221 - SSE Spittal Hub.aprx\0697221 - 04.01 - Spittal Hub Core Paths

APPENDIX E. FIGURE 4.2: ZONE OF THEORETICAL VISIBILITY (BARE EARTH)



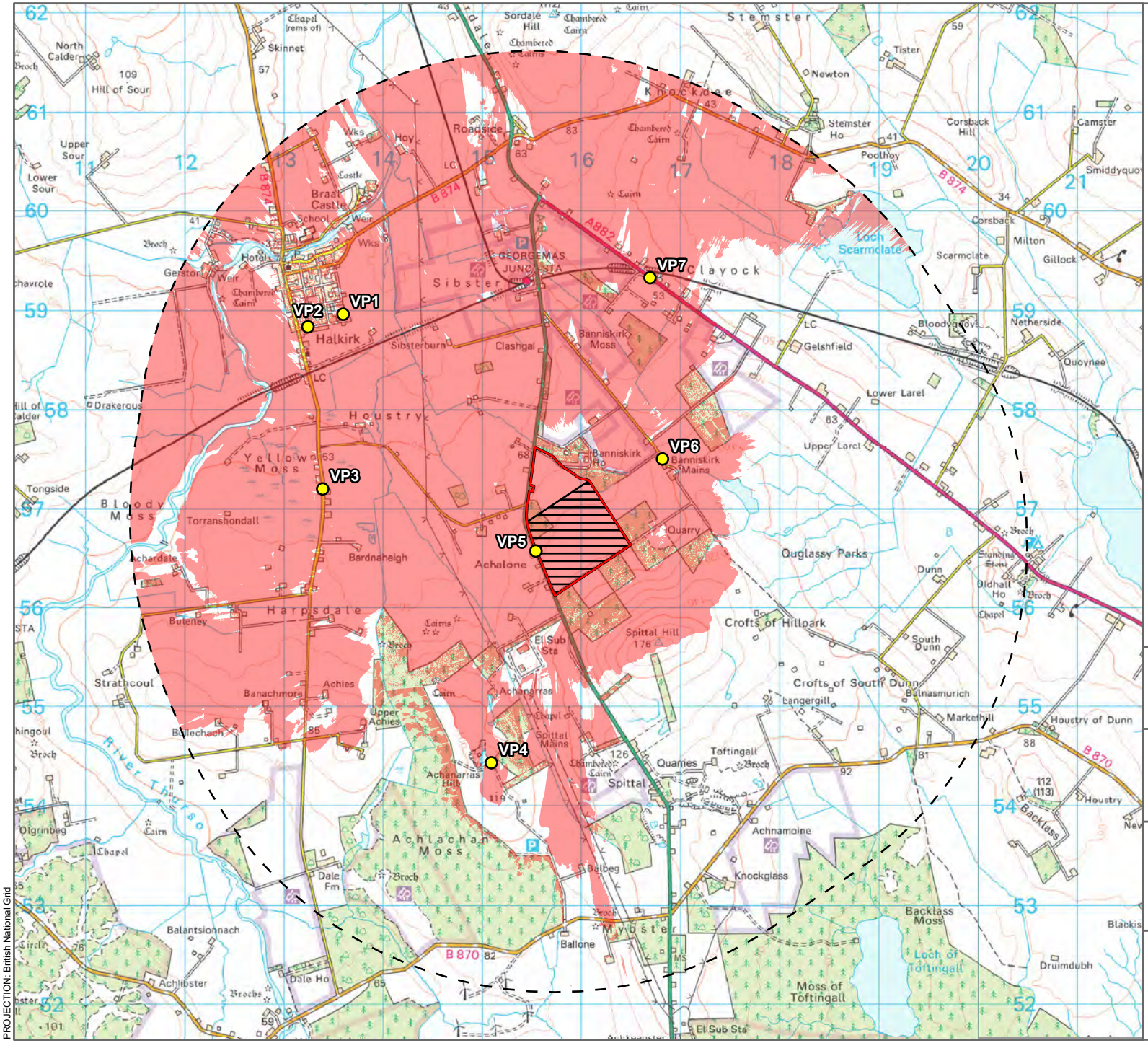
SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: RW
PROJECT: 0697221	CHECKED: JF
DATE: 10/11/2023	APPROVED:

Figure 4.2
Spittal Substation Zone of Theoretical Visibility Bare Earth Assessment Based on 30 m Substation Height (Anywhere Within Hatched Area)

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0697221 - SSE Spittal Hub\MAPS\0697221 - SSE Spittal Hub.aprx\0697221 - 04.02 - Spittal Hub Visibility Analysis - Bare Earth 30m

APPENDIX F. FIGURE 4.3: ZONE OF THEORETICAL VISIBILITY (SCREENED)



This visibility assessment is based on an aerial photography derived DSM at 2 m resolution.

0 500 1,000 1,500 2,000
Metres

N

SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: RW
PROJECT: 0697221	CHECKED: JF
DATE: 10/11/2023	APPROVED:

Figure 4.3
Spittal Substation Zone of Theoretical Visibility Screened Assessment Based on 30 m Substation Height (Anywhere Within Hatched Area)

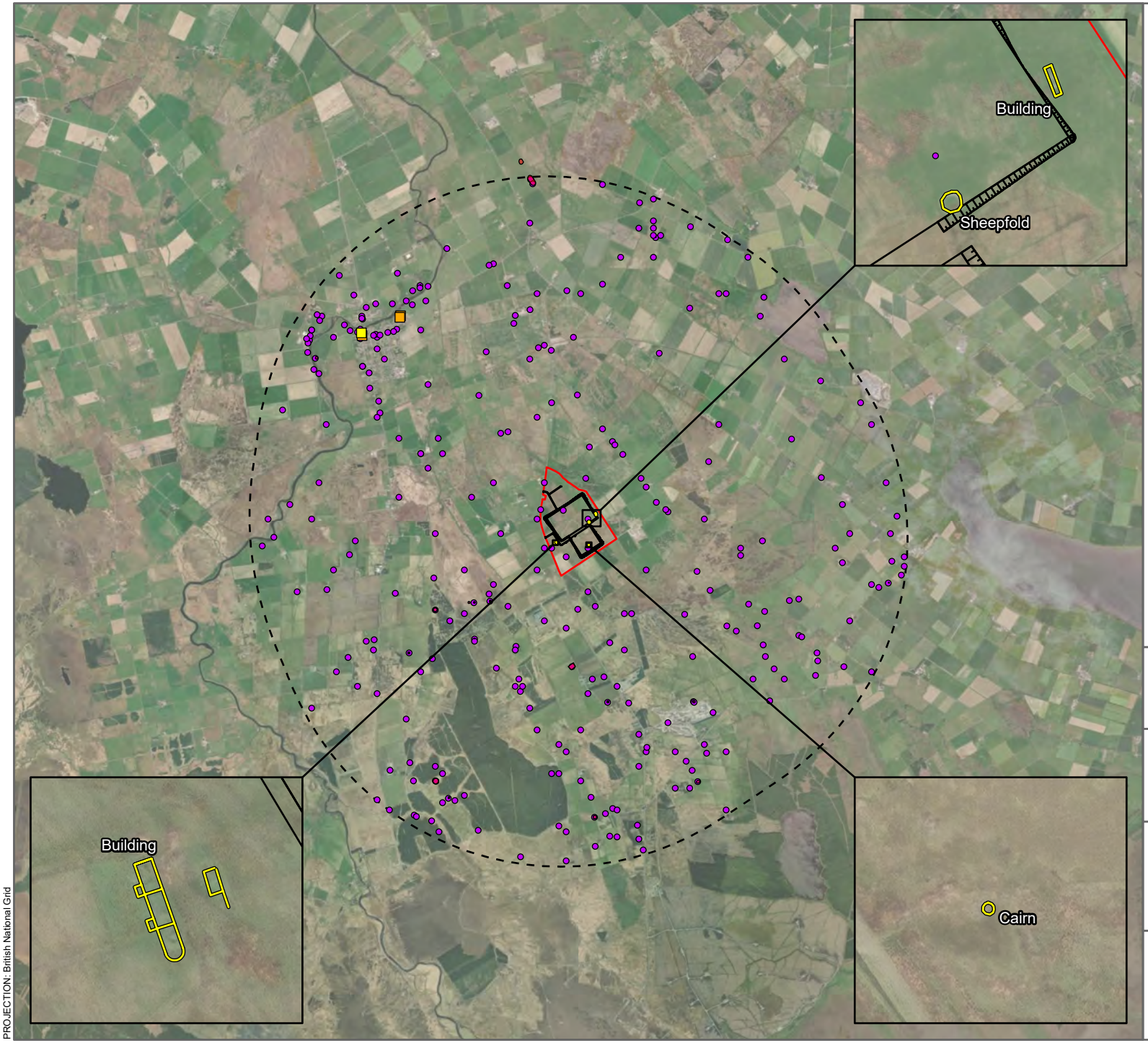
ERM

Scottish & Southern Electricity Networks
TRANSMISSION

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0697221 - SSE Spittal Hub\MAPS\0697221 - SSE Spittal Hub.aprx\0697221 - 04.03 - Spittal Hub Visibility Analysis GMDSM - Screened 30m

APPENDIX G. FIGURE 6.1: HERITAGE CONSTRAINTS



Site Layout
Walkover Survey Lines
National Record of the Historic Environment
Category B Listed Building
Category C Listed Building
Site Boundary
Scheduled Monument
4 km Buffer of Site Boundary

0 1 2 3
Kilometres

N

SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: RW
PROJECT: 0697221	CHECKED: LT
DATE: 08/11/2023	APPROVED: JL

Figure 6.1
Heritage Constraints

ERM

Scottish & Southern Electricity Networks
TRANSMISSION

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0697221 - SSE Spittal Hub\MAPS\0697221 - SSE Spittal Hub.aprx\0697221 - 06.01 - Spittal Hub Heritage Constraints

APPENDIX H. FIGURE 8.1: GEOLOGY, HYDROLOGY, HYDROGEOLOGY, AND SOILS STUDY AREAS

Core Study Area (Site Boundary)

Private Water Supply Study Area (2 km Buffer of Site Boundary)

Wider Study Area (10 km Buffer of Site Boundary)

0 1 2 3 4 5
Kilometres

N

SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: RW
PROJECT: 0697221	CHECKED: AS
DATE: 08/11/2023	APPROVED: JL

