

# **Consultation Document – Alignment and Site Selection**

## **Red John Pumped Storage Scheme 275kV**

### **Connection**

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## GLOSSARY

Term	Definition
AIS	Air Insulated Switchgear
Alignment	A centre line of an overhead line OHL, along with location of key angle structures.
Amenity	The natural environment, cultural heritage, landscape and visual quality. Also includes the impact of SHE Transmission's works on communities, such as the effects of noise and disturbance from construction activities.
Birds of Conservation Concern (BoCC)	Birds of Conservation Concern is compiled by a coalition of the UK's leading bird conservation and monitoring organisations and reviews the status of all regularly occurring birds in the UK, Channel Islands and Isle of Man.
Busbar	A metallic strip or bar, typically housed inside switchgear, panel boards, and busway enclosure for local high current power distribution.
Bus Coupler	Used to couple one bus to another without interrupting the power supply or creating hazardous arcs.
Conductor	A metallic wire strung from structure to structure, to carry electric current.
Consultation	The dynamic process of dialogue between individuals or groups, based on a genuine exchange of views and, normally, with the objective of influencing decisions, policies or programmes of action.
Corridor	A linear area which allows a continuous connection between the defined connection points. The corridor may vary in width along its length; in unconstrained areas it may be many kilometres wide.
Environmental Impact Assessment (EIA)	A formal process set down in The Electricity Works (EIA) (Scotland) Regulations 2000 (as amended in 2008) used to systematically identify, predict and assess the likely significant environmental impacts of a proposed project or development.
Gardens and Designed Landscapes (GDLs)	The Inventory of Gardens and Designed Landscapes lists those gardens or designed landscapes which are considered by a panel of experts to be of national importance.
Groundwater Dependent Terrestrial Ecosystems (GWDTE)	Habitats which critically depend on groundwater flows.
Habitat	Term most accurately meaning the place in which a species lives, but also used to describe plant communities or agglomerations of plant communities.
Kilovolt (kV)	One thousand volts.
Listed Building	Building included on the list of buildings of special architectural or historic interest and afforded statutory protection under the 'Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997' and other planning legislation. Classified categories A – C(s).
Mitigation	Term used to indicate avoidance, remediation or alleviation of adverse impacts.
Micrositing	The process of positioning individual structures to avoid localised environmental or technical constraints.
Mitigation	Term used to indicate avoidance, remediation or alleviation of adverse impacts.
National Scenic Area (NSA)	A national level designation applied to those landscapes considered to be of exceptional scenic value.
No Net Loss (NNL)	Where ecosystem services and damages resulting from human activities are balanced by at least equivalent gains.

<b>Term</b>	<b>Definition</b>
Overhead line (OHL)	An electric line installed above ground, usually supported by lattice steel towers or poles.
Plantation Woodland	Woodland of any age that obviously originated from planting.
Route	A linear area of approximately 1 km width (although this may be narrower/wider in specific locations in response to identified pinch points / constraints), which provides a continuous connection between defined connection points.
Routeing	The work undertaken which leads to the selection of a proposed alignment, and if required capable of being taken forward into the consenting process under Section 37 of the Electricity Act 1989.
Scheduled Monument	A monument which has been scheduled by the Scottish Ministers as being of national importance under the terms of the 'Ancient Monuments and Archaeological Areas Act 1979'.
Scottish Environment Protection Agency (SEPA)	SEPA is Scotland's principal environmental regulator, protecting and improving Scotland's environment.
Semi-natural Woodland	Woodland that does not obviously originate from planting. The distribution of species will generally reflect the variations in the site and the soil. Planted trees must account for less than 30% of the canopy composition
Sites of Special Scientific Interest (SSSI)	Areas of national importance. The aim of the SSSI network is to maintain an adequate representation of all natural and semi-natural habitats and native species across Britain.
Special Area of Conservation (SAC)	An area designated under the EC Habitats Directive to ensure that rare, endangered or vulnerable habitats or species of community interest are either maintained at or restored to a favourable conservation status.
Special Landscape Area (SLA)	Landscapes designated by The Highland Council which are considered to be of regional/local importance for their scenic qualities.
Special Protection Area (SPA)	An area designated under the Wild Birds Directive (Directive 74/409/EEC) to protect important bird habitats. Implemented under the Wildlife and Countryside Act 1981.
Sites of Special Scientific Interest (SSSI)	Areas of national importance. The aim of the SSSI network is to maintain an adequate representation of all natural and semi-natural habitats and native species across Britain.
Stakeholders	Organisations and individuals who can affect or are affected by SHE Transmission works.
Study Area	The area within which the corridor, route and alignment study takes place.
Underground Cable (UGC)	An electric line installed below ground.
Volts	The international unit of electric potential and electromotive force.
Wild Land Area (WLA)	Those areas comprising the greatest and most extensive areas of wild characteristics within Scotland.

# 1. INTRODUCTION

## 1.1 Purpose of Document

This Consultation Document invites comments from all interested parties on the proposals by Scottish Hydro Electric Transmission plc, operating and known as Scottish and Southern Electricity Networks Transmission (hereafter referred to as 'SSEN Transmission'), to construct and operate an underground cable connection from the consented Red John 275kV Switching Station to the existing Knocknagael 275kV Substation and also to construct an extension to the Knocknagael Substation. Taken together, these form the 'Proposed Development'.

This Consultation Document describes both the alignment and the site option appraisals undertaken, the alternatives considered and the identification of a preferred alignment and site. Comments are now sought from statutory authorities, key stakeholders, elected representatives and the public on the preferred options identified.

## 1.2 Document Structure

This Consultation Document comprises the following sections:

- **1: Introduction** – setting out the purpose of the Consultation Document;
- **2: The Proposals** – describes the need for the proposals, the strategic alternatives considered, the proposed technology solution and the typical construction methods;
- **3: Alignment Selection Process** – sets out the alignment selection process and methodology that has been applied to date;
- **4: Identification of Alignments** – describes the alignment options that have been identified;
- **5: Comparative Analysis of Alignments** – analyses each alignment option against a series of environmental, technical and economic considerations to arrive at a preferred alignment;
- **6: Description of Preferred Alignment** – describes the preferred alignment identified and summarises the reasons for this;
- **7: Site Selection Process** – sets out the site selection process and methodology that has been applied to date;
- **8: Identification of Sites** – describes the site options that have been identified;
- **9: Comparative Analysis of Sites** – analyses each site option against a series of environmental, technical and economic considerations to arrive at a preferred site;
- **10: Description of Preferred Site** – describes the preferred sites identified and summarises the reasons for this;
- **11: Consultation on the Proposals and Next Steps** – invites comments on the alignment and site selection assessment process and identification of preferred alignment and site.

## 1.3 Next Steps

As part of the consultation exercise, comments are sought from members of the public, statutory consultees, and other stakeholders on the preferred alignment and site options put forward in this report.

A Report on Consultation will be produced which will document responses received, and the decisions made in light of these.

Upon completion of the alignment and site selection process, an application to The Highland Council will be made for consent for the construction and operation of the Knocknagael substation extension under the Town and Country Planning (Scotland) Act 1997 (as amended). The underground cable (UGC) will benefit from Permitted Development rights as set out under Class 40 1(a) of The Town and Country Planning (General Permitted Development) (Scotland) Order 1992 (TCP GDPO) and does not require planning permission.

The intention is to submit the application for consent for the substation extension in Summer 2023.

## 2. THE PROPOSALS

### 2.1 The Need for the Project

SSEN Transmission is the electricity transmission licence holder in the north of Scotland and has a duty under Section 9 of the Electricity Act 1989 to '*develop and maintain an efficient, coordinated and economical system of electricity transmission and to facilitate competition in the generation and supply of electricity.*' SSEN Transmission also has obligations to offer non-discriminatory terms for connection to the transmission system, both for new generation and for new sources of electricity demand.

The consented Red John 450MW Pumped Storage (hydro) Scheme requires connection to the SSEN electricity network at Knocknagael substation by 2027.

### 2.2 Project Overview

#### 2.2.1 Red John Pumped Storage (hydro) Scheme Grid Connection

Due to the developer wanting certainty as to the consenting process, they have decided to pursue an underground cable route (the Proposed Development) from the Red John development to the substation at Knocknagael. This work can be undertaken via Permitted Development (PD) Rights as set out in under Class 40 1(a) of The Town and Country Planning (General Permitted Development) (Scotland) Order 1992 (TCP GDPO) and does not require planning permission.

#### 2.2.2 Knocknagael Substation Extension

As part of the works required to connect the Red John generation into the wider grid, it is necessary to undertake a substation extension at Knocknagael. The works will involve an extension of the existing footprint of the substation at Knocknagael within two distinct areas. The proposed connection requires a firm connection meaning that each of the two proposed circuits will need to be connected on either side of the bus section. This requirement dictates that the existing substation needs to be extended on two sides to allow the appropriate connection. The proposed development is in line with SSEN Transmission's commitment and licence obligation to facilitate the connection of renewable generators to the grid through an economical, efficient and coordinated approach to transmission reinforcement.

### 2.3 Proposals Overview

#### 2.3.1 Red John Pumped Storage (hydro) Scheme Grid Connection

A full underground cable solution is proposed to mitigate the following issues:

- Landscape and visual impacts;
- Impact to bird species associated with the nearby Loch Ashie SPA; and
- The additional complexity of consenting an overhead line.

#### *Construction Activities*

Key tasks during construction of underground cable (UGC) will involve:

- Enabling work (e.g. forestry clearance, public road improvements and establishment of temporary works such as construction drainage and site compound/welfare);
- Construction of permanent and temporary access roads and drainage;
- Excavation of cable trench;
- Installation of electrical equipment;
- Installation of cable ducts and joint bays;
- Inspections and commissioning; and
- Removal of temporary works and site reinstatement.

### *Access During Construction*

The access strategy has not yet been determined. Where possible, existing access tracks will be used and upgraded as required. New access tracks may be required and where there is a justified long-term requirement, they will be left in place. Where ground conditions permit, it is preferable to construct the infrastructure without an access track (e.g. on dry and level pasture) although it is unlikely no access track would be required. Temporary matting may be used in sensitive areas subject to an assessment of gradients and ground conditions.

New access tracks (permanent or temporary) would generally be constructed using a geotextile, with approximately 200 mm of crushed and compacted stone laid on top. Tracks may be floated over areas of peat, or may use cut and fill approaches, subject to ground conditions and gradients.

A Transport Statement or similar will be produced as part of the Environmental Appraisal to set out proposed traffic and transport details of the Proposed Development.

### *Forestry Removal*

Construction of the Proposed Development would require the removal of sections of forestry, which would be undertaken in consultation with Scottish Forestry and affected landowners.

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.

An operational corridor would be required to enable the safe operation and maintenance of the UGC. This will vary depending on the type of woodland (based on species present) in proximity to the UGC.

### *Biodiversity Net Gain*

SSEN Transmission has a target to achieve No Net Loss (NNL) on all projects gaining consent from April 2020 and Net Gain (NG) on projects gaining consent from April 2025.

As part of the route optioneering process, a Biodiversity Net Gain (BNG) assessment has been undertaken against each alignment option.

### *Programme*

The programme for the Project is currently under development, an indicative programme is as follows:

- Construction start: November 2024; and
- Construction complete and UGC operational: July 2027.

## 2.3.2 Knocknagael Substation Extension

### *Construction Activities*

Key tasks during construction of the substation are as follows:

- Enabling work (e.g. forestry clearance, public road improvements and establishment of temporary works such as construction drainage and site compound/welfare);
- Construction of cut/fill to provide a level platform;
- Construction of permanent access roads and drainage;
- Construction of civil engineering infrastructure;
- Installation of mechanical/electrical equipment;
- Inspections and commissioning; and
- Removal of temporary works, landscape design implementation (if required) and site reinstatement.

#### *Access During Construction*

The access strategy has not yet been determined. Where possible, existing access tracks will be used and upgraded as required. New access tracks may be required and where there is a justified long term requirement, they will be left in place. Where ground conditions permit, it is preferable to construct the infrastructure without an access track (e.g. on dry and level pasture) although it is unlikely no access track would be required. Temporary matting may be used in sensitive areas subject to an assessment of gradients and ground conditions.

New access tracks (permanent or temporary) would generally be constructed using a geotextile, with approximately 200 mm of crushed and compacted stone laid on top. Tracks may be floated over areas of peat, or may use cut and fill approaches, subject to ground conditions and gradients.

#### *Forestry Removal*

Construction of the Proposed Development would require the removal of sections of forestry, which would be undertaken in consultation with Scottish Forestry and affected landowners.

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.

#### *Biodiversity Net Gain*

SSEN Transmission has a target to achieve No Net Loss (NNL) on all projects gaining consent from April 2020 and Net Gain (NG) on projects gaining consent from April 2025.

As part of the site optioneering process, a Biodiversity Net Gain (BNG) assessment has been undertaken against each site option.

#### *Programme*

The programme for the Project is currently under development, an indicative programme is as follows:

- Construction Start: November 2024; and
- Operation: July 2027.

## 3. ALIGNMENT SELECTION PROCESS

### 3.1 Introduction

The approach to alignment selection is informed by the following SSEN Transmission guidance:

- Procedures for Routeing Overhead Lines and Underground Cables of 132kV or above, SSEN Transmission, 2020 (PR-NET-ENV-501) (Routeing Guidance); and
- Biodiversity Net Gain Flow Chart, Guidance and Project Toolkit (FC-NET-ENV-500).

The guidance develops a process which aims to balance environmental, technical and economic considerations throughout the route options process. In consideration of these principles, the method of identifying an environmentally preferred route option in this study has involved the following four key tasks:

- Identification of the baseline situation;
- Identification of alternative route options;
- Environmental, technical and economic analysis of route options; and
- Identification of an environmentally preferred route option.

This guidance helps SSEN Transmission to meet its obligations under Schedule 9 of the Electricity Act 1989, which requires transmission licence holders:

- To have a regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interests; and
- To do what they reasonably can to mitigate any effect that the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects.

The guidance develops a process which aims to balance these environmental considerations with technical and economic considerations throughout the route options process.

The guidance splits a project into six stages, as follows:

- Pre-Routeing Activities: Selection of proposed connection option;
- Stage 0: Routeing strategy development;
- Stage 1: Corridor Selection;
- Stage 2: Route Selection;
- Stage 3: Alignment Selection; and
- Stage 4: EIA and consenting.

The stages that are carried out can vary depending on the type, nature of and size of a project and consultation is carried out at each Stage of the process. The project is currently at Stage 3: Alignment Selection.

### 3.2 Stages of the Methodology

The key stages summarised above, have been undertaken for this project as follows:

#### 3.2.1 Pre-Routeing Activities

Pre-routing activities were not required due to the limited scale of the project.

#### 3.2.2 Stage 0 – Routeing Strategy Development

The routing strategy development process was not required due to the limited scale of the project.



### 3.2.3 Stage 1 – Corridor Selection

The corridor selection stage seeks to identify a series of linear areas (corridors) capable of providing a continuous connection between the defined connection points and delivering the required transmission connection. The corridor selection process was not required due to the limited scale of the project

#### Stage 2 – Route Selection

The route selection stage seeks to identify a series of 1 km wide linear areas (routes) capable of providing a continuous connection between the defined connection points and delivering the required transmission connection within the proposed route. Three routes were considered:

- Route A begins in the Red John Pumped Storage site and travels north until it meets the B862. Here, the route travels in a north-easterly direction until it crosses Laggan Burn, where the route curves to the east to join the Knocknagael substation, east of Essich.
- Route B begins in the Red John Pumped Storage development, and travels in a north easterly direction, to the west of Loch Ashie, until it meets Knocknagael substation. Route B is the most direct route of the options considered.
- Route C begins in the Red John Pumped Storage development and travels east, to the south of Loch Ashie. Just before the route meets Loch Ashie, it narrows to pass through a small corridor between Loch Ashie and an engineering headpond, that will form part of the Red John Pumped Storage development and must be avoided. The route then curves around the south of Loch Ashie, to continue north towards Knocknagael substation.

The appraisal concluded that Route B was the environmentally preferred route due to the lower potential for impacts to sensitive habitat including peat and blanket bog, as well as a lower potential to impact agriculture and is located further from residential properties. The BNG appraisal found Route A to be the preferred option, however, this was solely an assessment of habitats and did not take account of species data across the route options.

Consultation with key statutory consultees including Nature Scot, The Highland Council (THC), Scottish Environment Protection Agency (SEPA) and Historic Environment Scotland (HES) was undertaken on the proposed technology option and corridor.

### 3.2.4 Stage 3 – Alignment Selection

This project is currently at the alignment selection stage and in consideration of the principles outlined in the guidance document, the method of identifying a preferred alignment option in this study has involved the following key tasks:

- Identification of alignment options;
- Environmental analysis of alignment options;
- Identification of a preferred alignment option; and
- Will set out an access strategy i.e., how access to the alignment will be provided to facilitate construction e.g. the nature, indicative location and extent of temporary access tracks, construction tracks and road improvements.