Figure 8.1
Geology, Hydrology, Hydrogeology, and Soils Study Areas

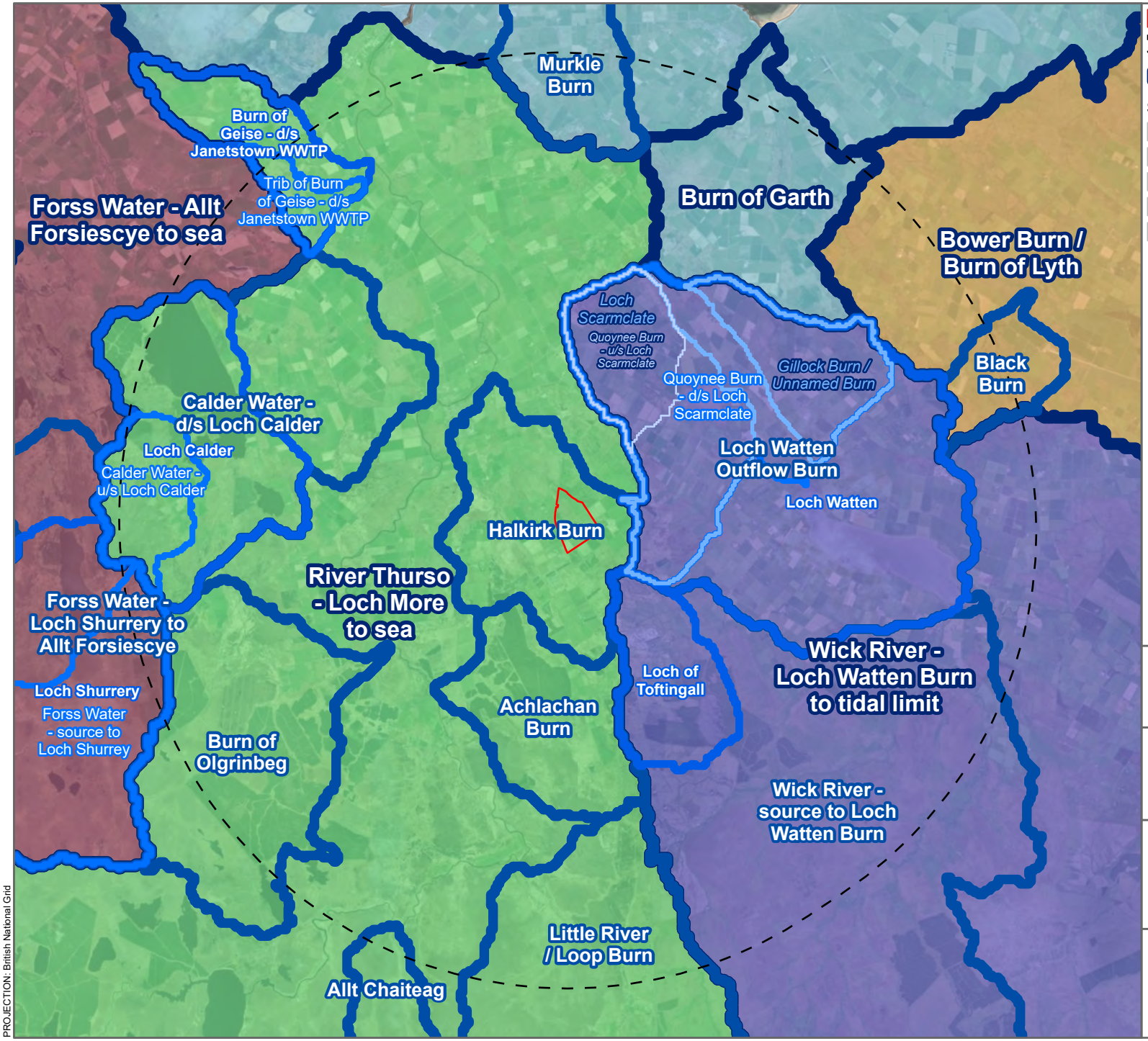
ERM

Scottish & Southern Electricity Networks
TRANSMISSION

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0697221 - SSE Spittal Hub\MAPS\0697221 - SSE Spittal Hub.aprx\0697221 - 08.01 - Spittal Hub Study Areas

APPENDIX I. FIGURE 8.2: SURFACE HYDROLOGY BASELINE (CATCHMENTS)



SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: RW
PROJECT: 0697221	CHECKED: AS
DATE: 08/11/2023	APPROVED: JL

Figure 8.2
Surface Hydrology Baseline (Catchments)

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0697221 - SSE Spittal Hub\MAPS\0697221 - SSE Spittal Hub.aprx\0697221 - 08.02 - Spittal Hub Surface Water Baseline - Catchments

Scottish & Southern Electricity Networks
TRANSMISSION

APPENDIX J. FIGURE 8.3: SURFACE HYDROLOGY BASELINE (SURFACE WATER FEATURES)

Site Boundary
Surface Water Line
Surface Water Area

0 1 2 3
Kilometres

N

SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: RW
PROJECT: 0697221	CHECKED: AS
DATE: 08/11/2023	APPROVED: JL

Figure 8.3
Surface Hydrology Baseline
(Surface Water Features)

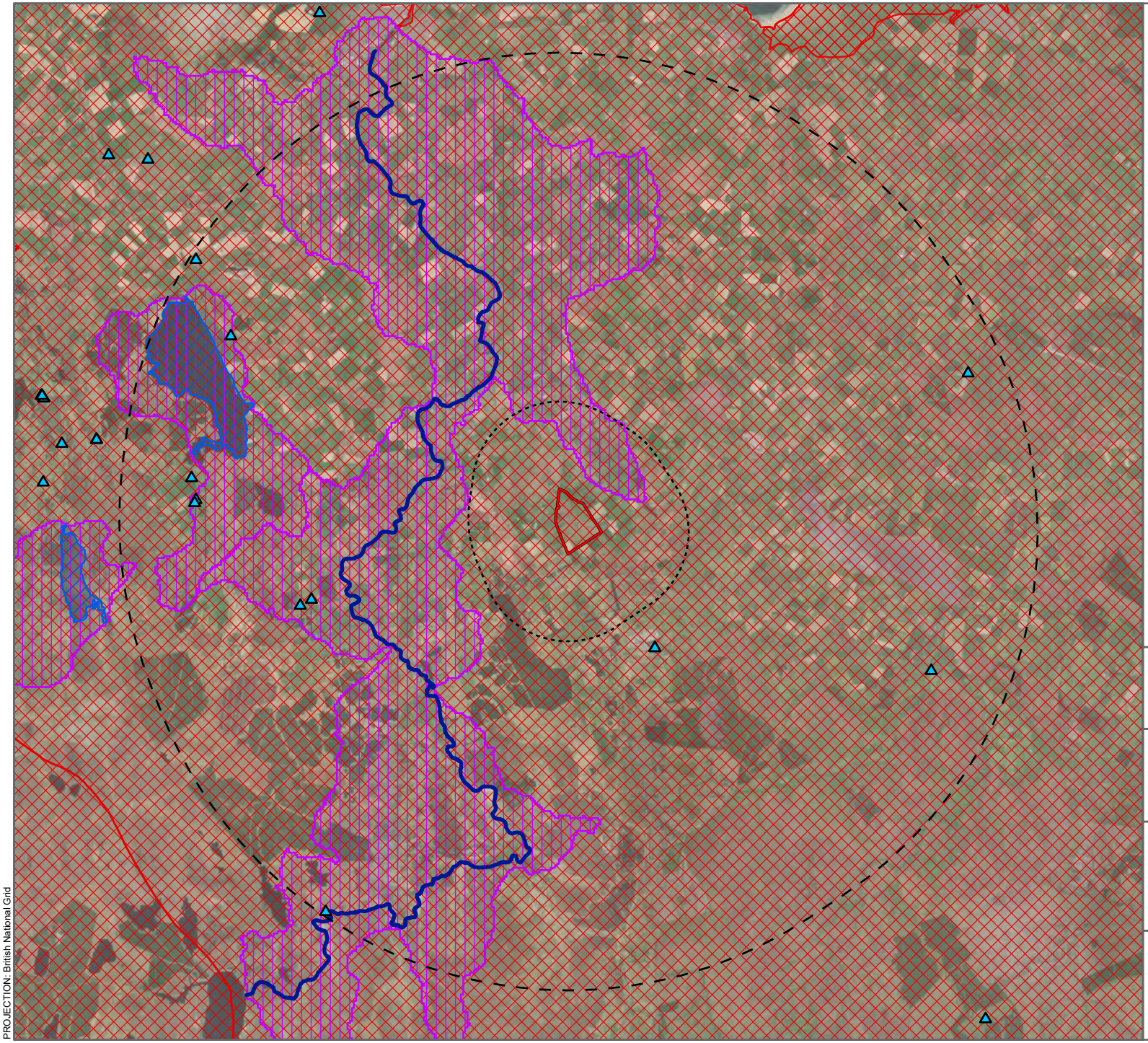
ERM

Scottish & Southern Electricity Networks
TRANSMISSION

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0697221 - SSE Spittal Hub\MAPS\0697221 - SSE Spittal Hub.aprx\0697221 - 08.03 - Spittal Hub Surface Water Baseline - SW Features

APPENDIX K. FIGURE 8.4: WATER SUPPLY BASELINE



- Private Water Supply
- Site Boundary
- Private Water Supply Study Area (2 km)
- Wider Study Area (10 km)
- Drinking Water Protected Area (River)
- Drinking Water Protected Area (Loch)
- Drinking Water Protected Area (Catchment)
- Drinking Water Protected Area (Groundwater)

0 1 2 3 4 5
Kilometres

N

SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: RW
PROJECT: 0697221	CHECKED: AS
DATE: 08/11/2023	APPROVED: JL

Figure 8.4
Water Supply Baseline

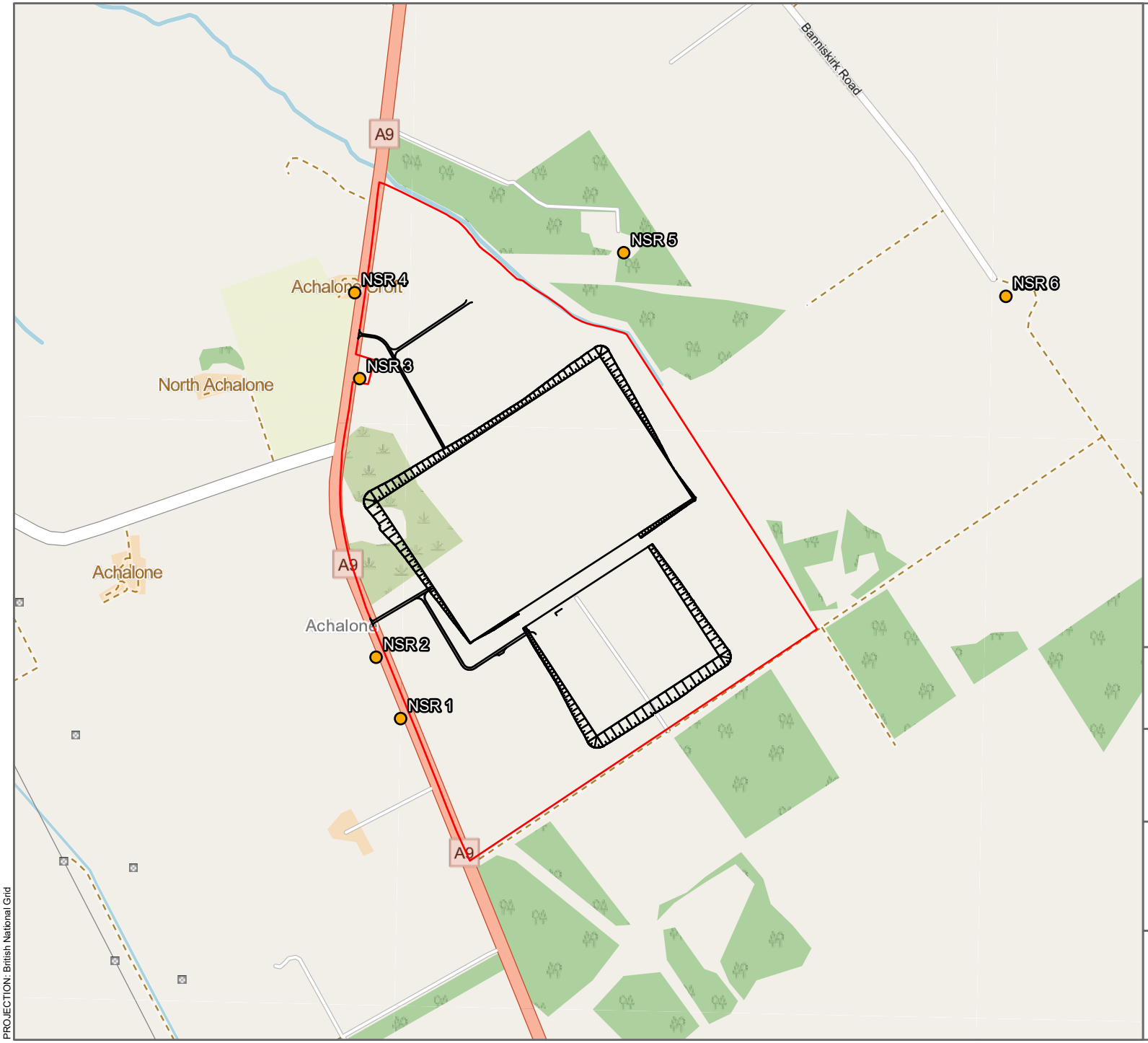
ERM

Scottish & Southern Electricity Networks
TRANSMISSION

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0697221 - SSE Spittal Hub\MAPS\0697221 - SSE Spittal Hub.aprx\0697221 - 08.04 - Spittal Hub Water Supply Baseline