## 3.3 Area of Search

The area of search is between a proposed connection point within the consented Red John Pumped Hydro Storage Scheme (approx. grid reference NH60652 34088), and the existing Knocknagael substation (approx. grid reference NH65235 39105).

## 3.4 Baseline Conditions

The following information sources have informed the desk-based baseline study to identify potential environmental constraints within and adjacent to the alignment.



- Identification of environmental designated sites and other constraints, utilising GIS datasets available via NatureScot Site Link<sup>1</sup> and other sources. These include:
  - Special Areas of Conservation (SAC);
  - Special Protection Areas (SPA);
  - Proposed Special Protection Areas (pSPA);
  - Sites of Special Scientific Interest (SSSI);
  - National Scenic Area (NSA);
  - Wild Land Areas (WLA);
  - Royal Society for the Protection of Birds (RSPB) reserves;
  - Land capability for agriculture;
  - Ancient Woodland Inventory (AWI);
  - Geological Conservation Review Sites;
  - Carbon-rich soil, deep peat and priority peatland habitats; and
  - Areas at risk of flooding (SEPA flood map <sup>(2)</sup>).
- Identification of archaeological designations and other recorded sites, utilising GIS datasets available via Historic Environment Scotland Data Services and Local Historic Environment Teams. These include:
  - World Heritage Sites (WHS) and buffers;
  - Scheduled Monuments;
  - Category A, B and C listed buildings; and
  - Gardens and Designed Landscapes.
- Review of the Highland Wide Local Development Plan (2012) to identify local policies and further environmental constraints and opportunities, such as Local Nature Conservation Sites (LNCS), core paths or other locations important to the public;
- Review of landscape character assessments of relevance to the Study Area;
- Review of Ordnance Survey (OS) mapping (1:50,000 and 1:25,000) and online GIS data sources from OS Open Data) and aerial photography (where available) to identify other potential constraints such as settlement, properties, walking routes, cycling routes etc.;
- Extrapolation of OS Vectormap GIS data to identify further environmental constraint including locations of watercourses and waterbodies, roads classifications and degree of slope; and
- Review of other local information through online and published media such as tourism sites.

### 3.5 Alignment Identification and Selection Methods

Alignment options were identified following site appraisals, taking into account the most notable constraints identified during the baseline studies. In summary, the following has been taken into account as far as they are practicable and relevant at this stage and will be considered in more detail during Stage 4 (EIA and consenting):

- Avoid if possible major areas of highest amenity value (including those covered by national and international designations and other sensitive landscapes); and
- Avoid by deviation, smaller areas of high amenity value.

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<sup>1</sup> <https://sitelink.nature.scot/home>

<sup>2</sup> <http://map.sepa.org.uk/floodmap/map.htm>

### 3.6 Appraisal Method

#### 3.6.1 Environmental

Appraisal of alignment options has involved systematic consideration against the following environmental topic areas:

- Natural Heritage - Designations, Protected Species, Habitats, Ornithology and Geology, Hydrology and Hydrogeology;
- Cultural Heritage - Designations and Cultural Heritage Assets;
- People – Settlements, Visual and Physical Effects;
- Landscape - Designations and Character; and
- Land Use - Agriculture, Forestry and Recreation.

#### 3.6.2 Engineering

Appraisal of alignment options has involved systematic consideration against the following engineering topic areas:

- Infrastructure crossings - major crossings;
- Environmental design - elevation, atmospheric pollution, contaminated land, flooding;
- Ground conditions - terrain, peat;
- Construction/Maintenance - access; and
- Proximity - clearance distance, communication masts, metallic pipelines.

#### 3.6.3 Economic

Appraisal of site options involves systematic consideration against the following economic topic areas:

- **Capital** - construction; diversions; public road improvements; felling; land assembly
- **Operational** – inspections; maintenance

The key consideration in the economic appraisal is the length of the varying alignment options. Due to the similar nature of the alignment options and the two diversions from these (see section 4.1) an economic appraisal was not undertaken. All options are considered comparable in terms of capital and operational costs.

#### 3.6.4 Identification of a Preferred Alignment

Following review of all of the potential alignment options, these have been considered in combination to arrive at a preferred alignment option. The overall objective throughout the appraisal of alignment options has been to take full consideration of all environmental factors to minimise any potential adverse impacts on the environment whilst taking into account technical and cost considerations.

## 4. DESCRIPTION OF ALIGNMENTS

### 4.1 Identification of Alignment Options

#### 4.1.1 Alignment 1

Alignment 1 travels from the consented Red John PSS Switching Station to the north-east corner of Clune Wood. It then follows the eastern side of C1064 General Wade's Military Road (hereafter referred to as 'General Wade's Military Road') northwards to the access track for Drumashie Farm. At this point, the alignment transfers to the western side of General Wade's Military road for approximately 640 m before moving back to the eastern side. It then heads north to Achvraid Farm where it splits with one branch of the alignment travelling north-east to the western boundary of Knocknagael Substation and the other branch travelling east to the eastern boundary of Knocknagael substation. Both branches pass south of Essich.

#### 4.1.2 Diversion 1

Diversion 1 splits from Alignment 1 at the access track for Drumashie Farm. At this point, Alignment 1 transfers to the western side of General Wade's Military road for 640 m heading north, whereas Diversion 1 stays on the eastern side.

#### 4.1.3 Diversion 2

Diversion 2 splits from Alignment 1 600 m south of the access track for Drumashie Farm. At this point, Diversion 2 transfers to the western side of General Wade's Military road for 600 m heading north till it reaches the access track for Drumashie Farm.

Alignment 1, Diversion 1, and Diversion 2 are shown on **Figure 1** in **Appendix A**.

## 5. COMPARATIVE ANALYSIS OF ALIGNMENTS

### 5.1 Alignment 1

#### 5.1.1 Environmental

##### *Natural Heritage*

Alignment 1 does not pass through internationally, nationally, or locally designated sites (see **Appendix A, Figure 2**). Alignment 1 is located 235 m west of the Loch Ashie SPA and SSSI with the potential to disturb qualifying feature species during construction with no direct loss of supporting habitat.

There are three ancient woodland sites adjacent to Alignment 1. One is approximately 600 m south of the divergence between Alignment 1 and Diversion 1. The other two are to the east and west side of the alignment in the southern 400 m of the alignment.

European protected species known to occur in the area include otter, wildcat and bat species. UK BAP species including red squirrel and pine marten are also known to occur in the area and may be present. Suitable habitat for these species is present within Alignment 1. It is assumed that best practice construction techniques and micro-siting of infrastructure will avoid significant impacts, resulting in low potential for impacts to protected species. Prior to any vegetation clearance, further otter, pine marten, badger, red squirrel and wildcat surveys should be completed by a suitably experienced ecologist to check for signs of any new protected species activity.

Habitats present along Alignment 1 comprise coniferous plantation woodland and areas of broadleaved woodland, unimproved, semi-improved and improved grassland, arable fields, heathland and blanket bog (see **Appendix A, Figures 3 and 4**). Areas of woodland are recorded on the Native Woodland Survey of Scotland (NWSS) as Annex I habitat, H91C0 – Caledonian Forest. The area of blanket bog to the south is of moderate condition or higher so considered irreplaceable habitat. The alignment is therefore on the east side of General Wade's Military Road in this area so that there is no impact. It is assumed that best practice construction techniques will avoid significant impacts to the other areas of blanket bog.

Non breeding populations of Slavonian grebe associated with the Loch Ashie SPA and SSSI, and suitable habitat for Schedule 1 species, are present within Alignment 1. If practicable, construction will be scheduled outside of breeding bird season for this species (March - August), reducing potential for significant impacts. If this is not possible, and prior to any construction work taking place, a precautionary working method statement shall be implemented adhering to SSEN's Bird Species Protection Plan to minimise the risk of inadvertently causing an offence in the disturbance of breeding birds. No supporting habitat for this species would be impacted.

A breeding bird survey identified two lekking black grouse at two locations between the north shore of Loch Ashie and the alignment. Figures showing the locations are confidential but available on request. The desk study did not return the presence of any lekking black grouse within 2 km of the site, and it is possible that this is a newly established lekking location, representing an expansion of the local distribution of this species. Black grouse is listed as a priority species on both the LBAP and SBL and is red-listed for the severe decline in its UK breeding population and moderate decline in its UK breeding range. If practicable, construction will be scheduled outside of lekking black grouse season (March - May) reducing potential for significant impacts. If this is not possible, and prior to any construction work taking place, a precautionary working method statement shall be implemented adhering to SSEN's Bird Species Protection Plan to minimise the risk of inadvertently causing an offence in the disturbance of lekking black grouse.

The area local to the alignment is considered to support two breeding territories of curlew, with nest sites assumed to be located beyond the site boundary, and the site providing feeding areas for the breeding birds. The exact location of nest sites off site was not confirmed during the survey, and since curlew are site faithful and will return to the same breeding grounds each year, additional survey may need to be undertaken prior to construction to identify these in order for the safe operating distance to be implemented.

The site also provides nesting and breeding habitat for crossbill and red kite. Should works take place within sensitive periods for Annex I, Schedule I, BoCC or nesting bird species, the SSEN bird Species Protection Plan (SPP) would be implemented, reducing potential for significant impacts.

There are no sites designated for hydrology or geology along or adjacent to Alignment 1 nor does it pass through known areas of Class 1 or Class 2 peatland. However, the alignment is within drinking water catchments where a Scottish Water abstraction is located. Scottish Water abstractions are designated as Drinking Water Protected Areas (DWPA) under Article 7 of the Water Framework Directive. Loch Ness supplies Invermoriston Water Treatment Works (WTW), Loch Ashie and Loch Duntelchaig supply Inverness Loch Ashie (WTW) and Loch. There are also private water supplies at Achvraid Farm and Drumashie Farm. Both the DWPA and private water supplies will be considered during Stage 4.

A summary of the preliminary BNG findings for Alignment 1 is contained within **Table 5.1**. The alignment option passes through an area of long-established woodlands of plantation origin (LEPO) and areas of blanket bog, but these are not considered irreplaceable habitats. Alignment 1 passes through upland heathland on the east side of General Wade's Military Road north of Clune Wood which is considered of high distinctiveness, and it is therefore recommended it is avoided, mitigated or compensated for.

**Table 5.1 BNG for Alignment 1**

Category	Result
UGC Biodiversity Units (BU)	259.66
Irreplaceable Habitats (BU)	0.00
Area (ha)	31.42
Biodiversity Units / Area	8.26

#### *Cultural Heritage*

The alignment does not directly cross any designated assets, nor are there any listed buildings, scheduled monuments or other statutory designated heritage assets (see **Appendix A, Figure 5**).

As shown in **Appendix B**, there are several Sites and Monument Record Entries within 50 m of the alignment. These include the remains of a farmstead and hut circles between the north and south branches that connect into Knocknagael Substation and hut circles both east of General Wade's Military Road opposite Drumashie Farm and west of Loch Ashie. A walkover survey was undertaken in December 2022 to confirm the presence of these Sites or Monument Record Entries and determine any potential impacts as a result of the alignment. Certain assets, as shown in **Appendix B**, would require monitoring and / or recording as part of construction.

#### *Landscape and Visual*

The majority of the alignment passes through broad leaved woodland, conifer forests and open moorland, with areas of farmland in the north. The alignment is within an area that is very lightly settled, with man-made structures including OHL towers and poles very visible in the open plateau landscape.

The southern portion of Alignment 1 falls within the SLA of Loch Ness and Duntelchaig. Any impacts on the SLA will be minor and only occur during the construction phase as the UGC will be buried during operation. All land will be restored to its existing state as far as practicable.

As the Proposed Development is UGC, visual impacts from nearby settlements, residential properties, roads and core paths would only be experienced during the construction phase and in turn would be temporary and of short duration.

#### *Other Potential Environmental Constraints*

Land use is mainly open moorland, forestry and agriculture and any impacts to moor or agriculture are likely to be temporary and of short duration. A forestry survey of the alignment options is to be undertaken in January

2023. The outcomes of the survey will be considered along with consultation responses to identify a preferred alignment which will be taken forward to the next stage (consenting).

The southern section of Alignment 1 has a land capability for agriculture (LCA) rating of 5.2 (land capable of supporting improved grassland). The northern section of Alignment 1 has an LCA rating of 4.1 (land capable of supporting mixed agriculture). Therefore the alignment will not affect the quality of most productive agricultural land of class 3b and below.

Alignment 1 would cross the eastern end of the Drumashie to Cullaird Core Path (see **Appendix A, Figure 2**) which would result in a temporary and short-term diversion. Alignment 1 would cross the western end of the access road to the Scottish Water Facility north of Loch Ashie. However, as part of detailed design, access to this would be maintained.

A planning appraisal against the Highland Wide Local Development Plan 2012 has been conducted and no planning policy constraints have been identified. It should be noted that whilst an appraisal has been undertaken, the UGC benefits from PD rights and does not require planning permission under the Town and Country Planning Act<sup>3</sup>. Should an access track be constructed however, it is likely that this will require a planning application to be made. Inner Moray Forth LDP is also applicable to this area but is not considered to be relevant to the Proposed Development.

#### 5.1.2 Engineering

Alignment 1 is approximately 7 km in length with standard installation techniques considered practical and feasible. Alignment 1 would have to cross some existing Scottish Water assets at Loch Ashie but this is not considered prohibitive. Alignment 1 would cross the western end of the access road to the Scottish Water Facility north of Loch Ashie and access will be maintained. The majority of the alignment runs in parallel to General Wade's Military Road so access is practical however the road would have to be crossed three times. From a technical perspective, introducing the road crossings does introduce slightly more complexity however these road crossing arrangements are common and generally considered standard installation. Topography is generally favourable for cable installation with their being minimal slopes along the alignment. There are localised areas of boggy and peaty ground at the southern end of the alignment but then areas of good open pasture land. Some localised felling of mature trees in Clune Wood would be required for the alignment.

## 5.2 Alignment 1 incorporating Diversion 1

#### 5.2.1 Environmental

Diversion 1 refers to the approximately 640 m of the alignment on the eastern side of General Wade's Military Road.

Impacts across all topics are the same for Diversion 1 as they are for Alignment 1 with the exception of biodiversity. A summary of the preliminary BNG findings for Alignment 1 incorporating Diversion 1 is contained within Table 5.2 below. The alignment option passes through a greater area of upland heathland as it does not cross over to the west side of General Wade's Military Road. This results in a greater number of biodiversity units associated with Alignment 1 incorporating Diversion 1.

**Table 5.2 BNG for Alignment 1 incorporating Diversion 1**

Category	Result
UGC Biodiversity Units (BU)	270.75
Irreplaceable Habitats (BU)	0.00
Area (ha)	31.23

<sup>3</sup> HM Government (1992) The Town and Country Planning (General Permitted Development) (Scotland) Order 1992. Available online: <https://www.legislation.gov.uk/uksi/1992/223/contents/made>

Category	Result
Biodiversity Units / Area	8.67

### 5.2.2 Engineering

From a technical perspective, impacts across all topics are the same for Diversion 1 as they are for Alignment 1 with the exception of road crossings. Although road crossing arrangements are common and generally considered standard installation, Diversion 1 would remove one instance of the road being crossed (two individual crossing points).

## 5.3 Alignment 1 incorporating Diversion 2

### 5.3.1 Environmental

Diversion 2 refers to the 600 m of the alignment on the western side of General Wade's Military Road till it reaches the access track for Drumashie Farm. To ensure a fair comparison of the alignments both with and without Diversion 2, the appraisal of Diversion 2 includes the effects of Alignment 1 with the exception of the sections where Alignment 1 differs to Diversion 2.

Alignment 1 incorporating Diversion 2 would cross the eastern end of the access road to Drumashie Farm however as part of detailed design access to this would be maintained.

A summary of the preliminary BNG findings for Alignment 1 incorporating Diversion 2 is contained within Table 5.3 below. The alignment option is on the west side of General Wade's Military Road for longer than Alignment 1 and Alignment 1 incorporating Diversion 1 through an area of modified grassland. This results in a lower number of biodiversity units associated with Alignment 1 incorporating Diversion 2.

**Table 5.3 BNG for Alignment 1 incorporating Diversion 2**

Category	Result
UGC Biodiversity Units (BU)	247.52
Irreplaceable Habitats (BU)	0.00
Area (ha)	31.4
Biodiversity Units / Area	7.88

### 5.3.2 Engineering

From a technical perspective, impacts across all topics are the same for Diversion 2 as they are for Alignment 1 with the exception of 1 additional road crossing for the existing access to Drumashie Farm. It is noted however that further engineering studies are to be undertaken on Diversion 2 to confirm this is the only additional engineering constraint.

## 6. SELECTION OF PREFERRED ALIGNMENT

There are no significant differences between the three alignment options however Alignment 1 incorporating Diversion 2 passes through less upland heathland habitat. It therefore has the lowest number of biodiversity units associated with it and as such is considered to be the environmentally preferred alignment.

From an engineering perspective, Alignment 1 incorporating Diversion 1 is the preferred option as it reduces from 3 to 1 the number of times General Wade's Military Road is crossed.

Overall, the current preferred alignment is Alignment 1. Note the preferred alignment is subject to change based on the outcome of consultation and further engineering assessment, including the Alignment 1 incorporating Diversion 2 option. Alignment 1 incorporating Diversion 2 has not yet had the same level of engineering assessment applied as Alignment 1 or Alignment 1 incorporating Diversion 1 and assessment is ongoing.

In the absence of Alignment 1 incorporating Diversion 2, the environmentally preferred alignment would be Alignment 1 as it impacts a lower number of associated biodiversity units than Diversion 1. The current overall preferred alignment reflects this outcome.



## 7. SITE SELECTION PROCESS

### 7.1 Introduction

The approach to site selection is informed by the SSEN Transmission guidance:

- Substation Site Selection Procedures for Voltages at or above 132kV; and
- Biodiversity Net Gain Flow Chart, Guidance and Project Toolkit (FC-NET-ENV-500).

This guidance broadens the basis for site selection decisions to reflect contemporary practice, and ensures environmental, technical and economic considerations are identified and appraised at each stage of the site selection process.

The guidance sets out the SSEN Transmission approach to selecting new electricity transmission substation sites. It also covers requirements to extend existing substation sites. This document helps SSEN Transmission to meet its obligations under Schedule 9 of the Electricity Act 1989, which requires transmission licence holders:

- to have a regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interests; and
- to do what they reasonably can to mitigate any effect that the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects.

The guidance develops a process which aims to balance these environmental considerations with technical and economic considerations throughout the site selection process.

The guidance splits a project into four stages, as follows:

- Pre-Site Selection Activities: Selection of proposed substation option (summarised in section 2.3 of this document);
- Stage 1: Initial Site Screening;
- Stage 2: Detailed Site Selection; and
- Post-Site Selection Activities Consenting Process.

The stages that are carried out can vary depending on the type, nature of and size of a project and consultation is carried out at each Stage of the process. The project is currently at Stage 2: Detailed Site Selection.

### 7.2 Stages of the Methodology

The key stages summarised above, have been undertaken for this project as follows:

#### 7.2.1 Pre-Site Selection Activities

The starting point in all substation projects is to establish the need for the project and to select the favoured strategic option to deliver it.

#### 7.2.2 Stage 1 – Initial Site Screening

This stage seeks to identify technically feasible, economically viable and environmentally acceptable site options within a defined area. The site options appraisal would be informed by input from the SSEN Transmission 'Suitability Multi-Criteria Analysis' (MCA), Geographic Information System (GIS) tool, site walkover and field reconnaissance, and further desk study information.

In line with Stage 1, an assessment of five substation options was undertaken. Options 1 and 2 were considered preferable due to slightly more favourable hydrological conditions. The engineering appraisal identified that only Options 1 and 3 are feasible. This is because the extension requires a close connection to the existing busbar sets which are adjacent to Options 1 and 3.

The preferred solution was therefore to extend Knocknagael Substation into both Options 1 and 3 to meet SSEN's connection requirements.

Engineering therefore identified four 'micro options' within Option 1 and four 'micro options' within Option 3 to be taken through to Stage 2 – Detailed Site Selection.

### 7.2.3 Stage 2 – Detailed Site Selection

This project is currently at the detailed site selection stage and seeks to identify a preferred substation site. This study has involved the following four key tasks;

- Identification of the baseline situation;
- Identification of alternative substation options;
- Environmental analysis of substation options; and
- Identification of a preferred substation option.

## 7.3 Area of Search

The area of search is on the periphery of the existing Knocknagael substation due to the need for the connection directly into the substation.

## 7.4 Baseline Conditions

The following information sources have informed the desk based baseline study to identify potential environmental constraints within and adjacent to the sites:

- Identification of environmental designated sites and other constraints, utilising GIS datasets available via Nature Scot Site Link and other sources. These include:
  - Special Areas of Conservation (SAC);
  - Special Protection Areas (SPA);
  - Proposed Special Protection Areas (pSPA);
  - Sites of Special Scientific Interest (SSSI);
  - National Scenic Area (NSA);
  - Wild Land Areas (WLA);
  - Royal Society for the Protection of Birds (RSPB) reserves;
  - Land capability for agriculture;
  - Geological Conservation Review Sites;
  - Carbon-rich soil, deep peat and priority peatland habitats; and
  - Areas at risk of flooding (SEPA flood map<sup>4</sup>).
- Identification of archaeological designations and other recorded sites, utilising GIS datasets available via Historic Environment Scotland Data Services and Local Historic Environment Teams. These include:
  - World Heritage Sites (WHS) and buffers;
  - Scheduled Monuments;
  - Category A, B and C listed buildings; and
  - Gardens and Designed Landscapes (GDL).
- Review of the Highland Wide Local Development Plan (2012) to identify local policies and further environmental constraints and opportunities, such as Local Nature Conservation Sites (LNCS), core paths or other locations important to the public;
- Review of landscape character assessments of relevance to the Study Area;

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(4) <http://map.sepa.org.uk/floodmap/map.htm>

- Review of Ordnance Survey (OS) mapping (1:50,000 and 1:25,000 and online GIS data sources from OS OpenData) and aerial photography (where available) to identify other potential constraints such as settlement, properties, walking routes, cycling routes etc.;
- Extrapolation of OS Vectormap GIS data to identify further environmental constraint including locations of watercourses and waterbodies, roads classifications and degree of slope; and
- Review of other local information through online and published media such as tourism sites.

## 7.5 Site Identification and Selection Methods

Eight sites have been appraised based on SSEN Transmission guidance; Substation Site Selection Procedures for Voltages at or above 132 kV. This includes Annex A; Holford Rules: Supplementary Notes of the Siting of Substations. The following considerations have been taken into account during site selection:

- Respect areas of high amenity value and take advantage of the containment of natural features such as woodland, fitting in with the landscape character of the area;
- Take advantage of ground form with the appropriate use of site layout and levels to avoid intrusion into surrounding areas;
- Use space effectively to limit the area required for development, minimising the effects on existing land use and rights of way;
- Alternative designs of substations may also be considered, e.g., 'enclosed', rather than 'open', where additional cost can be justified;
- Consider the relationship of towers and substation structures with background and foreground features, to reduce the prominence of structures from main viewpoints; and
- When siting substations take account of the effects of line connections that will need to be made.

## 7.6 Appraisal Method

### 7.6.1 Environmental

Appraisal of site options has involved systematic consideration against the following environmental topic areas:

- Natural Heritage - Designations, Protected Species, Habitats, Ornithology and Geology, Hydrology and Hydrogeology;
- Cultural Heritage - Designations and Cultural Heritage Assets;
- People – Settlements, Visual and Physical Effects;
- Landscape - Designations and Character; and
- Land Use - Agriculture, Forestry and Recreation).

Environmental sensitivity has been considered qualitatively, based on professional judgement and utilising the red, amber, green (RAG) rating. It has been applied to each topic area indicating potential impacts.

### 7.6.2 Engineering

Appraisal of site options has involved systematic consideration against the following engineering topic areas:

- Connectivity - Connection Feasibility, Outages, Extension Feasibility, Network Interfaces and LVAC Supplies;
- Footprint Requirements - Technology Solution, Adjacent Land Use and Space Availability;
- Hazards - Unique Hazards and Existing Utility Diversions;
- Ground Conditions - Topography, Superficial Deposits and Geology;
- Environmental Conditions - Elevation, Salt Pollution, Flooding, Carbon Footprint, SF6 Gas and Contaminated Land and Noise;
- Construction Access - Construction Access and Transformer Delivery Route; and



## 8. DESCRIPTION OF SITE OPTIONS

### 8.1 Identification of Site Options

In reference to Section 7.2.2, the micro-options in Substation Option 1 are referred to as options north-west (NW) 1, 2, 3 and 4. The micro-options identified in Substation Option 3 are referred to as options south-east (SE) 1, 2, 3 and 4. A micro-option from both the NW and SE sites will be required.

### 8.2 NW

#### 8.2.1 Option NW1

Extend the existing busbars parallel to their current orientation and build a new bus coupler. This would be on newly levelled ground on the opposite side of the access road within the current substation site. The extension would be at a high level to transition across the access road and would therefore allow a new bay to be constructed where the bus coupler is currently located.

#### 8.2.2 Option NW2

Move the access road to reduce the earthworks required. This allows the new bus coupler to be constructed directly beside the new bay, reducing the overall footprint of the substation site. The platform for the extension would be created and the access road diverted to run alongside the new fence line. The new bus coupler would then be constructed in place of the old access road and the main and reserve busbars would be extended across.

#### 8.2.3 Option NW3

Creation of a new “U-shaped” bus-coupler on the opposite side of the access road. This would allow the possibility of future extensions to the substation given the anticipated number of future connections required within SSEN Transmission’s network area.

#### 8.2.4 Option NW4

Creation of a new “U-shaped” bus-coupler and two additional bays in the footprint of the existing 275 kV Knocknagael – Tomatin Connection Bay. No previous options can avoid the rerouting of the 275 kV Knocknagael – Tomatin Connection therefore if an outage is required, this could potentially be utilised to improve the capabilities of the circuit.

### 8.3 SE

#### 8.3.1 Option SE1

Creation of a new bus-coupler on the opposite side of the existing access road. The main and reserve busbars would then be extended across the road at high level and drop down, connecting into the new bus-coupler. The existing bus coupler would then be deconstructed, and the location used for the creation of a new bay.

#### 8.3.2 Option SE2

Extend the main and reserve busbars further east to both avoid abutting into the 275 kV Knocknagael – Tomatin Connection Compound and reduce the overall earthworks required. A new bus coupler and bay would be created to the east of the site. The existing bus coupler would then be deconstructed, and the area used to transition the main and reserve busbars across the road, at high level, to connect into the new bay and bus-coupler.

### 8.3.3 Option SE3

Creation of a new “U-shaped” bus-coupler, at an angle to the existing substation, to allow for the 275 kV Knocknagael – Tomatin Connection Compound. The existing bus coupler would then be deconstructed, and the space used to extend the main and reserve busbars across to connect across the access road.

### 8.3.4 Option SE4

The repurpose of an existing bay into a “U-shaped” bus-coupler to create more efficient connection arrangements exist in light of the need for additional bays. This would require a prolonged outage on the Beaulieu 2 circuit.

The options are illustrated in **Appendix C and D**.

## 9. COMPARATIVE APPRAISAL OF SITE OPTIONS

### 9.1 NW

#### 9.1.1 Environmental

From an environmental perspective, there are no significant differentiators between Options NW1, NW2, NW3 and NW4. However, all the options will require the removal of broadleaved deciduous woodland and scattered scrub that contain habitat to support breeding birds. Option NW2 presents the smallest footprint extension and smallest extension into the aforementioned woodland and scrub area. A forestry survey of the woodland is to be undertaken in January 2023. The outcomes of the survey will be taken forward to the next stage (consenting process). there are no known non-designated assets within the Proposed Development area. There are seven known non-designated (Canmore database) assets within 250m of the Proposed Development area. Given the nature of the known archaeological remains in the wider area there is the potential for currently unknown buried archaeology to be encountered during works. As the significance of the potential buried archaeological remains cannot be assessed, the possibility remains that the significance may range from low to high.

**Table 9.1: NW RAG Impact Rating Summary**

Route	RAG Impact Rating - Environmental														
	Natural Heritage					Cultural Heritage		People	Landscape and Visual			Land Use			Planning
	Designations	Protected Species	Habitats	Ornithology	Hydrology/geology	Designations	Cultural Heritage Assets	Proximity to Dwellings	Designations	Character	Visual	Agriculture	Forestry	Recreation	Policy
Option NW1	L	L	L	L	L	M	L	L	L	L	L	L	L	L	L
Option NW2	L	L	L	L	L	M	L	L	L	L	L	L	L	L	L
Option NW3	L	L	L	L	L	M	L	L	L	L	L	L	L	L	L
Option NW4	L	L	L	L	L	M	L	L	L	L	L	L	L	L	L

#### 9.1.2 Engineering

The earthworks required to facilitate these four options are very similar and for all of the options, the existing ground levels will need to be raised to match the existing platform levels. The main challenge in this area is the existing cable running on the north-west of the existing site. Raising the ground for a new platform would create too much cover above the cable and so it will most likely have to be moved away from the new platform.

The access track to the sustainable urban drainage system (SuDS) pond lies on the north-west side of the existing substation and runs through the area where the new platform will be constructed. As accessing the SuDS Pond will be the only use for the track, the best option would be to move the track west or to a new route entirely.

**Table 9.2: NW RAG Impact Rating Summary**

Option	RAG Impact Rating - Engineering																						
	Connectivity					Footprint Requirements			Hazards		Ground Conditions			Environmental Conditions							Construction Access		O & M
	Connection Feasibility	Outages	Extension Feasibility	Network Interfaces	LVAC Supplies	Technology Solution	Adjacent Land Use	Space Availability	Unique Hazards	Existing Utility Diversions	Topography	Superficial Deposits	Geology	Elevation	Salt Pollution	Flooding	Carbon Footprint	SF6 Gas	Contaminated Land	Noise	Construction Access	Transformer Deliv. Route	Access O&M
Option NW1	L	M	H	M	L	M	L	M	M	M	L	L	L	M	L	L	L	L	L	M	L	L	L
Option NW2	L	M	H	M	L	M	L	M	M	M	L	L	L	M	L	L	L	L	L	M	L	M	L
Option NW3	L	M	M	M	L	M	L	M	M	M	M	L	L	M	L	L	L	L	L	M	L	L	L
Option NW4	L	H	M	H	L	L	L	L	M	M	M	L	L	M	L	L	L	L	L	M	L	L	L

## 9.2 SE

### 9.2.1 Environmental

From an environmental perspective, there are no significant differentiators between Options SE1, SE2, SE3 and SE4. For all four options there is a low to medium potential for GWDTE. This was previously assessed in the RAG impact ratings under hydrology/geology but in accordance with the 'DRAFT Substation Site Selection Procedures for Voltages at or above 132kV' is listed in Table 5.2 under habitats. The BNG appraisal previously identified the potential for blanket bog to the south-east of the site, a habitat which if classified as moderate condition or above is considered as irreplaceable habitat. However, following the Phase 1 habitat survey in June 2022 it was determined that blanket bog is not present within 250 m of these options. There are four known non-designated (Canmore database) assets within 250m of the Proposed Development area. Given the nature of the known archaeological remains in the wider area there is the potential for currently unknown buried archaeology to be encountered during works. As the significance of the potential buried archaeological remains cannot be assessed, the possibility remains that the significance may range from low to high.

Option SE1 presents the smallest footprint extension and therefore it is likely to present the least disturbance to the environment.



**Table 9.4: SE RAG Impact Rating Summary**

Route	RAG Impact Rating - Environmental														
	Natural Heritage					Cultural Heritage		People	Landscape and Visual			Land Use			Planning
	Designations	Protected Species	Habitats	Ornithology	Hydrology/geology	Designations	Cultural Heritage Assets	Proximity to Dwellings	Designations	Character	Visual	Agriculture	Forestry	Recreation	Policy
Option SE1	L	L	M	L	L	M	L	L	L	L	L	L	L	L	L
Option SE2	L	L	M	L	L	M	L	L	L	L	L	L	L	L	L
Option SE3	L	L	M	L	L	M	L	L	L	L	L	L	L	L	L
Option SE4	L	L	M	L	L	M	L	L	L	L	L	L	L	L	L

From a BNG perspective, Options SE1, SE2, SE3 or SE4 are the preferred options. Options SE1, SE2, SE3 and SE4 were previously assessed as potentially containing blanket bog. Following survey in June 2022 however, it was confirmed these habitats were not present. Options NW1, NW2, NW3 and NW4 contain deciduous woodland and the loss if these is more impactful from a BNG perspective.

### 9.2.2 Engineering

Option SE1 assumes that the additional electrical equipment continues parallel from the current arrangement. One major concern with this option is that there is insufficient space to slope the earthworks. A 1 in 3 slope has been assumed for the embankment but this would be subject to further stability analysis if this approach was continued to the next stage. To deal with the space constraint, a large retaining wall to support the soil between the platform and the existing Tomatin compound could be used instead of a sloped embankment. However, the proximity of the existing Tomatin compound would impose a large surcharge on the surroundings, both in terms of the existing structure but also loading from vehicles or equipment deliveries. These would have to be accounted for in the design process of the retaining wall and would add to the design and size requirements.

Options SE2 and SE3 both take the extension further from the Tomatin compound. Therefore, this option would require the ground to be lowered and slope to be constructed up to the higher ground level.