APPENDIX L. FIGURE 9.1: NOISE SENSITIVE RECEPTORS



Site Layout
Noise Sensitive Receptor
Site Boundary

0 100 200 300 400 500
Metres

N

SCALE: See Scale Bar	VERSION: A01
SIZE: A4	DRAWN: RW
PROJECT: 0697221	CHECKED: JL
DATE: 08/11/2023	APPROVED: JL

Figure 9.1
Noise Sensitive Receptors (NSRs)

ERM

Scottish & Southern Electricity Networks
TRANSMISSION

PROJECTION: British National Grid

Path: \\uksprdgisfs01\Data\London\Projects\0697221 - SSE Spittal Hub\MAPS\0697221 - SSE Spittal Hub.aprx\0697221 - 09.01 - Spittal Hub Noise Sensitive Receptors

APPENDIX M. CULTURAL HERITAGE ASSETS

State ID	Title	Designation	Category	Description	Distance	X	Y
LB589	STEMSTER HOUSE	Listed Building	B	Mid-later 19th century, symmetrically fronted 2-storey and attic, 5-bay house, probably incorporating earlier dwelling contained in centre portion. Appears in present form on 1st edition OS (1872).	Within 5 km	318340	960901
LB590	STEMSTER DOVECOTE AND MEMORIAL	Listed Building	C	Dovedote; late 17th-early 18th century square roofless rubble dovecote with centre door in south elevation and flightholes above. Early chapel site. Cote resembles that on Stroma dated 1677.	Within 5 km	318312	961092
LB590	STEMSTER DOVECOTE AND MEMORIAL	Listed Building	C	Dovedote; late 17th-early 18th century square roofless rubble dovecote with centre door in south elevation and flightholes above. Early chapel site. Cote resembles that on Stroma dated 1677.	Within 5 km	318305	961080
LB7793	WESTERDALE DALE HOUSE	Listed Building	B	Mid/later 18th century, facing east/west, with considerable sympathetic additions to north, dated 1910, and south, dated 1933. 1933 datestone initialled WMT and CEWL for Murray Threipland, the family in whose possession the property has been for many generations.	Within 5 km	312974	952291
LB7794	WESTERDALE DALE HOUSE DOVECOTE AND WALLED GARDEN	Listed Building	B	Dovecote; 17th or early 18th century, beehive rubble dovecote in 4 stages, with wide circular apex aperture as pigeon entrance. Walled garden; probably earlier 19th century square walled garden with rubble walls with stone slab coping.	Within 5 km	312956	952108
LB7794	WESTERDALE DALE HOUSE DOVECOTE AND WALLED GARDEN	Listed Building	B	Dovecote; 17th or early 18th century, beehive rubble dovecote in 4 stages, with wide circular apex aperture as pigeon entrance. Walled garden; probably earlier 19th century square walled garden with rubble walls with stone slab coping.	Within 5 km	312980	952120
LB7799	HALKIRK VILLAGE, BRIDGE STREET, CHURCH OF SCOTLAND AND GATE PIERS	Listed Building	B	Alexander Ross, Inverness, 1886. Rectangular church orientated east/west with Italian Romanesque west gable facade. Ecclesiastical building in use as such. Former Free Church of Scotland. Tower not completed at time of opening.	Within 5 km	312993	959423
LB7800	HALKIRK VILLAGE, BRIDGE STREET, ROSS INSTITUTE GATE PIERS AND WALLS	Listed Building	C	Sinclair Macdonald, architect, Thurso, 1912. Tall symmetrical Baronial 2-storey, 5-bay building. Ross Institute presented to Halkirk by Mr John Ross of Dunedin, New Zealand and late of Halkirk; opened by his son, Mr John Sinclair Ross. Conditions of use include "no travelling Theatrical Companies and no intoxicating drink".	Within 5 km	312984	959459
LB7801	HALKIRK VILLAGE OLD PARISH CHURCH AND BURIAL GROUND	Listed Building	B	1753, substantially repaired in 1833. Simple T-plan church, the rear (north) wing slightly lower than main portion (and	Within 5 km	313522	959695

				possibly a later addition, of 1833?). Building no longer in ecclesiastical use. Ground floor windows in east and west gables may have been former entrances			
LB14956	SORDALE FARM	Listed Building	B	Early-mid 19th century, farmstead, probably built over extended period. Polygonal group of 2 single storey, 3-bay cottages, steading range, mainly single storey, comprising cart sheds, byres, stables, and barn with winnowing floor, all enclosing centre court.	Within 5 km	314732	961949
LB7801	HALKIRK VILLAGE OLD PARISH CHURCH AND BURIAL GROUND	Listed Building	B	1753, substantially repaired in 1833. Simple T-plan church. Building no longer in ecclesiastical use. Ground floor windows in east and west gables may have been former entrances.	Within 5 km	313513	959674
SM5732	Chapel of Dunn, chapel, 300m SW of Oldhall House	Scheduled Monument	--	The monument consists of the remains of a post-medieval chapel built over a burial vault, still intact, which may belong to an older structure. The building, sitting in a walled graveyard, is rectangular and measures 11.3m E-W by 7.5m, over walls 1m thick. The monument is of national importance as an example of a type of simple post-Reformation chapel typical of Northern Scotland. Its importance is increased by the fact that it overlies the remains of an earlier medieval structure. As such, it is a site that has been in use as a place of worship and burial for a considerable period of time, and consequently it has the potential to produce evidence through analysis and excavation which may shed light on our understanding of ecclesiastical architecture, burial practices, medieval and post-medieval settlement and material culture in the area.	Within 5 km	320238	956025
SM5413	St Magnus' church,burial ground and hospital	Scheduled Monument	--	The monument consists of the remains of St Magnus' church, hospital and graveyard, situated on the farm of Spittal Mains. The monument is of national importance because it contains upstanding medieval ecclesiastical remains which can be documented, by a Charter of James III to William Sinclair, son of William Earl of Caithness, from 1476. The monument's importance is enhanced because it is the site of a hospital which was an important stage on two pilgrimage routes; the route N to St Magnus' in Orkney and that S to St Gilbert's at Dornoch. The monument is a valuable resource as it provides evidence, and has the potential to provide further evidence, through excavation and analysis, which may increase our understanding of secular and religious architecture, monastic settlement, parish evolution, medical history, burial practices, and material culture during the medieval and early modern period.	Within 5 km	315881	954875

SM2400	Achanarras,cairn 800m NW of	Scheduled Monument	--	Prehistoric ritual and funerary: cairn (type uncertain)	Within 5 km	314538	955753
SM2401	Achanarras,cairn 800m NW of	Scheduled Monument	--	Prehistoric ritual and funerary: cairn (type uncertain)	Within 5 km	314464	955754
SM2402	Achanarras,hut circle	Scheduled Monument	--	Prehistoric domestic and defensive: hut circle, roundhouse	Within 5 km	314756	955772
SM450	Gallow Hillock, cairn on Backlass Hill	Scheduled Monument	--	The monument is a prehistoric cairn visible as a grass covered mound. This monument is of national importance because of its potential to contribute to our understanding of prehistoric ritual and funerary practices: it is likely to contain at least one central burial as well as secondary burials dug into the mound. A mound of this size should also cover an area of prehistoric land surface, which would have the potential to enhance considerably our understanding of prehistoric environmental conditions.	Within 5 km	320493	954115
SM494	Tulach an Fhuarain,cairn 310m NW of Bridge of Westerdale	Scheduled Monument	--	Prehistoric ritual and funerary: cairn (type uncertain)	Within 5 km	312876	952088
SM496	Tulach Lochain Bhraseil,cairn 310m WNW of Bridge of Westerdale	Scheduled Monument	--	Prehistoric ritual and funerary: cairn (type uncertain)	Within 5 km	312821	952040
SM541	Cnoc Donn, broch 600m ESE of Dale Farm, Halkirk	Scheduled Monument	--	The monument to be scheduled is a broch known as Cnoc Donn. It currently survives as a group of turf-covered earthworks, the central mound standing c 2.5m high. This monument is of national importance as the well preserved remains of a broch defended by a ditch on its eastern side. It retains considerable potential to provide important information about the construction and defence of these prehistoric fortifications.	Within 5 km	314008	953296
SM545	Dale Farm,broch 800m SE of	Scheduled Monument	--	Prehistoric domestic and defensive: broch	Within 5 km	314188	953068
SM521	Ballone,broch 360m NE of,Spittal	Scheduled Monument	--	Prehistoric domestic and defensive: broch	Within 5 km	316195	952802
SM528	Fairy Hillock,chambered cairn SE of Spittal Mains	Scheduled Monument	--	Prehistoric ritual and funerary: chambered cairn	Within 5 km	316374	954386
SM561	Knockglass,broch E of	Scheduled Monument	--	Prehistoric domestic and defensive: broch	Within 5 km	317614	953289
SM582	Spittal Farm, broch 180m E of	Scheduled Monument	--	Prehistoric domestic and defensive: broch	Within 5 km	317558	954387

SM499	Tulloch of Milton,chambered cairn 640m W of Halkirk	Scheduled Monument	--	Prehistoric ritual and funerary: chambered cairn	Within 5 km	312367	959117
SM509	Achies,broch 180m E of	Scheduled Monument	--	Prehistoric domestic and defensive: broch	Within 5 km	313637	955060
SM475	The Shean, cairn 500m WNW of Achanarras	Scheduled Monument	--	Prehistoric ritual and funerary: cairn (type uncertain)	Within 5 km	314539	955259
SM619	Braal Castle	Scheduled Monument	--	Secular: castle	Within 5 km	313798	960118
SM442	Sordale Hill,Cnoc na Ciste,chambered cairn	Scheduled Monument	--	Prehistoric ritual and funerary: chambered cairn	Within 5 km	315730	961982
SM483	Gallow Hill,long cairns and chambered cairn	Scheduled Monument	--	Prehistoric ritual and funerary: chambered cairn; long cairn	Within 5 km	315325	961557
SM2235	Achies, broch 800m NE of	Scheduled Monument	--	Prehistoric domestic and defensive: broch	Within 5 km	313999	955653
SM468	Mill of Knockdee,chambered cairn SSW of	Scheduled Monument	--	Prehistoric ritual and funerary: chambered cairn	Within 5 km	317033	960778
CANMORE ID 94558	BANNISKIRK HOUSE	Non-designated	--	A roofed building and an enclosure are depicted on the first edition of the OS 6-inch map (Caithness 1877, sheet xviii) and on the current edition of the OS 1:10,560 map (1971).	Within 500 m	315500	957400
CANMORE ID 94567	ACHALONE	Non-designated	--	Longhouse (ND 1546 5704). Dimensions: 23 x 8m. Rectangular structure defined by grassy banks 0.3m high, divided into five compartments. Orientation NW-SE. (1995) One roofed building attached to the S side of an enclosure and a smaller enclosure are depicted on the first edition of the OS 6-inch map (Caithness 1877, sheet xviii). The larger enclosure is shown on the current edition of the OS 1:10,560 map (1971).	Within 500 m	315450	957030
CANMORE ID 94572	ACHALONE	Non-designated	--	One roofed building with an adjoining unroofed structure is depicted on the first edition of the OS 6-inch map (Caithness 1877, sheet xviii), but not on the current edition of the OS 1:10,560 map (1971).	Within 500 m	315400	956900
CANMORE ID 94582	ACHALONE	Non-designated	--	Longhouse. Dimensions: 10.7 x 5.3m. Rectangular structure with opposing fireplaces. An annexe 3.2 x 3.3m is attached to the SSE end. Orientation NNW-SSE., 1995. One building is depicted as roofed on the first edition of	Within	315760	957020

				the OS 6-inch map (Caithness 1877, sheet xviii) and as unroofed on the current edition of the OS 1:10,560 map (1971).			
CANMORE ID 90873	ACHCOMHAIRLE	Non-designated	--	Longhouse farm (ND 1610 5590), comprising; A: Longhouse. Dimensions: 38 x 5m. Rectangular structure divided into four units, the NW unit containing a fireplace. Orientation NW-SE. B: Enclosure. Dimensions: 6 x 2.5m. Rectangular enclosure defined by upright slabs 6.5m SW of A. Two rows of two slabs running parallel from the SW of this feature may indicate another enclosure. C: Enclosure. Dimensions: 38 x 12.5m. Rectangular enclosure defined by grassy banks. R J Mercer, NMRS MS/828/19, 1995 A farmstead comprising one roofed T-shaped building, one partially roofed long building, two unroofed buildings, one of which is a long building, and three enclosures is depicted on the 1st edition of the 6-inch map (Caithness 1877, sheet xviii). One roofed and one unroofed building, what may be another unroofed building and two enclosures are shown on the current edition of the OS 1:10560 map (1971).	Within 500 m	316100	955900
CANMORE ID 90874	ACHLONE	Non-designated	--	A farmstead comprising two roofed buildings, one of which is a long building, one unroofed building and an enclosure is depicted on the 1st edition of the 6-inch map (Caithness 1877, sheet xviii). Four roofed buildings are shown on the current edition of the OS 1:10560 map (1971).	Within 500 m	315500	956500
CANMORE ID 90875	ACHALONE	Non-designated	--	Longhouse farm (ND 1565 5658) comprising; A: Loghouse. Dimensions: 26 x 5m. Rectangular structure divided into four units with a circular kiln at the S end. It has two annexes attached to the W long wall, measuring 3 x 2m and 3.2 x 2m. Orientation NW-SE. B: Longhouse. Dimensions: 7 x 4m. Rectangular structure defined by grass-covered walls 0.4m high. There is no internal division, but the long wall projects for 4.5m from the SE corner. Orientation NW-SE.R J Mercer, NMRS MS/828/19, 1995. A farmstead comprising two unroofed buildings, one of which is a long building with what may be two outshots,	Within	315600	956500

				and two enclosures is depicted on the 1st edition of the 6-inch map (Caithness 1877, sheet xviii). One unroofed building is shown on the current edition of the OS 1:10560 map (1971).			
CANMORE ID 90876	ACHLONE	Non-designated	--	An unroofed long building is depicted on the 1st edition of the 6-inch map (Caithness 1877, sheet xviii), but it is not shown on the current edition of the OS 1:10560 map (1971).	Within	316100	956500
CANMORE ID 90877	ACHALONE	Non-designated	--	Longhouse (ND 1620 5695). Dimensions: 28 x 6m. Rectangular structure defined by grass and reed covered banks 0.45m high. It was apparently divided into five units and is associated with an enclosure 28 x 35m, to the W. Orientation NNE-SSW. R J Mercer, NMRS MS/828/29, 1995.A farmstead comprising one partially roofed long building and one unroofed building attached to an enclosure, is depicted on the 1st edition of the 6-inch map (Caithness 1877, sheet xviii). One unroofed building and an enclosure are shown on the current edition of the OS 1:10560 map (1971).	Within	316100	956900
CANMORE ID 94692	ACHALONE	Non-designated	--	Longhouse farm comprising; A: Longhouse. Dimensions: 16 x 4.5m. Rectangular tripartite structure. The SE and central units contain fireplaces. A small annexe 3 x 3m juts from the S long wall. Orientation NW-SE. B: Longhouse. Dimensions: 10 x 4.5m. Rectangular bipartite structure. The entrance has a funnel-shaped arrangement of upright flagstones leading from the entrance 0.9m wide and tapering from there to 0.5m wide. Orientation NE-SW. R J Mercer, NMRS MS/828/19, 1995 A roofed building is depicted on the first edition of the OS 6-inch map (Caithness 1877, sheet xviii). An unroofed building is shown on the OS 1:10,560 map (1971).	Within	315800	956380
CANMORE ID 94694	ACHALONE	Non-designated	--	Mill farm (ND 1545 5620). Mill unit, still roofed measures 23 x 5m. Attached at right angles to it is a range of barns measuring 31 x 5m. R J Mercer, NMRS MS/828/19, 1995 Five roofed buildings are depicted on the first edition of the OS 6-inch map (Caithness 1877, sheet xviii). Two roofed buildings are shown on the current edition of the OS 1:10,560 map (1971).	Within 500 m	315400	956200

CANMORE ID 184437	BANNISKIRK HOUSE	Non-designated	--	Country House (Period Unassigned)	Within 500 m	316070	957460
AOC_01	Linear	Non-designated	--	Linear feature aligned N-S located towards west edge. Measured 0.64m wide. Possible drainage channel.	Within	TP38	
AOC_02	Linear	Non-designated	--	Linear feature aligned E-W located towards north edge. Measured 0.64m wide with steep edge to south.	Within	TP56	
AOC_03	Building – farmstead	Non-designated	--	Under grass and turf is the remains of a stone built double faced building with multiple compartments, the walls measure, 0.6 m wide and stand up to 0.5 m high. There appears to be a green drain, kiln at the south end of the structure. The building measures 28 m long over walls and 3.5 m internally. There are two small square porches is attached to the west side.	Within	315649	956573
AOC_04	Building – farmstead	Non-designated	--	Under grass and turf is a stone built structure with double faced walls measuring 0.7 m wide and standing up to 0.5 m high. It measures 5.5 m by 3m internally and there is a type of wall on the southside.	Within	315666	956580
AOC_05	Sheepfold	Non-designated	--	Double-faced drystone circular enclosure measuring c. 19m in diameter and standing up to 1.4m.	Within	316115	956863
AOC_06	Cairn	Non-designated	--	Under moss and grass is a stone cairn measuring 4 m by 3 m and up to 0.3 m high. It appears to have been here for quite a while and it's unclear if this is of any particular date or type of cairn.	Within	316112	956545
AOC_07	Building	Non-designated	--	Under grass and turf is the remains of a rectangular stone-built structure measuring c. 27.5 m by 6.4 m, standing up to c. 0.35m high. The structure is in a ruinous state, overgrown vegetation in the area makes it difficult to identify internal divisions.	Within	316208	956969

APPENDIX N. GENERAL ENVIRONMENTAL MANAGEMENT PLANS

Scottish & Southern Electricity Networks

TG-NET-ENV-510

Environmental

General Environmental Management Plan (GEMP)

- Oil Storage and Refuelling

	Name	Title
Author	Dan Thomas	Environmental Project Manager
Checked by	Simon Hall	Environmental Project Manager
Approved by	Richard Baldwin	Head of Environment

Contents

1 Introduction

1.1 Oil and fuel inappropriately used, stored or disposed of can give rise to pollution of the environment.

1.2 Oil and fuel can be released into the environment through:

- Spillages during delivery or use
- Spillages during refuelling operations
- Loss during attempted theft or vandalism
- Spillages from hose bursts
- Spillages from mechanical failure of plant and their components
- Inadequate or damaged storage facilities, or
- Being poured directly to drains or gullies or being burned

1.3 Petrol, diesel and oil are all highly harmful to plants, animals and humans. If pollution is caused, prosecution may follow. The resultant cost of clean-up and legal proceedings following an incident is likely to far exceed the cost of putting proper control measures in place.

2 Legislation

2.1 The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) apply to any kind of oil including petrol, diesel, mineral oil, heating oil, lubricating oil, waste oil, vegetable and plant oil (except uncut bitumen) stored above ground at premises such as construction sites.

2.2 The relevant provisions of Waste Management Licensing Regulations 1994 (as amended) also apply to handling and storage of waste oil.

2.3 The carriage of diesel, kerosene and petrol by road is regulated by The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (CDG 2009), as amended.

3 General Compliance Requirements

3.1 General

3.1.1 Compile a protocol for oil and fuel storage & operations on site, including but not limited to, bulk fuel delivery procedure, refuelling procedure, fuel storage inspections (including spill kit & plant nappy provision and condition) & emergency response procedures.

3.1.2 All those undertaking or involved in refuelling operations should be nominated on the project as Refuelling Marshals and trained in the approved refuelling procedure.

3.1.3 Suitably sized and fully stocked spill kits of the appropriate type are to be located and maintained at all oil & fuel storage locations, refuelling locations and in all site vehicles. Plant nappies must also be available at all refuelling locations for use during refuelling procedure.

3.1.4 Used spill kit materials should be removed as Special Waste. Stocks of spares are required to be held on site to ensure restocking and replacement can occur in a timely manner.

3.1.5 Where a plant nappy is of two part design the use of plant nappy liners without plant nappy base, or plant nappy base without liner is not acceptable as their performance will be compromised.

3.1.6 All oil loss events such as spillages, hose bursts etc must be reported in line with Scottish and Southern Electricity Networks (SSEN) reporting procedures.

3.2 Deliveries & Storage

3.2.1 Oil and fuel storage areas should be clearly designated and shown on site layout and drainage plans clearly presented on site and briefed during site inductions. Tool Box Talks are to be used to communicate changes and periodically remind operatives on oil and fuel storage, refuelling procedures and emergency response requirements.

3.2.2 During delivery of fuel or oils by a supplier to site, the delivery vehicle must be supervised by a suitably trained Refuelling Marshal when on site. Volume and type of fuels delivered and stored on site should be recorded along with dates of delivery.

3.2.3 The following will be considered as a minimum when identifying the location for fuel storage:

- Maintaining a minimum of 30m from sensitive environmental receptors such as surface waters, surface drainage systems, wetlands, Groundwater Dependent Terrestrial Ecosystems (GWDTEs), drinking water or private water supply catchments
- Fuel stores must be sited away from where they could be hit by moving vehicles and plant whilst ensuring ease of access to proposed storage area for oil deliveries / refuelling
- Ensuring suitability of ground conditions e.g. can the area be protected against flood damage / inundation / subsidence
- Use existing oil interceptor facilities, bunded storage areas or suitable areas of hardstanding , and
- Locate areas to prevent risk of theft or vandalism

3.2.4 Clear signage should be provided at oil storage areas and designated fuelling areas.

3.2.5 Clearly identify any areas where fuelling or fuel storage is not permitted on site plans (e.g. within close proximity to watercourses). Where appropriate consider additional signage highlighting and defining exclusion zones.

3.3 Fuel and Oil Storage Containers

3.3.1 All fuel or oil storage containers must:

- Adhere to all and any conditions of the Controlled Activities Regulations (CAR)
- Be of suitable type for that fuel or oil
- Be appropriately labelled identifying the contents
- Be of enough strength and structural integrity to ensure that it is unlikely to burst or leak in its ordinary use
- Be maintained in good condition
- Not filled beyond design capacity
- Be impermeable to oil or water, and
- Positioned, or other steps taken to minimise any risk of damage by impact so far as reasonably practicable

3.3.2 Storage of fuel within 50 gallon/ 200 litre drums is not permitted on site. Where waste oil is stored in this equipment it should be for minimal duration and the drum should be placed within a suitably sized bund.

3.3.3 For fuel storage containers of 200 litres or greater these must be checked for compliance with General Binding Rule 28 of the Controlled Activity Regulations.

3.3.4 Secondary containment or bunds are required where storage of oil or fuel is within containers over 200 litres. This secondary containment must be checked and maintained regularly, with any liquid or materials within emptied/ removed and suitably disposed of to retain required volume.

3.3.5 The storage of oil or fuel in a portable container with a capacity of less than 200 litres must:

- Be securely sealed when not in use so as to contain the fuel in event of tipping of the container
- Be secured during transit within a vehicle so as not to slide, tip or otherwise be put at risk of damage
- Where being stored for any period longer than a day between use, be placed within suitable bunded Control of Substances Hazardous to Health (COSHH) containment when not in use, and
- When not stored within a bunded COSHH container, the container should be stored securely on a plant nappy, away from any sensitive receptors such as watercourses

3.4 Refuelling

3.4.1 The following must be adhered to for refuelling operations:

- Refuelling operations are to be included within the preparation of a protocol for oil and fuel storage & operations on site

- Undertake refuelling at appropriately sited and set up designated refuelling bays
- Where this is not possible for operational reasons, refuelling should not be undertaken within 30m of surface waters and should follow the above guidance regarding location of any fuel related activities
- Suitably sized spill kits must be easily accessible for all re-fuelling operations and drip trays / plant nappies used during refuelling operations to catch drips and splashes

3.5 Construction plant

3.5.1 Plant nappies should be placed under stationary plant and equipment such as oil powered pumps, generators, winches, hydraulic presses, compressors, lighting rigs (where these items are not "integrally bunded"). Hydraulic powered plant such as presses, winches or tensioners may require additional mitigation such as further plant nappies or impervious drip trays.