**Table 9.5: SE RAG Impact Rating Summary**

Option	RAG Impact Rating - Engineering																						
	Connectivity					Footprint Requirements			Hazards		Ground Conditions			Environmental Conditions						Construction Access		O & M	
	Connection Feasibility	Outages	Extension Feasibility	Network Interfaces	LVAC Supplies	Technology Solution	Adjacent Land Use	Space Availability	Unique Hazards	Existing Utility Diversions	Topography	Superficial Deposits	Geology	Elevation	Salt Pollution	Flooding	Carbon Footprint	SF6 Gas	Contaminated Land	Noise	Construction Access	Transformer Deliv. Route	Access O&M
Option SE1	M	L	H	L	L	M	L	L	L	L	H	L	L	M	L	L	L	L	L	M	L	L	L
Option SE2	L	M	M	M	L	M	L	M	L	M	L	L	L	M	L	L	L	L	L	M	L	M	L
Option SE3	L	M	L	M	L	M	L	M	L	M	L	L	L	M	L	L	L	L	L	M	L	M	L
Option SE4	M	H	H	H	L	M	L	L	L	L	H	L	L	M	L	L	L	L	L	M	L	L	L

## 10. SELECTION OF PREFERRED SITE OPTIONS

From an environmental perspective, there are no significant differentiators between Options NW1, NW2, NW3 and NW4 however based on the smallest proposed footprint, Option NW2 is the preferred micro-option within the Option 1 area. There are no significant differentiators between Options SE1, SE2, SE3 and SE4 however based on the smallest proposed footprint, Option SE1 is the preferred micro-option within the Option 3 area.

From an engineering perspective, although Options NW1 and NW4 scored more green ratings, Option NW3 has significantly fewer drawbacks in terms of future extension and outage requirements. Option SE3 has the most benefits, a readily extendable site in a preferable area of land and a retaining wall would not be required.

Overall, the preferred site options to progress are NW3 and SE3.

## 11. CONSULTATION ON THE PROPOSALS

### 11.1 Questions for Consideration by Consultees

SSEN Transmission places great importance on, and is committed to, consultation and engagement with all parties and stakeholders likely to have an interest in proposals for new projects. Stakeholder consultation is an essential part of an effective development process.

The proposals detailed in this report have been developed through environmental and technical analysis of various route and site options. The potential for environmental effects remains and further assessment and design will be important in giving detailed consideration to the development and integration of mitigation measures to address environmental effects identified.

When providing comment and feedback, SSEN Transmission would be grateful for your consideration of the questions below:

- Have we adequately explained the need for this Project?
- Do you feel sufficient information has been provided to enable you to understand what is being proposed on and why?
- Are you satisfied that our approach taken to select our preferred UGC alignment and Knocknagael Substation extension options have been adequately explained?
- Do you agree with our preferred alignment, if not, why?
- Are there any factors, or environmental features, that you consider may have been overlooked during the preferred UGC alignment and substation extension process?
- Do you have any particular concerns or queries on the proposed connection project?
- Do you have any other comments (positive or negative) or concerns in relation to the need for the project, the transmission infrastructure requirements or about the preferred UGC route and substation extension option?

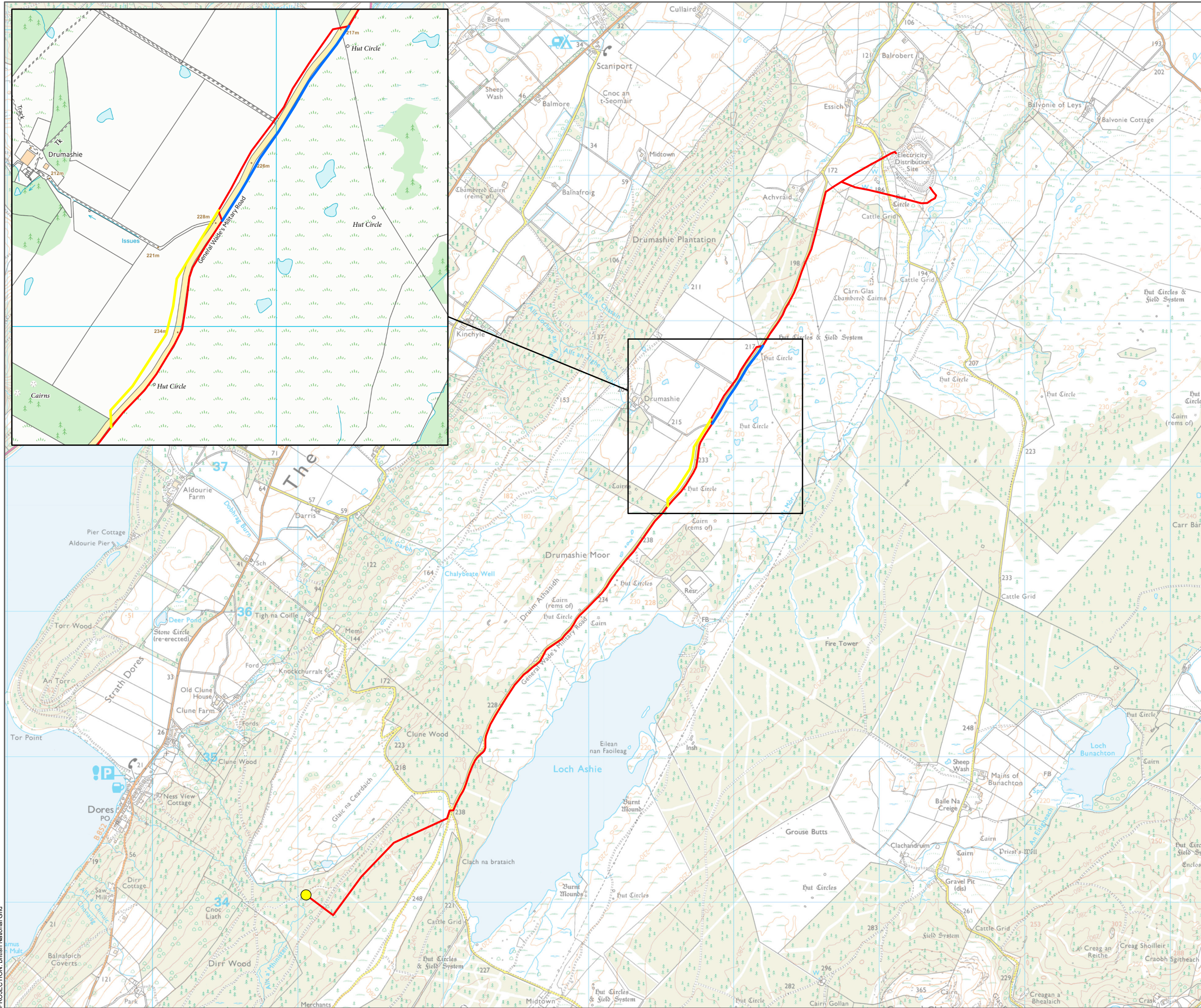
### 11.2 Next Steps

A consultation event was held on 7th December 2022 at Green Drive Hall, Inverness between 14:00 and 19:00 setting out the preferred alignment and substation extension options. An initial public consultation event was held at Lochardil House Hotel in Inverness on Thursday 28th April 2022 between 14:00 and 19:00. Meetings will be arranged with statutory and other stakeholders as the next stage of the project commences. The responses received, and those sought from statutory consultees and other key stakeholders will inform further consideration and design leading to the identification of a proposed alignment and substation extension site to take forward to the consenting stages. A further public event will be held in Spring / Summer 2023 prior to submission of the relevant planning consent application.

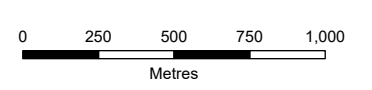
Please submit your comments to Ryan Davidson, Community Liaison Manager, Scottish Hydro Electric Transmission, 1 Waterloo Street, Glasgow, G2 6AY (ryan.davidson@sse.com). All comments are requested by 17th February 2023.

## **APPENDIX A FIGURES**





- Alignment 1
- Diversion 1
- Diversion 2
- Consented Red John PSS Switching Station



SCALE: See Scale Bar  
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 PROJECT: 0631293  
 DATE: 09/12/2022

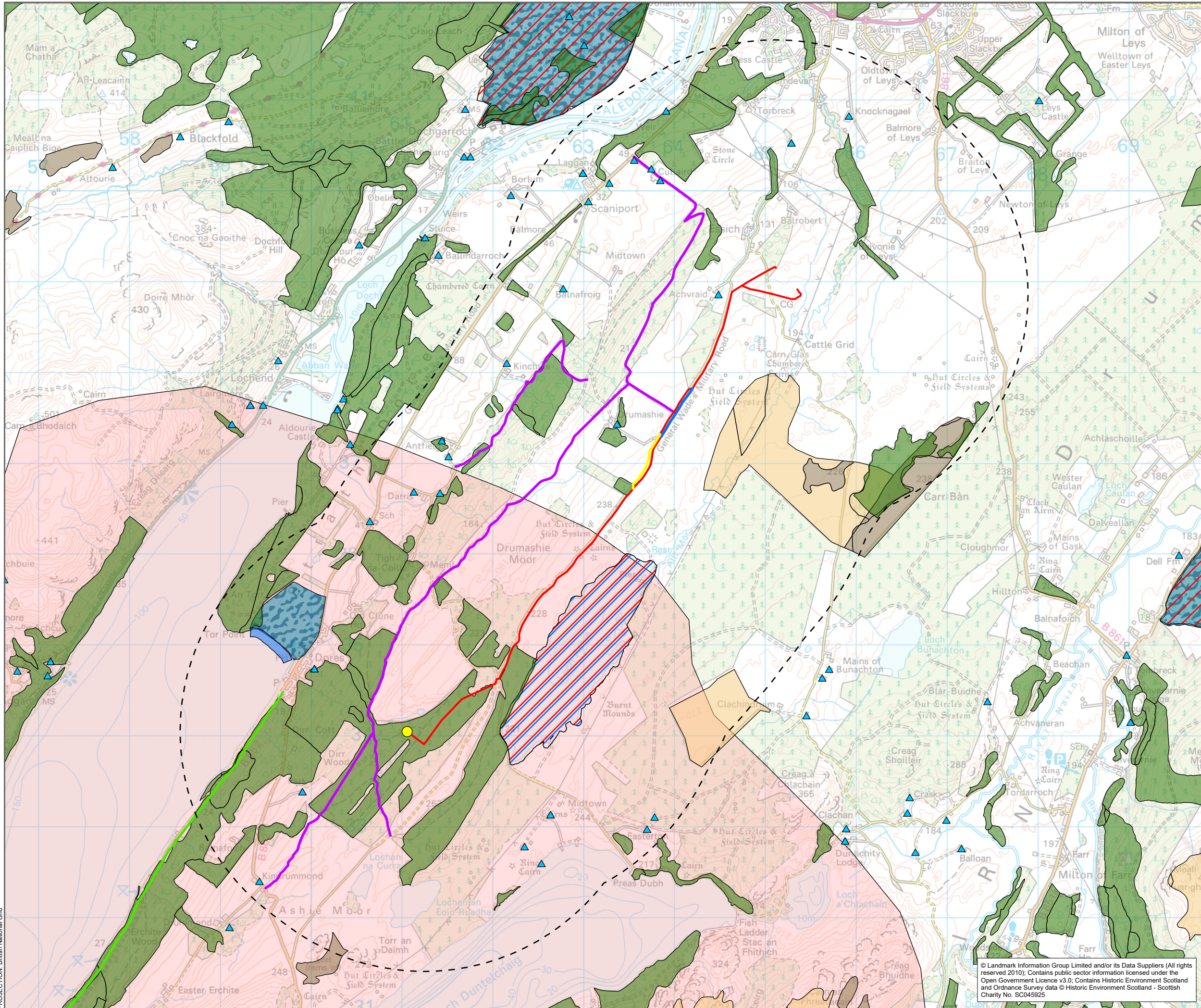
VERSION: A02  
 DRAWN: DN  
 CHECKED: ES  
 APPROVED:

**Figure 1**  
**Red John Alignment Options**

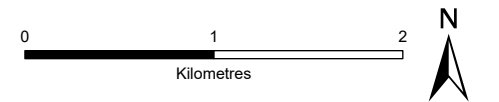


PROJECTION: British National Grid





- Alignment 1
  - Diversion 1
  - Diversion 2
  - Consented Red John PSS Switching Station
  - Study Area - 2.5 km Buffer of Alignment and Diversion
- Ecological Constraints:
- ▲ Private Water Supply
  - Core Path
  - National Cycle Network
  - Special Protection Area
  - Site of Special Scientific Interest
  - Bathing Water Site
  - Ancient Woodland
  - Class 1 Carbon and Peatland
  - Class 2 Carbon and Peatland
  - Geological Conservation Review Area
  - Special Landscape Area



SCALE: See Scale Bar	VERSION: A03
SIZE: A3	DRAWN: DN
PROJECT: 0631293	CHECKED: ES
DATE: 09/12/2022	APPROVED:

**Figure 2**  
**Red John Combined Constraints**



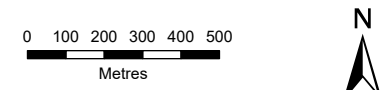
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PROJECTION: British National Grid





- Alignment 1
  - Diversion 1
  - Diversion 2
  - Target Note
- Phase 1 Habitat Classification:
- G2 - Running water
  - A1.1.1 - Broadleaved woodland - semi-natural
  - ▨ A1.1.2 - Broadleaved woodland - plantation
  - A1.2.1 - Coniferous woodland - semi-natural
  - ▨ A1.2.2 - Coniferous woodland - plantation
  - ▨ A1.3.1 - Mixed woodland - semi-natural
  - ▨ A1.3.2 - Mixed woodland - plantation
  - ▨ A2.1 - Scrub - dense/continuous
  - ▨ A2.2 - Scrub - scattered
  - ▨ A3.3 - Mixed parkland/scattered trees
  - A4.2 - Coniferous woodland - recently felled
  - ▨ B1.1 - Acid grassland - unimproved
  - ▨ B1.2 - Acid grassland - semi-improved
  - ▨ B2.2 - Neutral grassland - semi-improved
  - B4 - Improved grassland
  - ▨ B5 - Marsh/marshy grassland
  - C1.1 - Bracken - continuous
  - ▨ C1.2 - Bracken - scattered
  - ▨ D1.1 - Dry dwarf shrub heath - acid
  - ▨ D5 - Dry heath/acid grassland
  - E1.6.1 - Blanket sphagnum bog
  - G1 - Standing water
  - G1.3 - Standing water - oligotrophic
  - ▨ J1.1 - Cultivated/disturbed land - arable
  - ▨ J1.2 - Cultivated/disturbed land - amenity grassland
  - J3.6 - Buildings
  - J4 - Bare ground



SCALE: See Scale Bar	VERSION: A01
SIZE: A3	DRAWN: DN
PROJECT: 0631293	CHECKED: AN
DATE: 15/11/2022	APPROVED: CG

**Figure 3**  
**Red John Habitat Survey (June 2022)**  
**Phase 1 Habitat Classification**

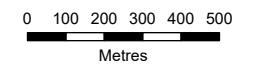
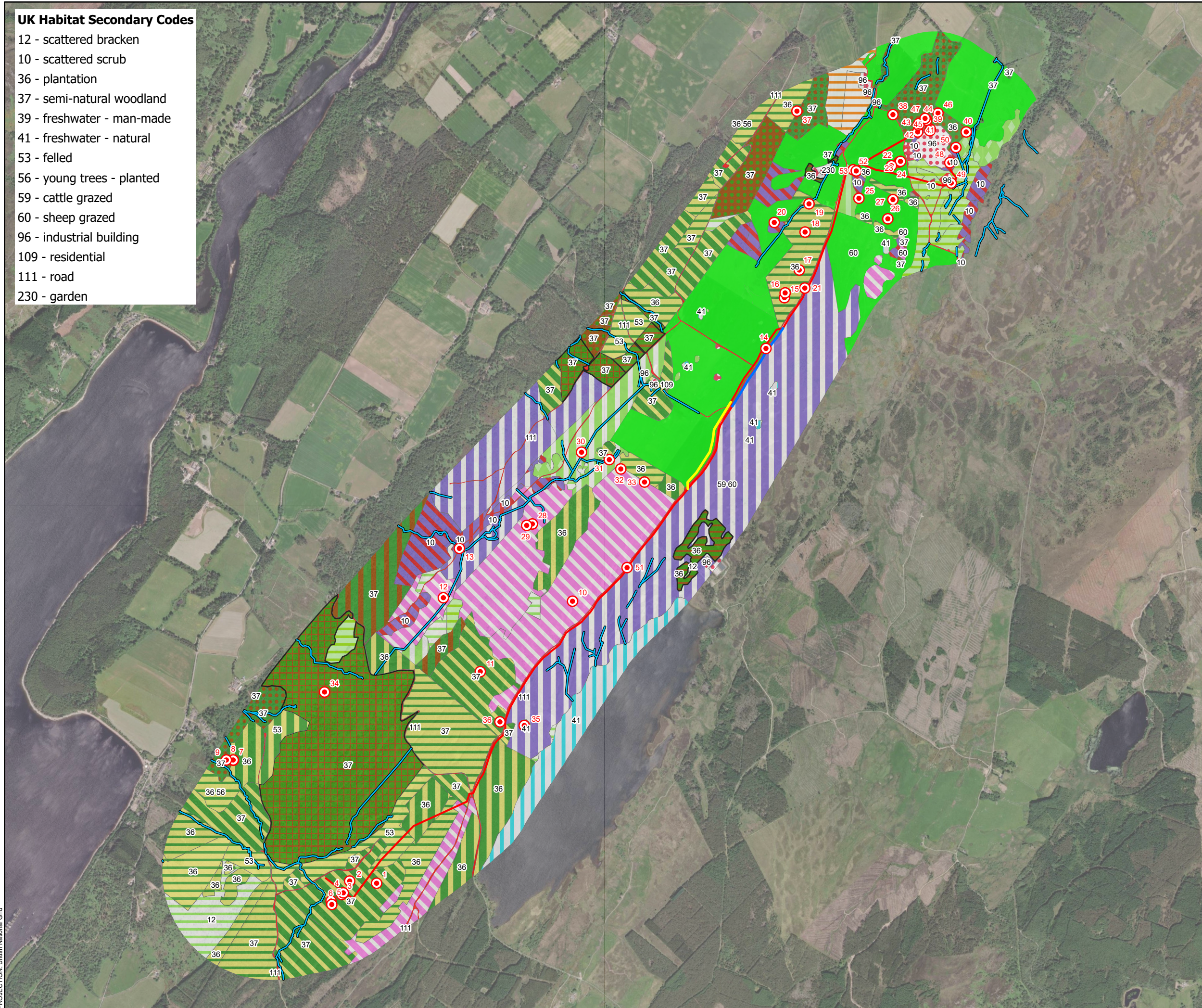