3.5.2 Whilst plant nappies do not provide significant containment capacity, they are easier to manage than impervious drip trays which require increased maintenance to ensure rain water is not contaminated and require to be regularly emptied of rainwater to ensure effectiveness.

3.5.3 Static plant should be located at least 30m from any watercourse (or other identified sensitive receptor). Where it is not possible, mitigation should be put in place to reduce the risk or impacts of a pollution incident occurring (including additional capture methods for losses, increased inspection visits of the plant or placement of oil booms).

3.5.4 Plant nappies are to be placed under mobile plant on site when parked up, for example during breaks, overnight or longer periods. A plant nappy will be assigned to each piece of plant and placed under the area of the plant considered the greatest risk, for example this may be under the engine bay (if unbunded) or under the hydraulic pumps or flexi hoses. Stones maybe placed on the plant nappy to prevent it being blown away in strong winds.

3.5.5 Plant nappies should be regularly inspected as part of plant pre-use checks and during other site inspections and should be replaced (or their liners replaced) when deterioration and/ or contamination is evident.

3.6 Further information

3.6.1 Further information is available from (but not limited to):

- SEPA The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) - A Practical Guide
- CIRIA (2005) C650 - Environmental Good Practice – site guide
- CIRIA (2006) C648 - Control of water pollution from linear construction sites – Technical Guidance
- https://www.hse.gov.uk/cdg/commonproblems/bowsers.htm

- https://www.gov.uk/government/publications/carriage-of-dangerous-goods-guidance-note-23

4 Revision History

No	Overview of Amendments	Previous Document	Revision	Authorisation
01	New document created	N/A	1.00	Richard Baldwin
02				

Scottish & Southern Electricity Networks

TG-NET-ENV-511

Environmental

General Environmental Management Plan (GEMP)

- Soil Management

	Name	Title
Author	Dan Thomas	Environmental Project Manager
Checked by	Simon Hall	Environmental Project Manager
Approved by	Richard Baldwin	Head of Delivery

Contents

1 Introduction

1.1 Soil is a precious resource and can provide the following functions:

- Supports a diverse ecological system and provide the growing medium for crops and timber;
- Provides a carbon sink and plays an important role in carbon sequestration;
- Absorbs rainfall, delaying its movement into watercourses;
- Filters or transforms chemicals that pass through it, preventing them from ending up in water or air.

1.2 Any damage to soil quality affects the long-term functioning of the soils and has an impact not only on ecological diversity, performance and visual amenity, but can have impacts off-site such as on flooding, aquifer recharge and water quality.

1.3 It is therefore essential that impacts to the resource are reduced to the minimum necessary for the works and that all work is undertaken in accordance with best practice. The methods of stripping, storage, reuse and disposal of soil can have significant impacts on both the soil resource and other environmental receptors.

2 General Compliance Requirements

2.1 General Principles of Soil Management Process

2.1.1 All stripping should follow this process, except in agricultural fields whereby the method should be informed by landowner requirements, or where archaeological concerns exist and smooth buckets maybe preferable:

- Turfs stripped to 300mm using large toothed bucket;
- Turfs stored vegetation side up and watered if drying out;
- Any remaining top soil and all subsoil layers to be removed and stored separately;
- Subsoil, topsoil and turfs replaced in same order as removed;
- Turfs reinstated vegetation side up;
- The toothed bucket should not be used to smooth over the excavation as it results in greater initial damage and slower recovery of the vegetation.

2.2 Stripping

2.2.1 Plan soil stripping carefully in advance.

2.2.2 Check whether the project archaeologist should be on site during the soil stripping.

2.2.3 Check all necessary pre-construction surveys have been completed prior to stripping (e.g. preconstruction protected species surveys in line with Species Protection Plans).

2.2.4 Follow all identified mitigation requirements for the location and method of stripping.

2.2.5 Where possible, strip soil during drier periods. Do not strip soil during periods of very heavy rainfall.

2.3 Storage

2.3.1 Topsoil should be stripped and stored within the pre-identified and agreed areas to ensure safe storage and swift and successful reinstatement.

2.3.2 If soil storage is being carried out on sensitive habitats, consideration should be given to storage on top of a geotextile mat with duration of storage minimised.

2.3.3 Topsoil must not be mixed with subsoil or other layers with a requirement for separate storage areas for each.

2.3.4 Record and 'signpost' where all removed soils are stored including the different subsoil layers (this is important as individual subsoil layers should be reinstated in the order in which they were removed).

2.3.5 If the storage is likely to be for an extended period (for example >6 months) it may be appropriate to store topsoil layered on top of subsoil bunds. Underlying turfs (and topsoil) at the storage location should be removed in advance with turfs stored on surface of the bund.

2.3.6 Soil storage areas should be located away from watercourses (minimum 10m) and protected from run-off from adjacent areas.

2.3.7 Storage bunds should be designed so the material is stable and unlikely to slip, slide or slump. Consider the risk of any adjoining topography, (e.g. avoiding storing soils near steep slopes or banks, or in areas at high risk of flooding.

2.3.8 Best practice should be applied in order to minimise the amount of compaction or other disturbance of the general structure of the superficial deposits.

2.3.9 Other site works should not impact on stored soil (e.g. Construction traffic must not track over stored soils).

2.3.10 Careful planning of storage areas and required works must be undertaken to avoid multiple handling of stored material and moving of stockpiles.

2.3.11 The surface of material storage bunds (not turfed as detailed above) can be smoothed with bucket to aid surface water run off to reduce potential for erosion. If significant soil erosion is occurring from storage piles during periods of heavy rain, consideration should be given to covering the stockpiles, with terram or other suitable material.

2.3.12 In periods of dry weather check the need for dampening down to reduce dust and potential nuisance.

2.3.13 If any stored soil is contaminated it should be managed in accordance with the Contaminated Land GEMP.

2.3.14 After removal of stored material, storage areas should be reinstated to the pre-existing condition.

2.4 Reinstatement

2.4.1 Stripped soil should be reinstated as close to where it was removed as possible. This will help to maintain a local seed base and the local geological/ hydrological characteristics.

2.4.2 Unless otherwise agreed, turfs should be reinstated following the works and orientated vegetation side up.

2.4.3 Where turfs are not available, areas would be left to revegetate naturally unless circumstances require otherwise, or vegetation is unlikely to establish within a reasonable timescale. Any seeding or replanting must be agreed in advance, including details of seed mixes and management regimes. Other techniques maybe more appropriate depending on the habitat to be reinstated.

2.4.4 The reinstatement of the construction area is to be undertaken to a high standard, using the existing soil and vegetation material wherever possible, in accordance with best practice.

3 Revision History

No	Overview of Amendments	Previous Document	Revision	Authorisation
01	New document created	N/A	1.00	Richard Baldwin
02				

Scottish & Southern Electricity Networks

TG-NET-ENV-512

Environmental

General Environmental Management Plan (GEMP)

- Working in or Near Water

	Name	Title
Author	Dan Thomas	Environmental Project Manager
Checked by	Simon Hall	Environmental Project Manager
Approved by	Richard Baldwin	Head of Delivery

Contents

1 Introduction

1.1 Construction activities in or near water have the potential to cause serious pollution or impact on the bed and banks of a watercourse and on the quality and quantity of the water.

1.2 Engineering works can cause damage to the habitat within rivers, lochs and wetlands, with associated impacts on invertebrates, plants, birds and mammals. Engineering works can also block the passage of migrating fish and damage spawning habitats during sensitive times.

1.3 Major causes of environmental harm associated with working in or near watercourses include:

- Silt e.g. disturbance of river bed or bank, dewatering and pumping of excavations, run-off from exposed ground, plant washing, roads and river crossings;
- Cement and concrete – which is very alkaline and corrosive and can cause serious pollution;
- Chemicals and solvents – oil storage, refuelling, trade materials etc;
- Herbicides – aerial and non-aerial applications; and
- Waste materials (including special waste) e.g. oily wastes, spent acids and solvents.

2 Legislation

2.1 There are a number of activities which pose a risk to the water environment including:

- Discharges to the water environment;
- Abstractions; and,
- Physical works within, and in proximity to controlled waters.

2.2 The Water Environment (Controlled Activities) (Scotland) Regulations 2011 – more commonly known as the Controlled Activity Regulations (CAR) sets out authorisations that are required for different activities in or near the water environments (including rivers, lochs, estuaries and groundwater).

2.3 Levels of authorisation include General Binding Rules (GBR), Registrations and Licences the most significant of which is a Construction Site Licence (CSL). A CSL is required for any project that:

- Exceeds 4 hectares in area;
- Contains a road or track length in excess of 5km; or
- Includes any area of more than 1 hectares or any length of more than 500 metres on ground with a slope in excess of 25 degrees.

3 General Compliance Requirements

3.1 General

3.1.1 Plan all works in accordance with best practice.

3.1.2 Ensure all necessary authorisations under the Controlled Activities Regulations (CAR) are in place.

3.1.3 Identify all activities that will be undertaken in or near watercourses (including all identifiable drainage paths).

3.1.4 Avoid works within 10m of a watercourse unless no other practical options exist and leave a vegetated buffer strip.

3.1.5 Where works are undertaken within 10 m of any watercourse or drain, ensure specific pollution prevention controls are in place.

3.1.6 Communicate risks associated with working in or near watercourses to all personnel and include control measures in the site-specific construction method statements.

3.1.7 Keep site tidy and do not store materials too close to watercourses or surface water features.

3.1.8 Ensure that all watercourses are routinely monitored for changes in water quality. If water quality deteriorates, stop works, identify the source of the problem and implement appropriate mitigation measures.

3.2 Watercourse Engineering

3.2.1 Seek to avoid or minimise watercourse engineering works wherever possible.

3.2.2 Vehicles should not work within the water unless no other reasonable options exist.

3.2.3 All construction machinery operating in-stream should be mechanically sound to avoid leaks of oils, hydraulic fluid, etc.

3.2.4 Machinery should be thoroughly cleaned and checked prior to commencement of in-stream works.

3.2.5 All reasonable steps shall be taken to prevent the transport of sediments or other matter disturbed by the works.

3.2.6 Ensure all required pre-construction surveys have been completed before starting works (these will include, where appropriate, fresh water pearl mussels, otter, water vole).

3.2.7 Check if there are any timing restrictions to works because of protected species (e.g. spawning salmonids, otter, water vole etc) or landowner commitments.

3.2.8 Any temporary dams used should be designed to accommodate periods of high watercourse discharge and dried out sections of bed should be check for stranded fish. Any stranded fish or other wildlife must be immediately translocated to suitable nearby habitat.

3.2.9 Pumps should also be fitted with screens to prevent fish mortalities and ingress of debris, and the outfall to pumps be designed to prevent erosion of the receiving waters (i.e. by dissipating the flow). Back up pumps should be available.

3.2.10 Where stock has access to the works fencing may be necessary to allow the regeneration of native riparian and aquatic marginal vegetation.

3.3 Surface Water Control

3.3.1 Locate areas of high-risk activities away from watercourses and drainage paths. Areas of high risk include:

- Fuel and chemical storage;
- Refuelling areas;
- Material stockpiles;
- Vehicle and equipment washing areas;
- Site compounds / parking areas.

3.3.2 Minimise the volume of contaminated run-off being created by:

- Diverting clean surface water away from areas using cut-off drains, catch pits and bunds (where necessary these can be lined);
- Do not allow water to drain down the length of a haul road. Roads should have adequate cambers to shed water quickly and if necessary cut-off drains installed across the road;
- Minimise erosion of exposed soils and working areas;
- Reduce the exposed working area through phased construction;
- Reinstate exposed soil as soon as practical;
- Roughen exposed surfaces to reduce rate of water run off;
- Prevent water from leaving site prior to treatment;
- Ensure adequate buffer zones are identified between working areas and surface waters;
- Diversion drains should be used to catch sediment laden run-off and direct it to treatment facilities such as settlement ponds (where necessary these can be lined), silt fences, settlement tanks etc (see CIRIA C6848);
- Maintain all mitigation measures regularly to ensure their effectiveness;
- Depending on the level of contamination, silty water can be pumped over land to filter through vegetation and infiltrate into the ground provided it is carried out in line with the CAR regulations. An appropriate buffer distance must be agreed to allow sufficient distance for the vegetation to filter the silty water prior to reaching a watercourse;
- Ensure construction works minimise disturbance to the current run-off regimes.

3.4 Vegetation Removal

3.4.1 Trees and shrubs should not be removed without agreement.

3.4.2 Avoid un-necessary vegetation removal.

3.4.3 Where necessary leave a vegetated buffer distance of 10m between works and a watercourse.

3.4.4 Only break the ground surface when works are required and initiate a phased approach.

3.4.5 Comply with agreed buffer zones of vegetation as this will allow further treatment of surface water.

3.4.6 Do not dispose of cleared vegetation into the watercourse and avoid debris from clearance.

3.4.7 Vegetation removal can impact on bank stability and increase erosion. Ensure that all banks are restored to a condition prior to works commencing and assess what further protection may be required.

4 Revision History

No	Overview of Amendments	Previous Document	Revision	Authorisation
01	New document created	N/A	1.00	Richard Baldwin
02				

Scottish & Southern Electricity Networks

TG-NET-ENV-513

Environmental

General Environmental Management Plan (GEMP)

- Working in Sensitive Habitats

	Name	Title
Author	Dan Thomas	Environmental Project Manager
Checked by	Simon Hall	Environmental Project Manager
Approved by	Richard Baldwin	Head of Environment

Contents

1 Working in Peatland and Sensitive Habitats

1.1 Introduction

1.1.1 This General Environmental Management Plan concentrates on sensitive habitats associated with Peat, Blanket Bog, Wet Heath and Dry Heath habitats.

1.1.2 Section 3 of this General Environmental Management Plan includes guidance specific to peat management and the preparation of Peat Management Plans where on-site activities impact on peat. Site specific measures should be developed before construction begins at any location where working in peat is a constraint.

1.2 Legislation

1.2.1 Sensitive habitats may include those Scheduled under Annex 1 of the Habitats Directive. The Habitats Directive is more formally known as Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora, a European Union Directive adopted in 1992. Sensitive habitats may more widely be defined as habitats where additional care is required to avoid permanent damage or to reinstate to the previous condition.

2 General Compliance Requirements

2.1 General

2.1.1 Whilst working within sensitive habitats or peatlands follow best practice from SNH and SEPA.

2.1.2 When working in areas with sensitive habitats, the hierarchy of avoid, minimise, mitigate and manage must be applied.

2.1.3 Where possible areas of development such as cable routes, access tracks and tower positions should be micro-sited within permissible limits to minimise impacts on areas of sensitive habitat and areas of deep peat.

2.1.4 Stripping areas of sensitive habitat and peatland should be kept to an absolute minimum and done in consultation with the environmental representative.

2.1.5 During planning and implementation consider how the site will be restored or reinstated on completion of the works.

2.1.6 Ensure adequate corridors / areas are allowed for water management and reinstatement works which may include sourcing donor material from adjoining areas in some instances.

2.1.7 Consider effects of local hydrology factors (drainage, watercourses, flushes, bog pools, peatlands etc) on established habitats and seek to maintain hydrology regimes during the works.

2.1.8 If hydrological impacts cannot be avoided, or significantly mitigated through design and implementation, ensure hydrological connectivity is re-stablished as soon as possible. Ensure development or reinstated areas do not form preferential drainage.

2.1.9 Areas where rain water has been flowing over the ground surface should be identified in advance of works.

2.1.10 Design drainage channels or pipe systems to conduct water across cable trenches (or areas where tracks have been removed and ground reinstated. This will minimise post-construction damage and to allow better opportunities for re-vegetation and successful reinstatement. Any drainage pipes should be removed once vegetation and stabilisation of original drainage has been established.

2.1.11 Undertake post-installation inspections to identify any areas where surface water flow is causing soil erosion.

2.2 Access

2.2.1 Access across sensitive habitats must be done as efficiently as possible, avoiding unnecessary movements back and forth.

2.2.2 Agree an Access Strategy and details of all access routes with the environmental representative ahead of works, avoiding impacts on peatland or sensitive habitats as far as possible. Where All Terrain Vehicles (ATVs) are proposed consider the trade-off of changing access route as ground becomes damaged, to maintaining one access that subsequently requires reinstatement / restoration.

2.2.3 Where no existing access tracks exist, seek to use temporary trackway solutions including trackway panels (E.g. Terrafirma Dura-Base or Trackway), timber log mats or bog mats when transiting sensitive habitats or peatlands. Where plant and terrain do not suit the use of temporary access panels type solutions, temporary floating stone roads may be needed.

2.2.4 Access across unprotected peatland or other sensitive habitats should be restricted to low ground pressure vehicles and plant only (i.e. suitable ATV- argocat or Soft track, or wide spread tracked machines), and should avoid rutting.

2.3 Access Track Construction

2.3.1 Design of works should avoid the potential for concentrated discharges of water onto the hill slopes. In particularly susceptible areas, the use of drainage ditches may be necessary upstream of the construction corridor. These should be installed following advice from hydrological specialists and in agreement with project environmental resource.

2.3.2 Ensure adequate drainage is installed upfront across tracks upfront (temporary or permanent access tracks) through use of culverts at regular intervals (including where there may not be obvious watercourses). Culverts should be installed in compliance with Controlled Activities Regulations (CAR) requirements.

2.3.3 Working in areas of peatland should be avoided, as far as practicable during times of the year with the highest rainfall. Stripping of peat and reinstatement works should stop during periods of sustained heavy rainfall.

2.3.4 During the reinstatement of sensitive habitats, it may be necessary to utilise living donor turfs from land either side of the development and to reworked acrotelm from land adjoining the works corridor to prevent formation of preferential drainage.

2.3.5 Across areas of deep peat and other sensitive habitats, floating roads are generally preferable, especially where temporary. The formation of temporary access tracks should be underlaid with geotextile and geogrids. This should exceed the width of the track formation to avoid overspill of stone onto adjoining habitat and to assist in separation of the track construction materials from the underlying soils.

2.3.6 Where excavation is required, a tracked excavator should first remove turfs to a depth of 300 mm using as large a toothed bucket wherever possible. (This may not be appropriate where archaeological interest exists, and smooth buckets are specified).

2.3.7 Turfs, peat and subsoil should be stored separately in line with Soil Removal, Storage and Reinstatement General Environment Management Plan.

2.3.8 Turfs and soil should be stored to the side of the excavation. Where this is on good quality blanket bog storage should be on top of a geotextile membrane.

2.3.9 Turfs should be stored root side down and should remain in the storage location until required for reinstatement (this is to avoid multiple handling and reduce the potential for turfs becoming unstable).

2.3.10 Subsoil layers and peat layers should be reinstated in the order they were removed, and the turfs should be reinstated root side down.

3 Peat Management

3.1 General peat management requirements

3.1.1 In addition to the unique habitats provided by peatlands, areas of deep peat have a significant global role in carbon sequestration. Disturbing peat can release CO_2 to the atmosphere as the peat is oxidised when exposed to air or dried out. Through proper management of peat these impacts can be reduced

3.1.2 It is important to ensure the hydrological regime of peatland is maintained and that peat is not left unprotected to avoid erosion and degradation. Avoid unnecessary drainage of peatlands. Any temporary cut off ditches should be back filled as soon as practical on completion of works.

3.1.3 Ensure that large loads do not compress peat and create a barrier to water movement which could cause ponding at one side of the corridor and drying out at the other, or cause peat slump by displacement. Peat Slide risk assessments may also be required by the project.

3.1.4 Existing degraded peatland can often be stabilised or re-established to active peatland with minimal effort and opportunities to undertake such works should be investigated where possible.

3.2 Peat Management Plans

3.2.1 Where significant impacts on peat are identified, or peat depth is greater than 0.5 metres, a site or project specific Peat Management Plan (PMP) may be required and should be agreed prior to the construction phase. The PMP must be developed with input from the environmental representative and may require stakeholder input.

3.2.2 In certain circumstances a Peat Management plan may be required as a condition of consent or specifically specified as a contract deliverable. In these circumstances the content must reflect that required by the consent or contract.

3.2.3 The Peat Management Plan, as a minimum should:

- Include and adhere to principles set out in best practice and guidance notes from SNH and SEPA, including SEPA's guidance note WST-G-052 -Developments on Peat and Off-Site Uses of Waste Peat
- Include detailed OS background-based plans with site location insets, detailing peat depth maps, highlighting areas of deep peat, storage areas and any areas suitable for restoration / reinstatement
- Reference peat depth maps, identify how impacts on peat have been minimised and quantify types and volumes of peat anticipated to be disturbed by the project
- Identify appropriate storage of peat for reuse (during reinstatement for example). In line with Soil Removal, Storage and Reinstatement GEMP
- Identify suitable areas for separate storage of excavated strata, including for example, turfs, peat and subsoil. It may also be appropriate to implement different management and storage strategies for the various strata of deep peat, including top vegetative layer and acrotelm, where fibrous living organic matter is still evident, separate to the catotelm, where the structure of the peat is more homogenous and loses its structure more easily
- Detail how the works have been planned to ensure minimal handling of peat. (In moving and reworking peat, the structure can easily be lost making storage and reuse more challenging. Turfs and other peat materials should be stored as close to origin as possible
- Detail inspection regime to ensure peat is regularly checked for signs of drying out and detail planned measures to prevent this occurrence. (If drying out is occurring the storage areas may require to be sprayed with water. Any water abstraction associated with this activity needs to be compliant with the Controlled Activities Regulations (CAR).)
- Identify opportunities for reuse on and off site if required (in peatland restoration for example). Detail plans for reinstatement of stored material, including potential peatland restoration works. During implementation ensure that no bare (unvegetated) peat is exposed as this may take a long time to re-establish, and will be a high risk of degradation and erosion; and
- Include a water management strategy for minimising impacts of construction activities on the peatland

3.2.4 The Peat Management Plan should then be followed during the construction phase, with any required changes agreed as the project progresses

4 Revision History

No	Overview of Amendments	Previous Document	Revision	Authorisation
01	New document created	N/A	1.00	Richard Baldwin
02				

Scottish & Southern Electricity Networks

TG-NET-ENV-514

Environmental

General Environmental Management Plan (GEMP)

- Working with Concrete

	Name	Title
Author	Dan Thomas	Environmental Project Manager
Checked by	Simon Hall	Environmental Project Manager
Approved by	Richard Baldwin	Head of Environment

Contents

1 Working with Concrete

1.1 Background

1.1.1 The chemical reactions that enable fresh concrete to cure are complex. A by-product of these reactions is the production of calcium hydroxide, a highly alkaline chemical that has a pH in excess of 12.

1.1.2 There are a number of sources of alkaline water on construction sites, which include:

- Concrete wash water from cleaning of machinery and tools used with fresh concrete – e.g. chutes, drums, pumps, hand tools
- Cutting or coring of concrete structures
- Hydro-demolition (high pressure water cutting)
- Surface water runoff from newly concreted areas
- The storage or use of Concrete Bound Sand (CBS) in backfilling of cable works
- Leaching form installed cabling works utilising CBS backfill
- Crushed demolition materials, and
- Concrete installed below groundwater level (e.g. piled foundations)

1.1.3 The release of untreated highly alkaline water into the environment from any of the sources described above, can have a significant environmental impact, including on the ecology of receiving waters. The following are potential impacts of concrete and cement born contamination if not properly treated:

- Increase in pH of the water environment to toxic levels
- Kill invertebrate and other aquatic life including plants
- Particles can impact the turbidity of receiving waters
- Smother the bed and kill aquatic life
- Block gills of fish
- Impact directly and indirectly protected species which may be present e.g. otters, freshwater pearl mussels, or salmon
- Increase flood risk or agricultural drainage by blocking of drains and other structures

1.2 Legislation

1.2.1 Under the Controlled Activities Regulations, it is on offence to discharge polluting substances to controlled waters (surface water and groundwater) without prior approval from the Regulator (SEPA). This includes any discharge of concrete/ cementitious materials or contaminated water.