**UK Habitat Secondary Codes**

- 12 - scattered bracken
- 10 - scattered scrub
- 36 - plantation
- 37 - semi-natural woodland
- 39 - freshwater - man-made
- 41 - freshwater - natural
- 53 - felled
- 56 - young trees - planted
- 59 - cattle grazed
- 60 - sheep grazed
- 96 - industrial building
- 109 - residential
- 111 - road
- 230 - garden

- Alignment 1
  - Diversion 1
  - Diversion 2
  - Target Note
- UK Habitat Classification:
- r2 - rivers and streams
  - c1c - cereal crops
  - f1a - blanket bog
  - g1b - upland acid grassland
  - g1c - bracken
  - g3b - upland hay meadows
  - g3c - other neutral grassland
  - g3c6 - Lolium-Cynosurus neutral grassland
  - g3c8 - Holcus-Juncus neutral grassland
  - g4 - modified grassland
  - h1b - upland heathland
  - h3e - gorse scrub
  - h3h - mixed scrub
  - r1c - oligotrophic and dystrophic lakes
  - u1b - developed land, sealed surface
  - u1b5 - buildings
  - u1c - artificial unvegetated unsealed surface
  - u1d - suburban mosaic of developed/natural surfaces
  - u1e - built linear features
  - w1e - upland birchwoods
  - w1g - other woodland, broadleaved
  - w1g6 - line of trees
  - w1h - other woodland, mixed
  - w1h5 - other woodland; mixed; mainly broadleaved
  - w1h6 - other woodland; mixed; mainly conifer
  - w2a - native pine woodlands
  - w2b - other scots pine woodland
  - w2c - other coniferous woodland



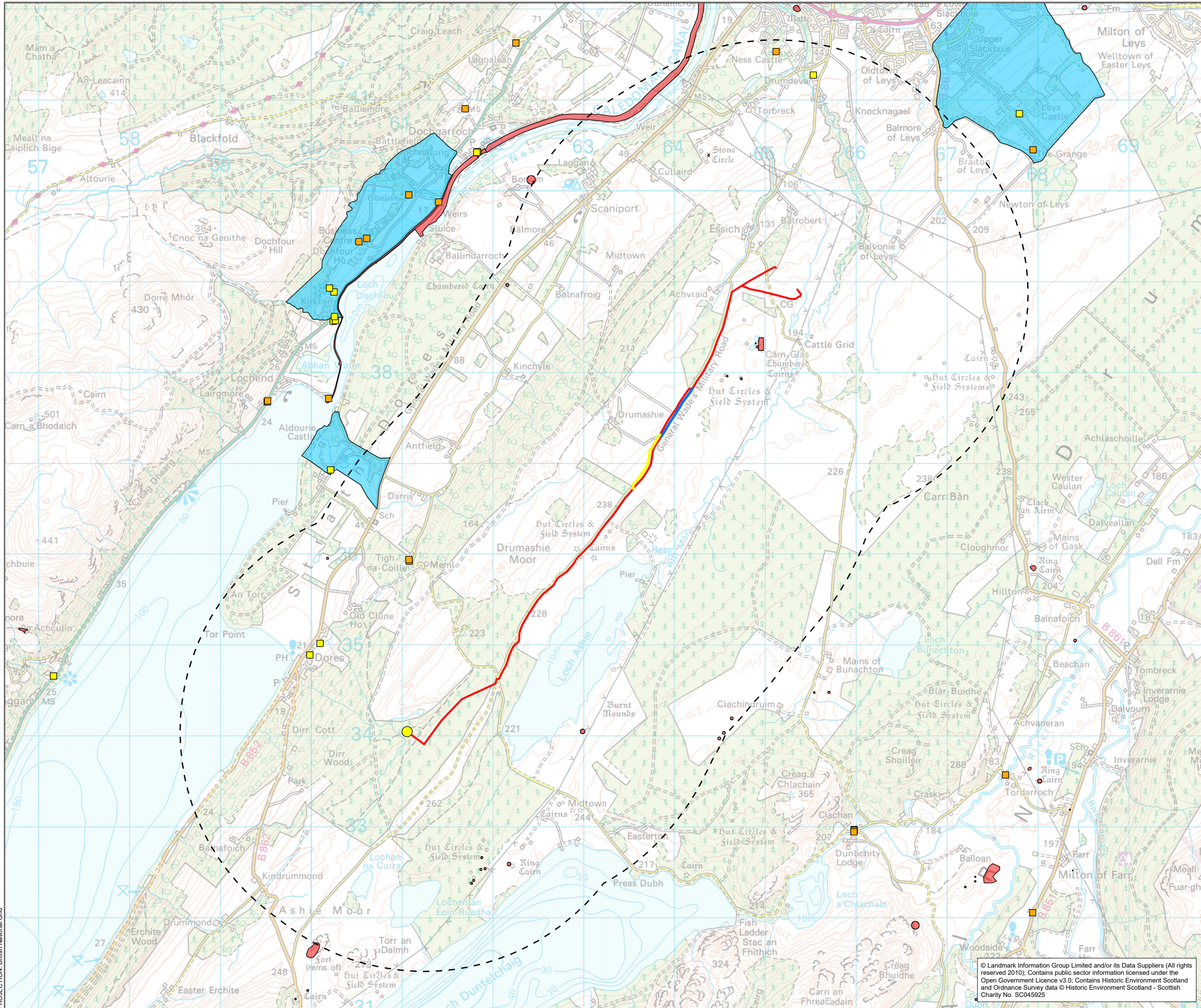
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 APPROVED: CG

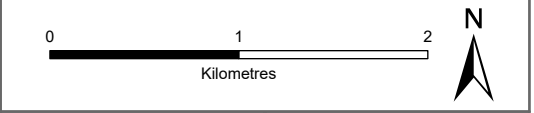
**Figure 4**  
**Red John Habitat Survey (June 2022)**  
**UK Habitat Classification**







- Alignment 1
  - Diversion 1
  - Diversion 2
  - Consented Red John PSS Switching Station
  - Study Area - 2.5 km Buffer of Alignment and Diversion
- Cultural Heritage Constraints:
- Category B Listed Building
  - Category C Listed Building
  - Scheduled Monument
  - Garden and/or Designed Landscape



SCALE: See Scale Bar	VERSION: A03
SIZE: A3	DRAWN: DN
PROJECT: 0631293	CHECKED: ES
DATE: 09/12/2022	APPROVED:

**Figure 5**  
**Red John Cultural Heritage Designations and Assets**



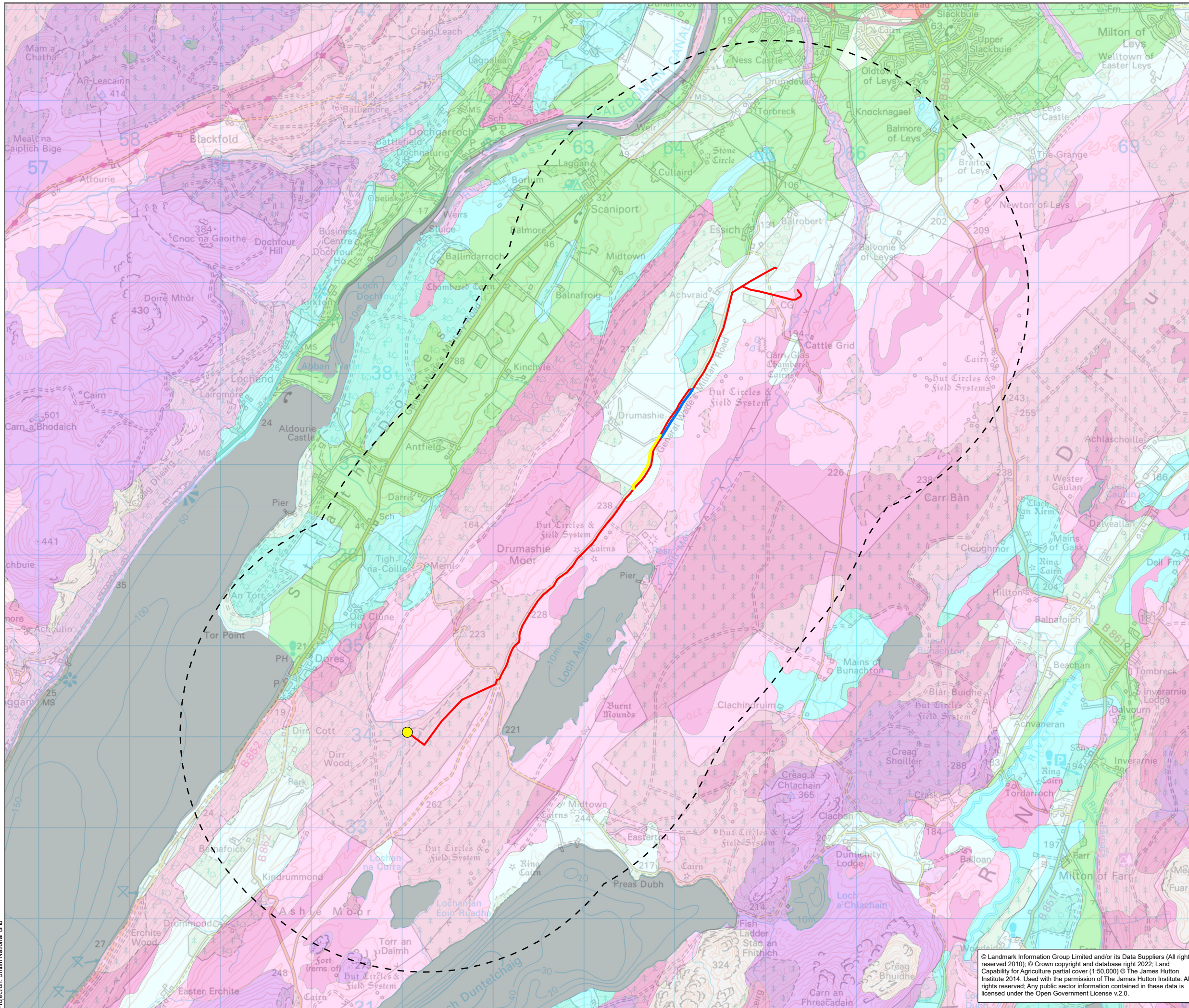
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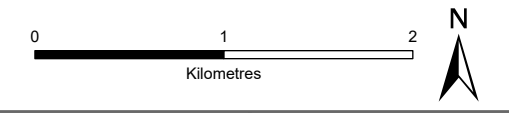
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- Alignment 1
- Diversion 1
- Diversion 2
- Consented Red John PSS Switching Station
- Study Area - 2.5 km Buffer of Alignment and Diversion
- 3.1
- 3.2
- 4.1
- 4.2
- 5.1
- 5.2
- 5.3
- 6.2
- 6.3
- 7
- Built-up area
- Inland water



SCALE: See Scale Bar	VERSION: A02
SIZE: A3	DRAWN: DN
PROJECT: 0631293	CHECKED: ES
DATE: 09/12/2022	APPROVED: KG

**Figure 6**  
**Red John Land Capability for Agriculture**

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Projection: British National Grid



## **APPENDIX B ARCHAEOLOGICAL WALKOVER SURVEY**

264000 264200 264400 264600 264800 265000 265200 265400 265600

N

Asset No.	Type	Asset No.	Type
2	Other	1	Hut circle
17	Other	3	Hut circle
21	Wall	4	Hut circle
22	Hut circle	5	Structure
23	Hut circle	6	Farmstead
24	Clearance Cairn	7	Enclosure
25	Dyke	8	Structure
26	Hut circle	18	Bank
27	Hut circle	19	Clearance Cairn
28	Cairn	20	Dyke
29	Hut circle		
30	Hut circle		
33	Hut circle		

Achvraid

Achvraid House

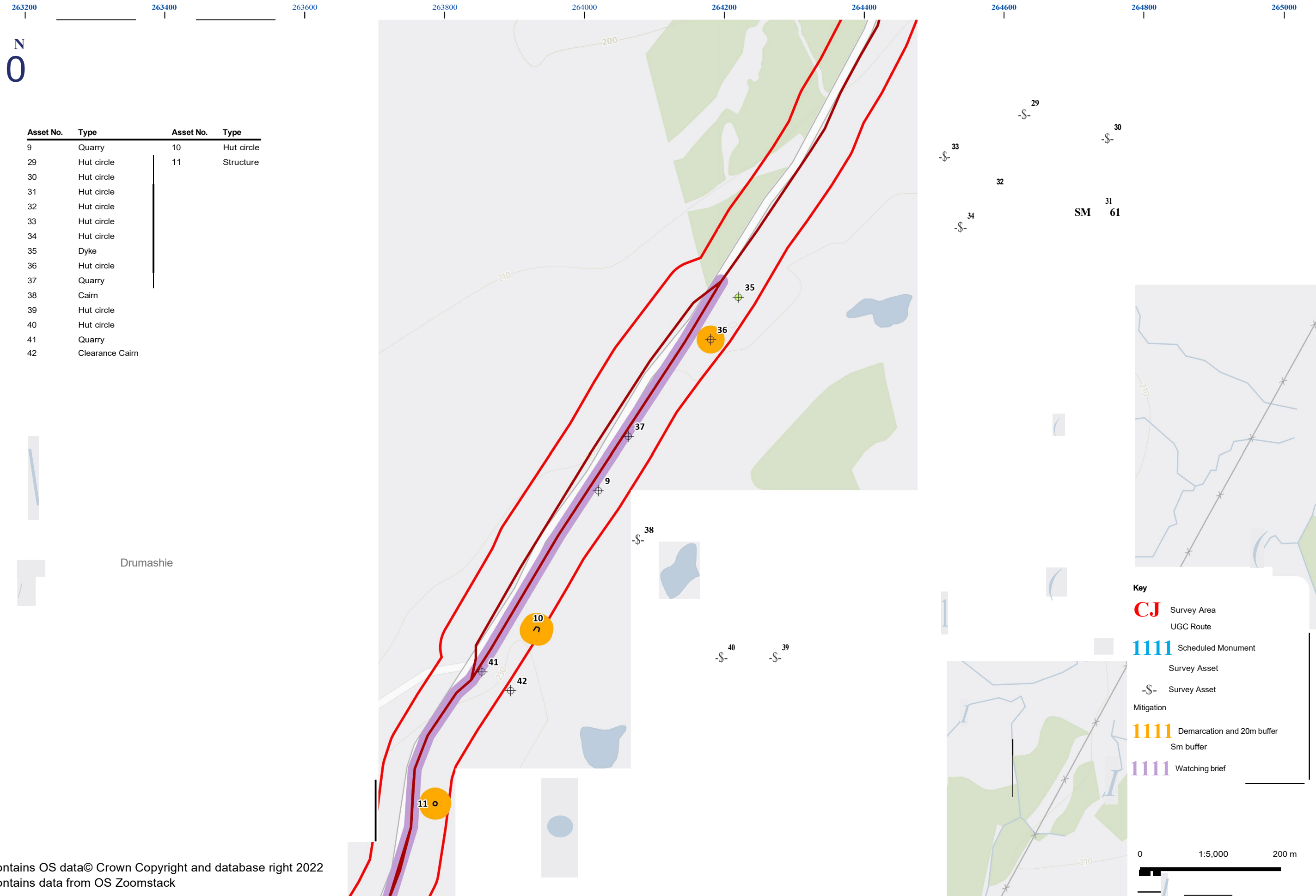
Key

- c:J** Survey Area
- UGC Route
- 1111** Scheduled Monument
- Survey Asset
- S- Survey Asset
- Mitigation
- 1111** Demarcation and micrositing
- 1111** Demarcation and 20m buffer
- 10m buffer
- 5m buffer
- 1111 Watching brief

0 1:5,000 200 m

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Figure 2: Survey results Knocknagael to Achvraid