2 General Compliance Requirements

2.1 General use

2.1.1 Concrete shall not be used within 10m of any watercourse or loch. Should there be the requirement to use concrete and cement within 10m of a waterbody, this should be fully risk assessed and agreed in advance of the works.

2.1.2 Store bulk and bagged cement and concrete additives at least 30 metres away from watercourses, gullies and drains in properly secured, covered and bunded areas.

2.1.3 Ensure dust from storage areas is controlled.

2.1.4 Ensure all staff are briefed on the potential environmental risks of working with concrete.

2.1.5 Ensure that any residue from cutting/ coring/ hydro-demolition activities is correctly contained and treated where necessary.

2.1.6 Consider the materials being used e.g. recycled concrete aggregate may cause elevated pH levels as a result of run-off.

2.1.7 Recirculating systems should be used where possible to minimise the use of water resources.

2.2 Washout

2.2.1 Areas should be established for concrete washout which avoid important habitats and species.

2.2.2 Surplus concrete should be removed from equipment by scraping before washing down in order to minimise the volume of water required.

2.2.3 All concrete wash water should be contained for treatment on site or disposal off site. None shall be allowed to enter any drains, ditches or watercourses or land.

2.2.4 Discharge of small volumes to land should only take place where there is no connectivity to surface and ground waters and can be demonstrated to be fully compliant with legislative requirements.

2.3 Treatment Options on site

2.3.1 The pH scale is a logarithmic scale which means that each unit change in pH for example pH 7 to 8 represents a tenfold increase in alkalinity. Because of this, attempting to treat concrete washout by dilution alone has the potential to increase the risk of a serious pollution incident.

2.3.2 Dilution of high pH water is ineffective due to the logarithmic scale of pH. (For example, to dilute one IBC of concrete wash water at pH 12, the equivalent of four Olympic swimming pools of fresh water would be needed to bring it back to neutral (pH 7).

2.3.3 In order to adjust high pH wash water in line with acceptable levels, a process of neutralisation using controlled amounts of reagent may be required. Typical reagents include mineral acid (either sulphuric or hydrochloric acid), citric acid, carbon dioxide (CO_2) and self-buffering solutions. Propriety units for treatment of high pH water on site are available, some of which use CO_2 diffusers to neutralise the high pH water.

3 Revision History

No	Overview of Amendments	Previous Document	Revision	Authorisation
01	New document created	N/A	1.00	Richard Baldwin
02				

Scottish & Southern Electricity Networks

TG-NET-ENV-515

Environmental

General Environmental Management Plan (GEMP)

- Watercourse Crossings

	Name	Title
Author	Dan Thomas	Environmental Project Manager
Checked by	Simon Hall	Environmental Project Manager
Approved by	Richard Baldwin	Head of Delivery

Contents

1 Introduction

1.1 The installation of structures for the purpose of crossing watercourses presents potential risks to the environment. These include:

- Obstruction to fish migration and spawning;
- Obstruction to mammal access;
- Impacts on aquatic flora and fauna;
- Loss or degrading of aquatic and riparian habitats;
- Alteration of the hydrological regime with associated impacts on habitats; and
- Releases of substances to the water environment during construction and operation e.g. suspended solids, oils etc;
- Impacts alternating the natural geomorphological balance of the watercourse, leading to erosion and bank stability issues.

2 Legislation

2.1 All watercourse crossings will require some level of authorisation under The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended) (CAR). Levels of authorisation include General Binding Rules (GBR), Registrations and Licences.

2.2 It is essential that these legislative requirements are considered in the early stages of the planning and design process of a project.

3 General Compliance Requirements

3.1 General

3.1.1 Seek to avoid watercourse engineering works wherever possible.

3.1.2 Where this is not possible, seek to use existing crossings, upgrading as required (e.g. installation of a bridge at a fording point).

3.1.3 Plan all works in accordance with best practice, referring to SEPA guidance document 'WAT-SG-25 Engineering in the water environment: Good Practice Guide, River crossings'.

3.1.4 Design crossing to account for maximum flow conditions.

3.1.5 Culverts should be dug into bed of watercourse, allowing for natural strata in the watercourse to form the new bed of the culverted watercourse (Note: This may reduce the hydraulic capacity of the culvert and should be allowed for when specifying diameter of culvert).

3.1.6 Ensure crossing or associated works do not impede fish passage through the system.

3.1.7 Do not use multi piped culverts.

3.1.8 If the watercourse is wider than 1.5 m (measured top of bank to top of bank) use a bridge as opposed to a culvert.

3.1.9 Ensure all necessary authorisations under the Controlled Activities Regulations (CAR) are in place and adhered to.

3.1.10 Ensure all required pre-construction protected species surveys have been completed before starting works (these will include, where appropriate, fresh water pearl mussel (FWPM), otter, and water vole).

3.1.11 Consult with Scottish Natural Heritage (SNH) for advice on the presence of fish in the catchment.

3.1.12 Establish if the watercourse is used for fish spawning (through consultation with SNH, the local Fishery Board or Fisheries Trust), and if so, avoid periods in which spawning occurs and the subsequent emergence of the juvenile fish.

3.1.13 Pump intakes must be fitted with screens to prevent fish mortalities and ingress of debris.

3.1.14 Where possible flume pipes should be used for temporary works in areas where migratory fish are present, as an alternative to pumps.

3.2 Construction

3.2.1 Where possible works should be undertaken during drier periods (subject to other ecological timing conditions) and avoid periods of high rainfall. The weather forecast should be consulted 3 days in advance of works commencing the water crossing.

3.2.2 Vehicles should not work within the water unless no other reasonable options exist. If working within the watercourse, then plant must be thoroughly cleaned prior to use and vegetable based hydraulic oils specified in the plant.

3.2.3 During construction and use of the crossing, measures must be taken to prevent the transport of sediments or other materials into the watercourse, for example using correctly installed silt fencing.

3.2.4 Access across the watercourse crossing should be constructed of suitable material and in a manner that will not give rise to rutting, ponding or silt run-off (use of silt fencing along edges may be appropriate).

3.2.5 Vegetation removal should be minimised wherever possible. Any vegetation removed shall not be disposed of into any inland surface water;

3.2.6 Any length of bank with bare earth shall be re-established with an appropriate and agreed mix of riparian vegetation or with a fully biodegradable geotextile.

3.2.7 Any storage of material should be far enough away from the watercourse so as to prevent wash off entering the watercourse.

3.2.8 Any temporary dams used should be designed to accommodate periods of high flows.

3.2.9 Where pumps are used, back up pumps should be available.

3.2.10 Any engine used to drive a pump must be located as far away from a watercourse as possible.

3.2.11 Any stranded fish or other wildlife should be immediately removed from de-watered sections of bed and translocated to suitable habitat.

3.2.12 All temporary crossings must be reinstated to a condition that existed prior to the works as soon as possible.

3.3 Fording of Watercourses

3.3.1 Fording of watercourses is generally not acceptable and should be avoided if possible. However, depending on the activity it may be appropriate for limited access.

3.3.2 If fording is required, access should be restricted to one crossing point, using an existing / previous crossing point if available.

3.3.3 Scottish Environment Protection Agency (SEPA) must be consulted in order to obtain the relevant agreement or authorisations (as required).

3.3.4 A method statement for the use of the ford should be agreed ahead of works, identifying the crossing point, surveys undertaken ahead of crossing, frequency of use, and any required mitigation measures.

3.3.5 If the crossing point is not an established ford, measures to protect the bed and bank should be implemented as appropriate.

3.3.6 After use, the watercourse must be reinstated to a condition that existed prior to the works as soon as possible.

4 Revision History

No	Overview of Amendments	Previous Document	Revision	Authorisation
01	New document created	N/A	1.00	Richard Baldwin
02				

Scottish & Southern Electricity Networks

TG-NET-ENV-516

Environmental

General Environmental Management Plan (GEMP)

- Waste Management

	Name	Title
Author	Dan Thomas	Environmental Project Manager
Checked by	Simon Hall	Environmental Project Manager
Approved by	Richard Baldwin	Head of Delivery

Contents

1 Introduction

1.1 Waste is defined in the in the Waste Framework Directive (75/442/EEC) as "any substance or object which the holder discards, intends to discard or is required to discard". This includes materials that other people want, or for which they can find a beneficial use i.e. material that is to be recovered / recycled.

1.2 In any construction project, there may be a variety of different wastes, from office and canteen waste to construction materials, waste aggregate from temporary tracks, waste oils, asbestos and clinical waste that will require management.

2 Legislation

2.1 Waste legislation and guidance is extensive, complex and works must comply with all the obligations they impose. Key guidance from the Scottish Environment Protection Agency (SEPA), can be found on their waste website (www.sepa.org.uk/regulations/waste). This includes information on core legislation including:

- Environmental Protection Act 1990 (as amended)
- Waste Management Licensing (Scotland) Regulations 2011 (as amended)
- The Waste (Scotland) Regulations 2012 (as amended)

3 General Compliance Requirements

3.1 Principles of Waste Management

3.1.1 Waste management priorities and practical actions that can be undertaken on site should follow the principles of the waste hierarchy as illustrated below:

- Eliminate - Design out waste
- Reduce - Minimise waste generation
- Reuse - Reuse materials on site if possible
- Recycle - Reprocess materials for off-site use
- Recover - Recovery of energy from waste sent off site
- Dispose - Least desirable option – last resort

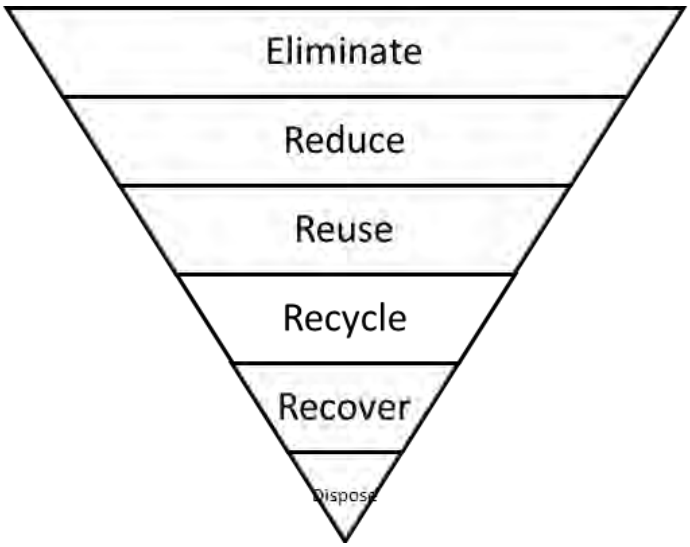


Figure 3.1 – Waste Hierarchy

3.1.2 A Site Waste Management Plan (SWMP) is required to be prepared agreed prior to construction works starting. This plan should be based on the above principles and include the following minimum requirements:

- Waste minimisation;
- Allocate a waste champion – who is responsible for the SWMP;
- Record types and quantities of waste that will be produced during the project;
- Decide how waste arising will be managed in line with the waste hierarchy;
- Plan for efficient materials and waste handling and set reduction targets (KPIs);
- Measure quantities and types of waste produced and compare against targets;
- Monitor the implementation of the SWMP and update as necessary; and
- Compile a waste budget.

3.2 Duty of Care

3.2.1 All those who produce or handle waste have legal responsibilities, a “Duty of Care”, for its safe keeping, transport and subsequent recovery or disposal.

3.2.2 Failure to comply the “Duty of Care” is an offence as it is a legal requirement under Section 34 of the Environmental Protection Act 1990 (as amended).