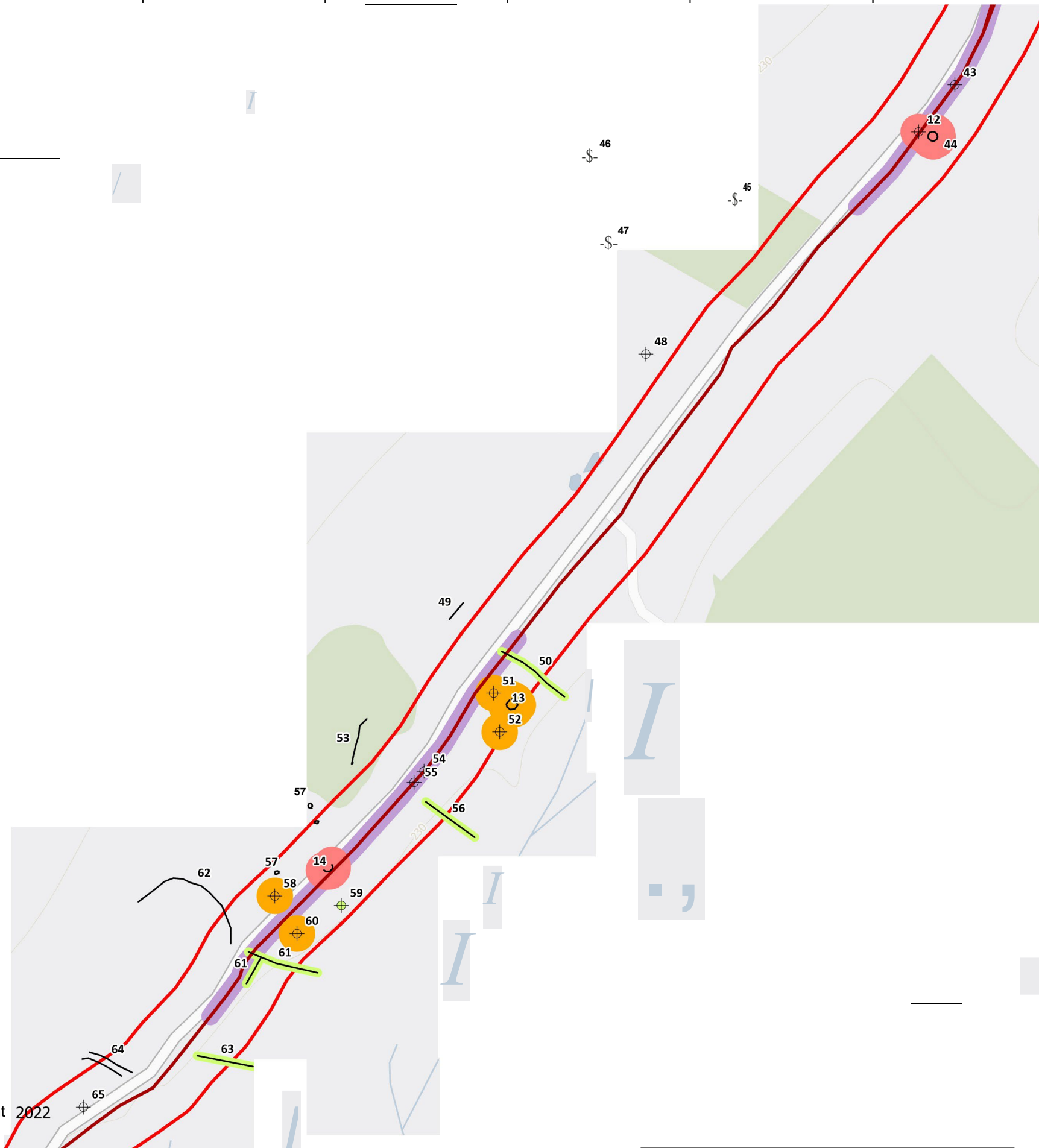
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Figure 3: Survey results Achvraid to Drumashie

262200 262400 262600 262800 263000 263200 263400 263600 263800 264000

N  
0

Asset No.	Type	Asset No.	Type
12	Clearance Cairn	13	Hut circle
43	Quarry	14	Hut circle
45	Cairn	44	Hut circle
46	Cairn	49	Bank
47	Bank	50	Dyke
48	Cairn	53	Bank
51	Hut circle	56	Dyke
52	Hut circle	57	Clearance Cairn
54	Quarry	61	Dyke
55	Quarry	62	Bank
58	Cairn	63	Dyke
59	Clearance Cairn	64	Bank
60	Hut circle		
65	Quarry		



**Key**

- c:J** Survey Area
- UGC Route
- Survey Asset
- S- Survey Asset

**Mitigation**

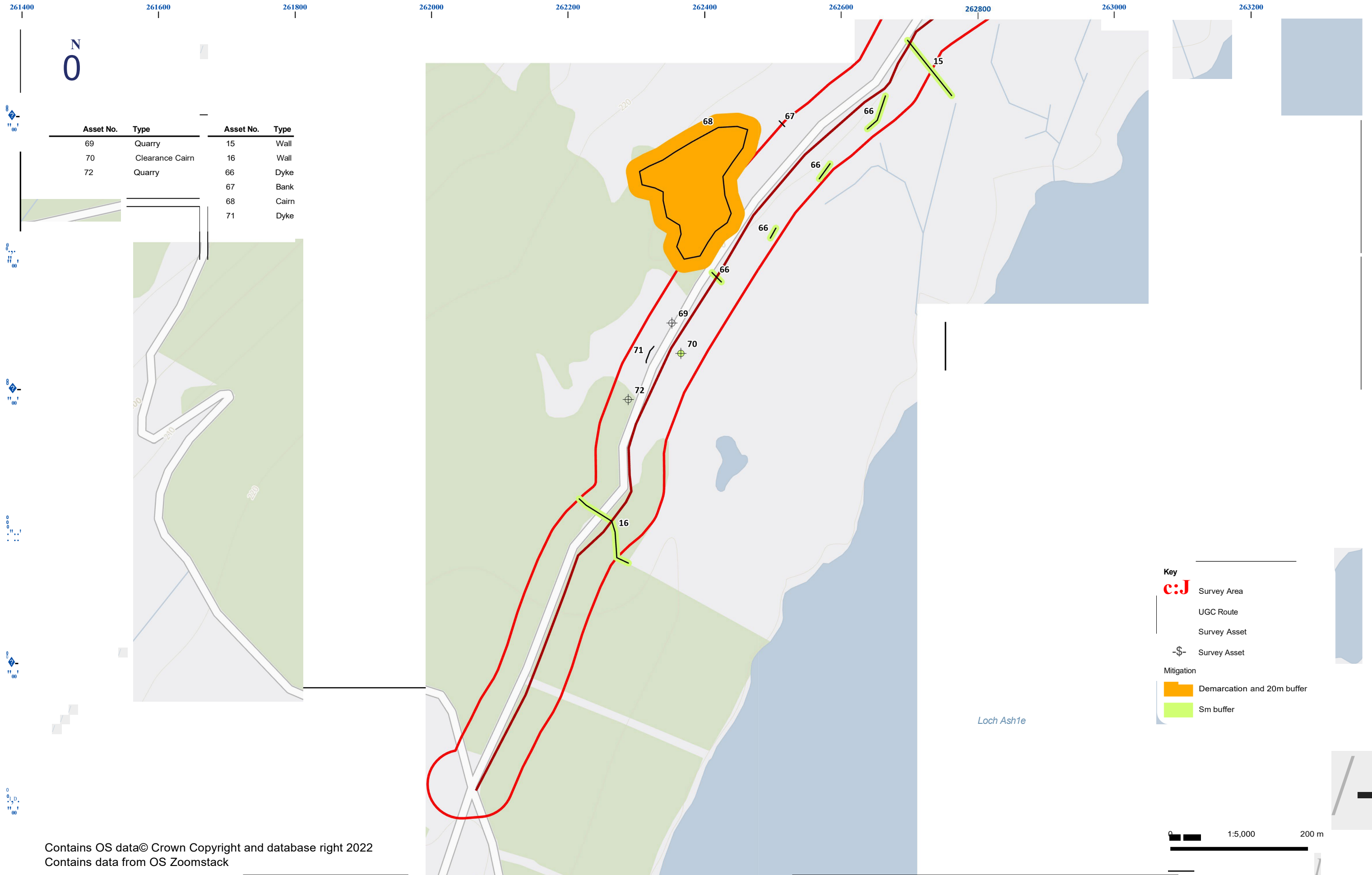
- 1111 Demarcation and micro-siting
- 1111 Demarcation and 20m buffer
- 5m buffer
- 1111 Watching

0 1:5,000 200 m

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Figure 4: Survey results Drumashie Moor





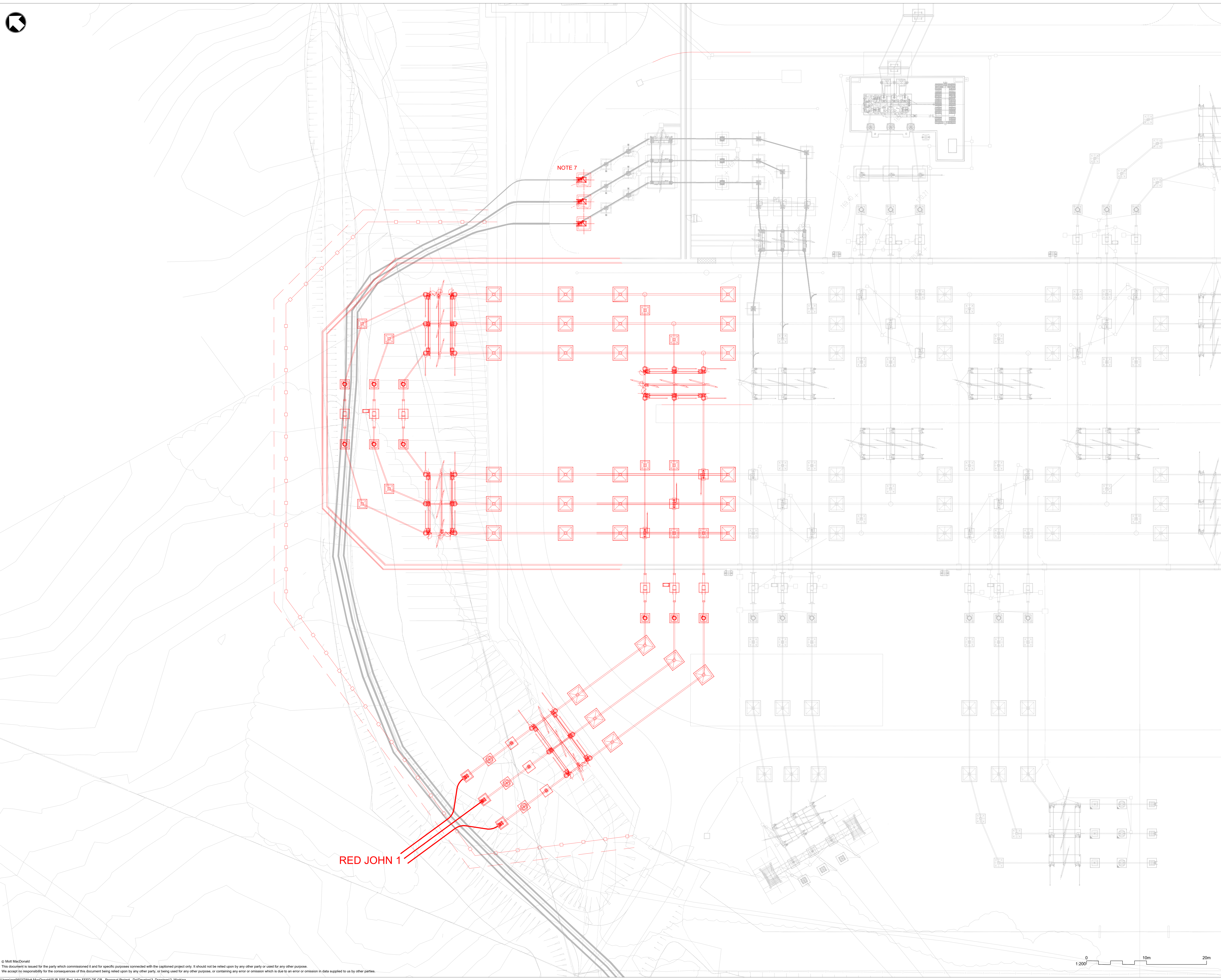
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Figure 5: Survey results Loch Ashie



## **APPENDIX C NW SUBSTATION OPTIONS**





- Notes
1. ALL EXISTING INFORMATION BASED ON DRAWING NS7\_1110\_1001\_01\_05 (KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES).
  2. KNOCKNAGAE OPTION DRAWINGS SHOULD BE TREATED AS INDICATIVE ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
  3. EQUIPMENT CLEARANCES TO BE VERIFIED DURING DESIGN DEVELOPMENT ONCE NATIVE AS BUILT FILES BECOME AVAILABLE.
  4. KNOCKNAGAE SUBSTATION RATING 275kV 4000A 40KA 1s.
  5. ALL SURVEY INFORMATION IS REFERENCED TO ORDNANCE SURVEY NATIONAL GRID OSGB36.
  6. SUBSTATION COMPOUND TO BE EXTENDED TO ACCOMMODATE NEW BUSBARS AND BUS SECTIONS. CIVIL WORKS WILL BE REQUIRED TO CREATE A LEVEL GROUND AREA FOR THIS EXTENSION.
  7. TOMATIN CMA2 CABLE TO BE REROUTED PRIOR TO EXTENSION WORKS.

Key to symbols

- CT
- CVT
- SA
- CSE
- PI (LOW LEVEL)
- PI (HIGH LEVEL)

Reference Documents

NS7\_1110\_1001\_01\_05 KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES.

FOR INFORMATION

P2	08/07/22	S.P.	FOR DISCUSSION	N.F.	H.S.
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Rev Date Drawn Description Chk'd App'd

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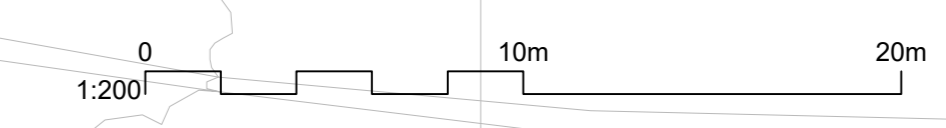
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NORTHWEST OPTION 1 (NW1)  
CONVENTIONAL BUS-COUPLER**

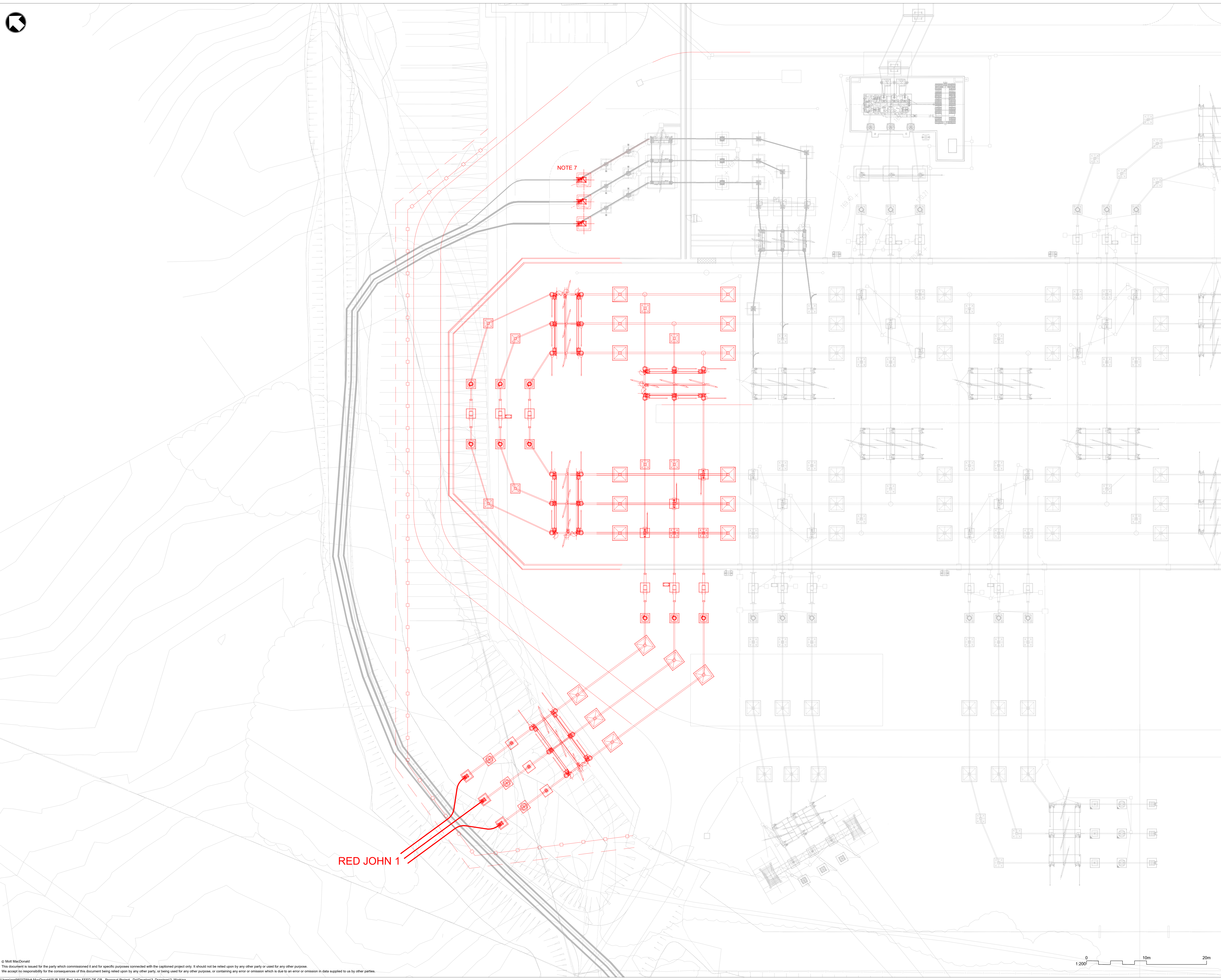
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Drawn	S.Prentice	S.P.	Coordination		
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- Notes
1. ALL EXISTING INFORMATION BASED ON DRAWING NS7\_1110\_1001\_01\_05 (KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES).
  2. KNOCKNAGAE OPTION DRAWINGS SHOULD BE TREATED AS INDICATIVE ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
  3. EQUIPMENT CLEARANCES TO BE VERIFIED DURING DESIGN DEVELOPMENT ONCE NATIVE AS BUILT FILES BECOME AVAILABLE.
  4. KNOCKNAGAE SUBSTATION RATING 275kV 4000A 40KA 1s.
  5. ALL SURVEY INFORMATION IS REFERENCED TO ORDNANCE SURVEY NATIONAL GRID OSGB36.
  6. SUBSTATION COMPOUND TO BE EXTENDED TO ACCOMMODATE NEW BUSBARS AND BUS SECTIONS. CIVIL WORKS WILL BE REQUIRED TO CREATE A LEVEL GROUND AREA FOR THIS EXTENSION.
  7. TOMATIN CMA2 CABLE TO BE PROTECTED / REROUTED AS APPROPRIATE PRIOR TO EXTENSION WORKS.