3.2.3 ‘Duty of Care’ requires the producer to:

- Ensure those transporting waste are registered with SEPA;
- Ensure the waste is being treated, re-used or disposed of at a suitably licensed site in line with current legislation;
- Keep a waste transfer slip for all waste being transported off site;
- Ensure that all waste on site is properly stored and secured;

- Take all reasonable steps to prevent unauthorised handling or disposal by others;
- If you are dealing with hazardous / special wastes, such as asbestos, chemicals, oils or contaminated soils, you have extra legal responsibilities and may be required to complete detailed 'special waste consignment notes'; and
- Should there be uncertainty over whether a waste is hazardous or special, advice should be sought.

3.3 Storage

3.3.1 The site should be kept tidy and free from litter at all times.

3.3.2 Segregation of waste (including metal, plastic, glass, paper and card) at the point of generation should be provided for site offices / welfare facilities and for construction activities by the use of designated storage areas / containers to ensure cross-contamination is reduced.

3.3.3 All storage areas / containers should be clearly labelled to identify the waste type and properties.

3.3.4 Waste storage areas should be appropriately secured to ensure to prevent pollution.

3.3.5 Controls should be in place to prevent wind blow (e.g. covered skips).

3.3.6 All wastes that could leach or be entrained in water should be stored in a sealed container or on an impervious surface with barriers to lateral flow.

3.3.7 Storage of liquid wastes should be stored in a sealed container within a secondary containment system (bund) with 110% capacity of the container.

3.3.8 Keep the duration of storage to the minimum required.

3.4 Special Waste Storage

3.4.1 Containers used for storage of special waste should be inspected weekly for leaks and corrosion.

3.4.2 Take care to separate different types of special waste, e.g. different chemicals that, if mixed, could react.

3.4.3 Written instructions should be available on site for storing and disposing of each type of special waste.

3.4.4 An inventory should be maintained of all special wastes stored on site, detailing quantities and locations.

3.5 Movement

3.5.1 All movement of waste should be undertaken in line with the relevant waste regulations.

3.5.2 Any waste being transported off site should be done so by a registered waste carrier.

3.5.3 A waste transfer note / special waste consignment note should be completed and retained prior to waste leaving the site.

3.5.4 Before waste is allowed to leave site, the producer should ensure that the site it is being transported to is appropriately licensed.

3.5.5 Vehicles transporting waste should be suitably secured so as not to allow waste to escape.

3.6 Reuse, Treatment, Disposal

3.6.1 All re-use, treatment and disposal of waste must be undertaken in line with an appropriate waste management licence (WML) or an exemption to require a waste management licence (WMX), under the Waste Management Licensing (Scotland) Regulations 2011 (as amended).

3.6.2 If it can be proven that the material is not waste, it will not fall within these requirements.

3.6.3 A WML and WMX must be obtained from SEPA prior to undertaking the activity.

3.6.4 No burning of waste is permitted on site.

3.6.5 No fly-tipping is permitted.

4 Further information

4.1.1 Some useful sites on waste management are:

- www.sepa.org.uk
- www.zerowastescotland.org.uk
- www.wrap.org.uk
- www.bre.co.uk
- www.smartwaste.co.uk
- www.ciria.org.uk
- www.netregs.org.uk

5 Revision History

No	Overview of Amendments	Previous Document	Revision	Authorisation
01	New document created	N/A	1.00	Richard Baldwin
02				

Scottish & Southern Electricity Networks

TG-NET-ENV-517

Environmental

General Environmental Management Plan (GEMP)

- Contaminated Land

	Name	Title
Author	Dan Thomas	Environmental Project Manager
Checked by	Simon Hall	Environmental Project Manager
Approved by	Richard Baldwin	Head of Environment

Contents

1 Introduction

1.1 Previous land use can lead to ground becoming contaminated with substances which may be hazardous to health or the environment. During construction works there is potential for these materials to be exposed, disturbed and mobilised. It may be possible to identify this as a risk during appropriate assessments at the planning stage, or it may be encountered unexpectedly during site works.

2 Legislation

2.1 Investigation and management of any potentially contaminated land must be undertaken in compliance with relevant Environmental and Health and Safety Legislation.

3 General Compliance Requirements

3.1 Planning the works

3.1.1 Plan works taking account of recognised best practice and all relevant waste regulations.

3.1.2 Key stakeholders for Contaminated land issues often include landowners / tenants, the local authority, and the Scottish Environment Protection Agency (SEPA).

3.1.3 Assess the risk of contaminated land issues at a site using historical land use checks and information from site walkovers, hydrological and geological mapping and other relevant data sources (sometimes referred to as Phase 1 Contaminated land assessments).

3.1.4 Where a risk of contamination is identified, further site investigations may be appropriate, including analysis of soil and water samples for specific suites of potential contaminants and more detailed contaminated land assessments (which may consider source, pathway, receptor models).

3.1.5 Identified, high risk or known areas of contaminated land should be recorded and identified clearly in project documentation, including clear scaled plans with inset showing location context of plan.

3.1.6 Contamination could however be encountered in areas where it has not been expected and checks must be undertaken to ensure that any risks to the environment are identified and controlled.

3.2 During works

3.2.1 During works keep a careful lookout for any signs of contamination during boring, excavating, soil stripping and similar operations.

3.2.2 Signs of potential contamination may include discoloured soil, unexpected odours, a fibrous texture to the soils (e.g. asbestos), or presence of foreign objects (e.g. chemical/oil, containers/waste).

3.2.3 Increased risks of contamination may exist if there is any evidence of previous soil workings, underground structures or waste pits, evidence of made ground, or old drain runs.

3.3 If contamination is encountered

3.3.1 Stop work immediately.

3.3.2 Report the discovery to the site manager and project environmental representative within 30 minutes. A SEAR may be raised to track the occurrence and expert advice and guidance on required measures / mitigation should be implemented. Ensure the landowner / occupier is informed.

3.3.3 Seal off the area to contain spread of contaminants.

3.3.4 Undertake risk assessment to minimise the risk to health and safety of site workers. This should identify acceptable working methods, PPE, contact, and other required procedures.

3.3.5 Clear site to ensure there is nothing that could cause fire or explosion.

3.3.6 Ensure that the suspected contamination is tested and characterised, including any Waste Acceptance Criteria required if waste is to be disposed offsite and agree changes to the existing site proposals and method statements.

3.3.7 Avoid causing or spreading contamination.

3.3.8 Do not stockpile contaminated soil unless it cannot be avoided. If it is necessary, stockpile only on an area of hard standing to prevent contamination of the underlying area. If possible, place material on non-permeable geotextile or membrane.

3.3.9 Cover the stockpile with plastic sheeting to prevent infiltration of precipitation and spread of soluble contaminants and to prevent potentially contaminated wind-blown dust.

3.3.10 Control surface drainage from stockpiled area. Remember water draining from a stockpile may be contaminated and require controlled off-site disposal.

3.3.11 Where disposal of contaminated land is required, this should be done in accordance with current Waste Legislation.

4 Revision History

No	Overview of Amendments	Previous Document	Revision	Authorisation
01	New document created	N/A	1.00	Richard Baldwin
02				

Scottish & Southern Electricity Networks

TG-NET-ENV-519

Environmental

General Environmental Management Plan (GEMP)

- Forestry

	Name	Title
Author	Dan Thomas	Environmental Project Manager
Checked by	Simon Hall	Environmental Project Manager
Approved by	Richard Baldwin	Head of Delivery

Contents

1 Introduction

1.1 Forestry and woodland is an important resource in Scotland. It can contribute biodiversity, climate resilience, flood regulation as well as be an important product for materials. Overall there is a large societal importance on healthy, sustainable forestry management and works to tree's needs to be carefully considered to impact is minimised and the appropriate management regime is put in place. This GEMP is to be followed by anyone working undertaking forestry works, other tree felling or arboreal works on behalf of Scottish and Southern Electricity Networks (SSEN).

2 Legislation

2.1 All felling works must be authorised under an appropriate Planning Permission, Section 37 consent, Felling Licence, or permitted under The Forestry (Exemptions) (Scotland) Regulations 2019. The requirements of any consent must be adhered to at all times.

2.2 Landowner agreement must be in place prior to felling or other tree works taking place.

3 General Compliance Requirements

3.1 Felling/Tree Removal

3.1.1 No tree felling/vegetation removal should take place during the bird breeding season unless pre-felling surveys have been undertaken.

3.1.2 Mulching should only be used where there is a need to clear the site of tree residue or where trees or areas are too small to fell commercially (typically, a minimum top diameter of 7 cm will be commercially recovered). The resultant mulch is to be partially incorporated with the vegetation layer, or separated and made available for alternative reuse, preferably within the project.

3.2 Other Tree Works

3.2.1 Avoid all recognised injurious practices such as:

- Topping or lopping to an arbitrary height or branch length;
- Flush cuts;
- Unbalancing a tree crown by excessive one-sided pruning;
- Inappropriate use of flailing; and
- Climbing damage - Care shall be taken to avoid injuring thin and weak barked species by inappropriate use of rope access techniques on trees (such as use of climbing irons) on trees to be retained.

3.2.2 Vegetation should be left well balanced with natural crown shapes.

3.2.3 If the only pruning option is to severely reduce or unbalance a tree, then coppicing, or felling and replacement planting are often better options and shall be agreed with the landowner.

3.2.4 Pruning must also take into account the vegetation re-growth expected in the interval between cuts. This will vary widely between plant species and sites.

3.3 Protection of Retained Trees

3.3.1 Avoid damaging those standing trees which are to be retained.

3.3.2 A root protection zone should be identified and enforced around all trees to remain on site that are within close proximity to the works area to ensure that no accidental damage is caused to the tree roots. Root protection zones should be defined in line with the British Standard 5837.

3.3.3 No material arising from site works are to be stored within the root protection zone or stacked against trees.

3.4 Access

3.4.1 Utilise brash to assist with the access requirements for felling and construction machinery and give consideration to rights of way by transient wildlife. In agreement environmental specialists and landowners, small piles of brash and timber may be left on site at specific, identified locations in the interest of habitat creation and increasing biodiversity.

3.4.2 Access damage - Vehicle access and treatment of arisings shall avoid injury to low branches, stems, root buttresses and feeder roots. Branches should be removed by saw prior to access being taken. Breaking of limbs is not acceptable during access.

3.5 Storage of Marketable Timber

3.5.1 Presentation of produce should be in neat, safely stacked piles ready for forwarder/tractor pick-up, where required. Timber stacks must be not higher than 3m.

3.5.2 Sites shall be left tidy, with brash and stumps cut low and neatly with any hinge or jagged spikes removed, to prevent them becoming a trip hazard or an obstacle to vehicles. Remove all litter from site.

3.6 Forestry Waste

3.6.1 Note that forest wastes are controlled under SEPA Waste Regulations which must be adhered to.

3.7 General Forestry Practice

3.7.1 Forestry best practice as specified by Scottish Forestry and Forest Industry Safety Accord (FISA) is to be implemented at all times. The following is provided as a guide (but not a definitive list) to the standards that should be followed during forestry works:

- BS 5837 (2012) – Trees in Relation to Design, Demolition and Construction; and
- The Forestry Commission publication 'Managing Forest Operations to Protect the Water Environment'.

3.7.2 Spreading Disease - Appropriate regard shall be given to avoiding spreading fungal diseases. Forestry Commission Biosecurity Guidance should be followed. Consideration should be given to landowners' requirements for treating stumps.

3.7.3 Leave watercourses, culverts and ditches undamaged and clear of arisings. No felling into watercourses is allowed.

3.7.4 Local drainage systems to be maintained and not damaged or interrupted by the felling works.

3.7.5 No fires should be lit on site. Fire risk in and near wooded areas should be considered and risk assessed with additional mitigations imposed during prolonged dry periods (e.g. implementation of wider non-smoking zones.)

4 Revision History

No	Overview of Amendments	Previous Document	Revision	Authorisation
01	New document created	N/A	1.00	Richard Baldwin
02				

Scottish & Southern Electricity Networks

TG-NET-ENV-520

Environmental

General Environmental Management Plan (GEMP)

- Dust Management