Key to symbols

- CT
- CVT
- SA
- CSE
- PI (LOW LEVEL)
- PI (HIGH LEVEL)

Reference Documents

NS7\_1110\_1001\_01\_05 KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES.

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P2	08/07/22	S.P.	FOR DISCUSSION	N.F.	H.S.
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Rev	Date	Drawn	Description	Chk'd	App'd

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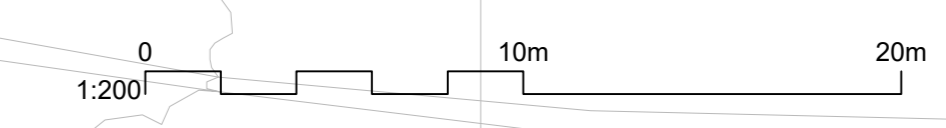
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 CONVENTIONAL BUS-COUPLER  
 NEW PERIMETER ROAD**

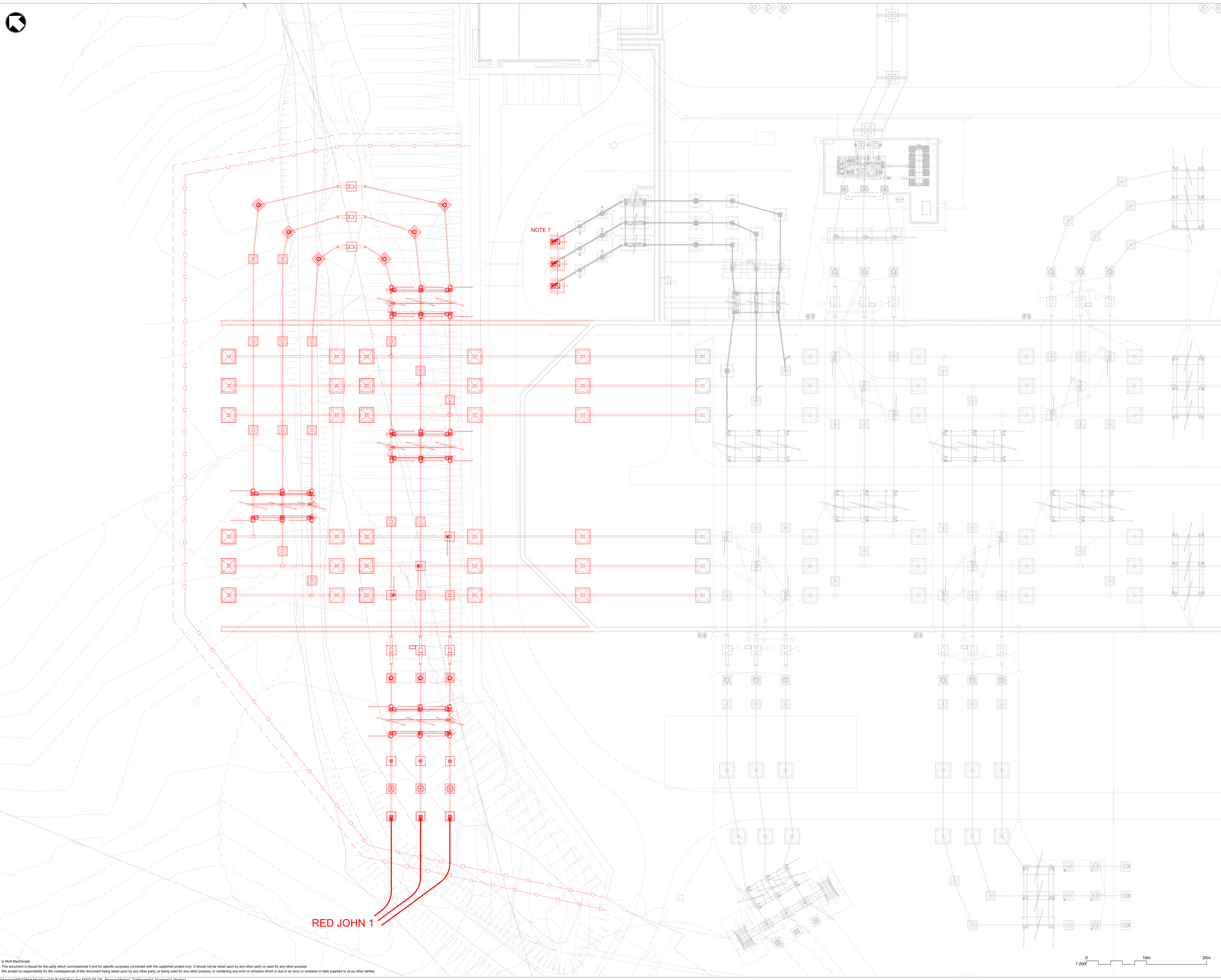
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Drawn	S.Prentice	S.P.	Coordination		
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N.T.S	PRE	P2	STD		

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- Notes
1. ALL EXISTING INFORMATION BASED ON DRAWING NS7\_1110\_1001\_01\_05 (KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES).
  2. KNOCKNAGAE OPTION DRAWINGS SHOULD BE TREATED AS INDICATIVE ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
  3. EQUIPMENT CLEARANCES TO BE VERIFIED DURING DESIGN DEVELOPMENT ONCE NATIVE AS BUILT FILES BECOME AVAILABLE.
  4. KNOCKNAGAE SUBSTATION RATING 275kV 4000A 40KA 1s.
  5. ALL SURVEY INFORMATION IS REFERENCED TO ORDNANCE SURVEY NATIONAL GRID OSGB36.
  6. SUBSTATION COMPOUND TO BE EXTENDED TO ACCOMMODATE NEW BUSBARS AND BUS SECTIONS. CIVIL WORKS WILL BE REQUIRED TO CREATE A LEVEL GROUND AREA FOR THIS EXTENSION.
  7. TOMATIN CMA2 CABLE TO BE REROUTED PRIOR TO EXTENSION WORKS.

Key to symbols

- CT
- CVT
- SA
- CSE
- PI (LOW LEVEL)
- PI (HIGH LEVEL)

Reference Documents

NS7\_1110\_1001\_01\_05 KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES.

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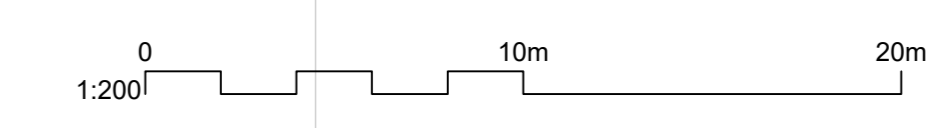
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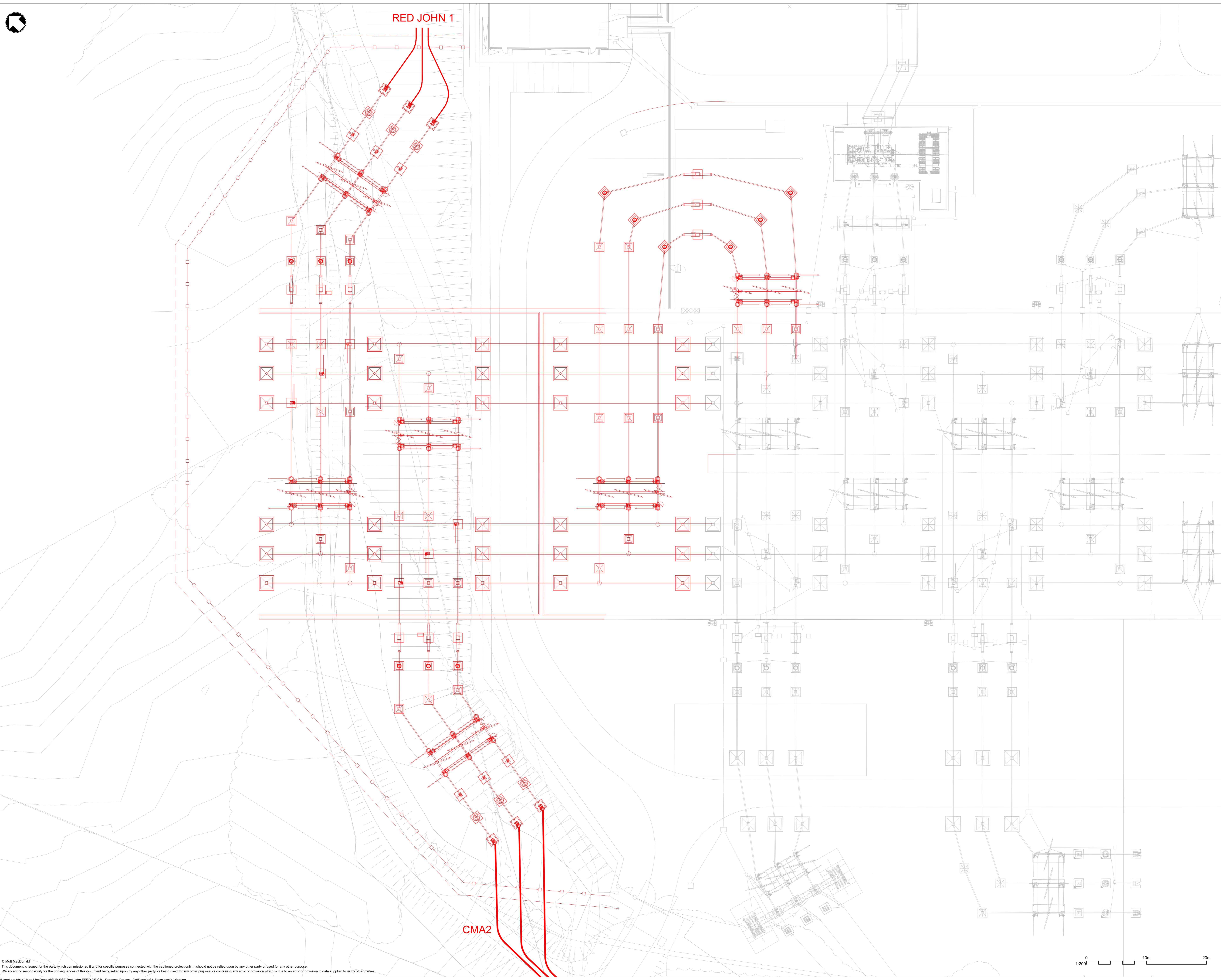
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 NORTHWEST OPTION 3 (NW3)  
 EXTENDABLE BUS COUPLER**

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Drawn	S.Prentice	S.P.	Coordination		
Dwg check	N.Ferguson	N.F.	Approved	H.Smith	H.S.
Scale at A0	Status	Rev	Security		
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Drawing Number  
**MMD-106510-E-DR-01-XX-0003**







- Notes
1. ALL EXISTING INFORMATION BASED ON DRAWING NS7\_1110\_1001\_01\_05 (KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES).
  2. KNOCKNAGAE OPTION DRAWINGS SHOULD BE TREATED AS INDICATIVE ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
  3. EQUIPMENT CLEARANCES TO BE VERIFIED DURING DESIGN DEVELOPMENT ONCE NATIVE AS BUILT FILES BECOME AVAILABLE.
  4. KNOCKNAGAE SUBSTATION RATING 275kV 4000A 40KA 1s.
  5. ALL SURVEY INFORMATION IS REFERENCED TO ORDNANCE SURVEY NATIONAL GRID OSGB36.
  6. SUBSTATION COMPOUND TO BE EXTENDED TO ACCOMMODATE NEW BUSBARS AND BUS SECTIONS. CIVIL WORKS WILL BE REQUIRED TO CREATE A LEVEL GROUND AREA FOR THIS EXTENSION.
  7. EXTENDED OUTAGE (6-12 MONTHS) REQUIRED ON TOMATIN CMA2 CABLE FOR DURATION OF EXTENSION WORKS.

Key to symbols

- CT
- CVT
- SA
- CSE
- PI (LOW LEVEL)
- PI (HIGH LEVEL)

Reference Documents

NS7\_1110\_1001\_01\_05 KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES.

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P1	15/03/22	S.P.	FIRST ISSUE FOR COMMENTS	N.F.	H.S.
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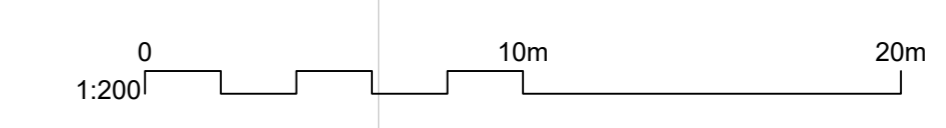
Title

**KNOCKNAGAE EXTENSION  
 NORTHWEST OPTION 4 (NW4)  
 EXTENDED OUTAGE  
 TOMATIN DIVERSION**

Designed	N.Ferguson	N.F.	Eng check	H.Smith	H.S.
Drawn	S.Prentice	S.P.	Coordination		
Dwg check	N.Ferguson	N.F.	Approved	H.Smith	H.S.
Scale at A0	N.T.S.	Status	Rev	Security	
	N.T.S.	PRE	P2	STD	

Drawing Number  
**MMD-106510-E-DR-01-XX-0004**

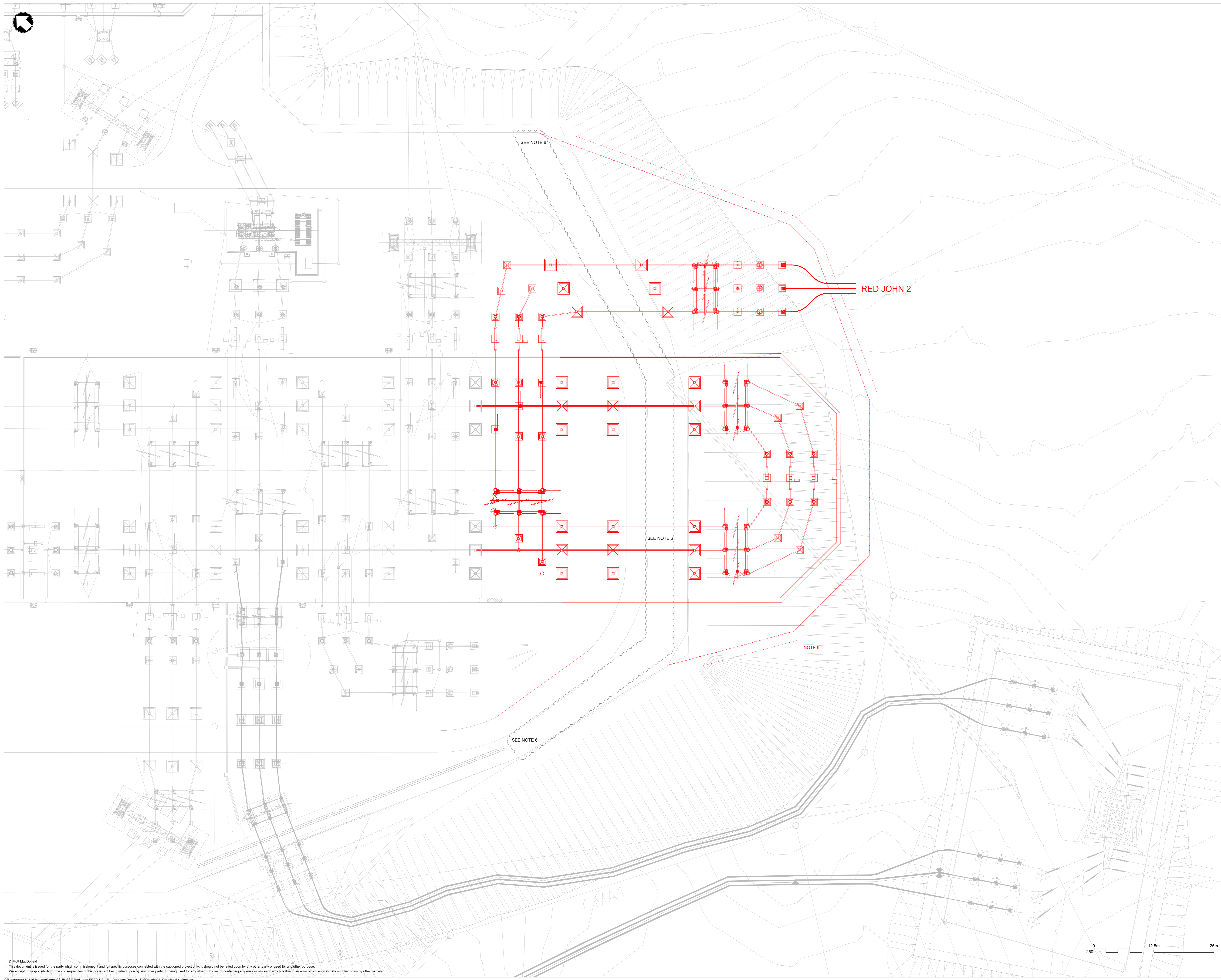
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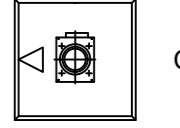

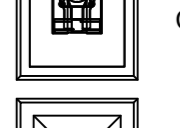
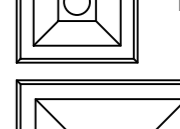
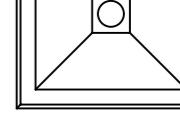


## **APPENDIX D SE SUBSTATION OPTIONS**





- Notes
1. ALL EXISTING INFORMATION BASED ON DRAWING NS7\_1110\_1001\_01\_05 (KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES).
  2. KNOCKNAGAE OPTION DRAWINGS SHOULD BE TREATED AS INDICATIVE ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
  3. EQUIPMENT CLEARANCES TO BE VERIFIED DURING DESIGN DEVELOPMENT ONCE NATIVE AS BUILT FILES BECOME AVAILABLE.
  4. KNOCKNAGAE SUBSTATION RATING 275kV 4000A 40KA 1s.
  5. ALL SURVEY INFORMATION IS REFERENCED TO ORDNANCE SURVEY NATIONAL GRID OSGB36.
  6. BEAUTY CABLES RUN IN VERGE. CABLES TO BE INDICATED ON FINAL DRAWING FOLLOWING GI SURVEY.
  7. SUBSTATION COMPOUND TO BE EXTENDED TO ACCOMMODATE NEW BUSBARS AND BUS SECTIONS. CIVIL WORKS WILL BE REQUIRED TO CREATE A LEVEL GROUND AREA FOR THIS EXTENSION.
  8. ACCESS ARRANGEMENTS (INCLUDING EXISTING PERIMETER ROAD) TO BE REVIEWED ONCE PREFERRED OPTION IS SELECTED.
  9. REQUIREMENT FOR A RETAINING WALL TO BE CONFIRMED BY DETAILED EARTHWORKS MODEL IF OPTION IS PROGRESSSED.

- Key to symbols
-  CT
  -  CVT
  -  SA
  -  CSE
  -  PI (LOW LEVEL)
  -  PI (HIGH LEVEL)

Reference Documents

NS7\_1110\_1001\_01\_05 KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES.

FOR INFORMATION

Rev	Date	Drawn	Description	Chk'd	App'd
P2	08/07/22	S.P.	FOR DISCUSSION	N.F.	H.S.
P1	15/03/22	S.P.	FIRST ISSUE FOR COMMENTS	N.F.	H.S.

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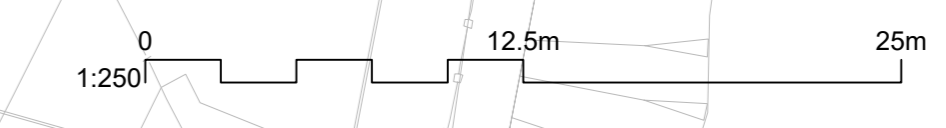
Title

**KNOCKNAGAE EXTENSION  
 SOUTHEAST OPTION 1 (SE1)  
 CONVENTIONAL BUS-COUPLER  
 PARALLEL EXTENSION**

Designed	N.Ferguson	N.F.	Eng check	H.Smith	H.S.
Drawn	S.Prentice	S.P.	Coordination		
Dwg check	N.Ferguson	N.F.	Approved	H.Smith	H.S.
Scale at A0	N.T.S.	PRE	P2	STD	

Drawing Number  
**MMD-106510-E-DR-01-XX-0005**

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- Notes
1. ALL EXISTING INFORMATION BASED ON DRAWING NS7\_1110\_1001\_01\_05 (KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES).
  2. KNOCKNAGAE OPTION DRAWINGS SHOULD BE TREATED AS INDICATIVE ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
  3. EQUIPMENT CLEARANCES TO BE VERIFIED DURING DESIGN DEVELOPMENT ONCE NATIVE AS BUILT FILES BECOME AVAILABLE.
  4. KNOCKNAGAE SUBSTATION RATING 275kV 4000A 40KA 1s.
  5. ALL SURVEY INFORMATION IS REFERENCED TO ORDNANCE SURVEY NATIONAL GRID OSGB36.
  6. BEAUTY CABLES RUN IN VERGE. CABLES TO BE INDICATED ON FINAL DRAWING FOLLOWING GI SURVEY.
  7. SUBSTATION COMPOUND TO BE EXTENDED TO ACCOMMODATE NEW BUSBARS AND BUS SECTIONS. CIVIL WORKS WILL BE REQUIRED TO CREATE A LEVEL GROUND AREA FOR THIS EXTENSION.
  8. ACCESS ARRANGEMENTS (INCLUDING EXISTING PERIMETER ROAD) TO BE REVIEWED ONCE PREFERRED OPTION IS SELECTED.

Key to symbols

- CT
- CVT
- SA
- CSE
- PI (LOW LEVEL)
- PI (HIGH LEVEL)

Reference Documents

NS7\_1110\_1001\_01\_05 KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES.

FOR INFORMATION

Rev	Date	Drawn	Description	Chk'd	App'd
P2	08/07/22	S.P.	FOR DISCUSSION	N.F.	H.S.
P1	15/03/22	S.P.	FIRST ISSUE FOR COMMENTS	N.F.	H.S.

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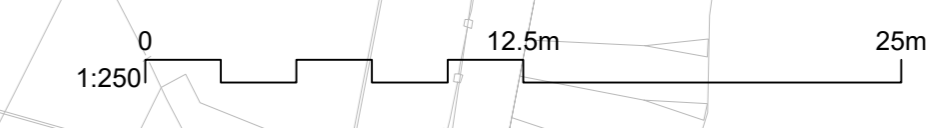
Title

**KNOCKNAGAE EXTENSION  
SOUTHEAST OPTION 2 (SE2)  
CONVENTIONAL BUS-COUPLER  
ANGLED EXTENSION**

Designed	N.Ferguson	N.F.	Eng check	H.Smith	H.S.
Drawn	S.Prentice	S.P.	Coordination		
Dwg check	N.Ferguson	N.F.	Approved	H.Smith	H.S.
Scale at A0	N.T.S.	PRE	P2	STD	

Drawing Number  
**MMD-106510-E-DR-01-XX-0006**

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- Notes
1. ALL EXISTING INFORMATION BASED ON DRAWING NS7\_1110\_1001\_01\_05 (KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES).
  2. KNOCKNAGAE OPTION DRAWINGS SHOULD BE TREATED AS INDICATIVE ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
  3. EQUIPMENT CLEARANCES TO BE VERIFIED DURING DESIGN DEVELOPMENT ONCE NATIVE AS BUILT FILES BECOME AVAILABLE.
  4. KNOCKNAGAE SUBSTATION RATING 275kV 4000A 40RA 1S.
  5. ALL SURVEY INFORMATION IS REFERENCED TO ORDNANCE SURVEY NATIONAL GRID OSGB36.
  6. BEAULY CABLES RUN IN VERGE. CABLES TO BE INDICATED ON FINAL DRAWING FOLLOWING GI SURVEY.
  7. SUBSTATION COMPOUND TO BE EXTENDED TO ACCOMMODATE NEW BUSBARS AND BUS SECTIONS. CIVIL WORKS WILL BE REQUIRED TO CREATE A LEVEL GROUND AREA FOR THIS EXTENSION.
  8. ACCESS ARRANGEMENTS (INCLUDING EXISTING PERIMETER ROAD) TO BE REVIEWED ONCE PREFERRED OPTION IS SELECTED.

Key to symbols

- CT
- CVT
- SA
- CSE
- PI (LOW LEVEL)
- PI (HIGH LEVEL)

Reference Documents

NS7\_1110\_1001\_01\_05 KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES.

FOR INFORMATION

Rev	Date	Drawn	Description	Chk'd	App'd
P2	08/07/22	S.P.	FOR DISCUSSION	N.F.	H.S.
P1	15/03/22	S.P.	FIRST ISSUE FOR COMMENTS	N.F.	H.S.

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Title

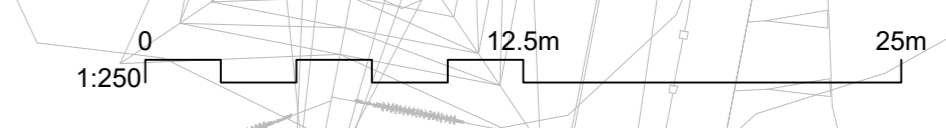
**KNOCKNAGAE EXTENSION  
SOUTHEAST OPTION 3 (SE3)  
EXTENDABLE BUS-COUPLER**

Designed	N.Ferguson	N.F.	Eng check	H.Smith	H.S.
Drawn	S.Prentice	S.P.	Coordination		
Dwg check	N.Ferguson	N.F.	Approved	H.Smith	H.S.
Scale at A0	N.T.S.	Status	Rev	Security	
	N.T.S.	PRE	P2	STD	

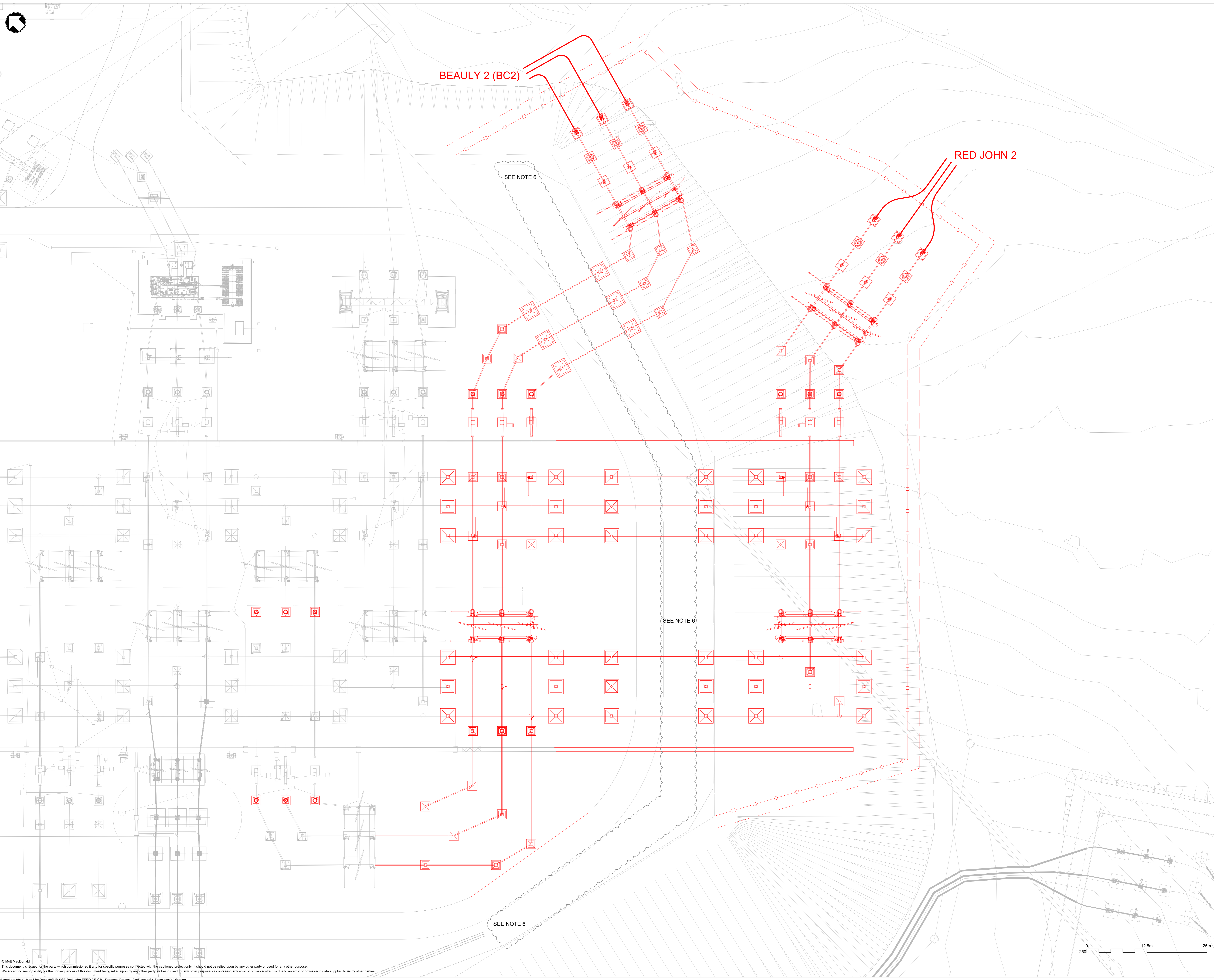
Drawing Number

**MMD-106510-E-DR-01-XX-0007**

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- Notes
1. ALL EXISTING INFORMATION BASED ON DRAWING NS7\_1110\_1001\_01\_05 (KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES).
  2. KNOCKNAGAE OPTION DRAWINGS SHOULD BE TREATED AS INDICATIVE ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION PURPOSES.
  3. EQUIPMENT CLEARANCES TO BE VERIFIED DURING DESIGN DEVELOPMENT ONCE NATIVE AS BUILT FILES BECOME AVAILABLE.
  4. KNOCKNAGAE SUBSTATION RATING 275kV 4000A 40KA 1s.
  5. ALL SURVEY INFORMATION IS REFERENCED TO ORDNANCE SURVEY NATIONAL GRID OSGB36.
  6. BEAULY BC2 CABLE CONNECTION RECONNECTED TO NEW BAY. BEAULY CABLES RUN IN VERGE. CABLES TO BE INDICATED ON FINAL DRAWING FOLLOWING GI SURVEY.
  7. SUBSTATION COMPOUND TO BE EXTENDED TO ACCOMMODATE NEW BUSBARS AND BUS SECTIONS. CIVIL WORKS WILL BE REQUIRED TO CREATE A LEVEL GROUND AREA FOR THIS EXTENSION.
  8. ACCESS ARRANGEMENTS (INCLUDING EXISTING PERIMETER ROAD) TO BE REVIEWED ONCE PREFERRED OPTION IS SELECTED.

Key to symbols

- CT
- CVT
- SA
- CSE
- PI (LOW LEVEL)
- PI (HIGH LEVEL)

Reference Documents

NS7\_1110\_1001\_01\_05 KNOCKNAGAE - TOMATIN 132kV & 275kV UNDERGROUND CABLES - CMA1 & CMA2 OVERALL CABLE ROUTES.

FOR INFORMATION

P2	08/07/22	S.P.	FOR DISCUSSION	N.F.	H.S.
P1	15/03/22	S.P.	FIRST ISSUE FOR COMMENTS	N.F.	H.S.
Rev	Date	Drawn	Description	Chk'd	App'd

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Scottish & Southern Electricity Networks

Title

**KNOCKNAGAE EXTENSION  
SOUTHEAST OPTION 4 (SE4)  
EXTENDED OUTAGE  
BEAULY DIVERSION**

Designed	N.Ferguson	N.F.	Eng check	H.Smith	H.S.
Drawn	S.Prentice	S.P.	Coordination		
Dwg check	N.Ferguson	N.F.	Approved	H.Smith	H.S.
Scale at A0	N.T.S.	Status	Rev	Security	
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**MMD-106510-E-DR-01-XX-0008**

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