

# Appendix 6.1 – Preliminary Investigation Report on Ground Conditions (Contamination and Stability)

# Cruachan Expansion Project – Preliminary Investigation Report on Ground Conditions (Contamination and Stability)

# 1 Introduction

## 1.1 Preamble

- 1.1.1 Stantec UK Limited (Stantec) has been commissioned by Drax Generation Enterprise Ltd (“the Client”), to undertake a Preliminary Investigation Report on ground conditions (previously known as a Phase 1 Report) in support of the proposed ‘Cruachan Expansion Project’ 600 megawatts (MW) generating station pumped storage facility.
- 1.1.2 The Site is located on the northern banks of Loch Awe in Argyll and Bute and to the north of the A85 (hereafter referred to as “the Site”). The Site is irregular in shape and covers approximately 272 hectares (ha). The nearest Site postcode is PA33 1AN and the existing Cruachan 1 powerhouse national grid reference (NGR) is NN 080 277. The Site location is illustrated in **Figure 1** and a description of the Site is provided in **Section 2.2** below.
- 1.1.3 This report presents the findings of the desk study research carried out, together with the observations from a Site walkover and preliminary information on Tier 1 (preliminary/qualitative) contamination risk and ground stability assessment.
- 1.1.4 This is a Preliminary Investigation Report on Ground Conditions and does not purport to be an ecological study, flood risk study, archaeological study or any other survey.
- 1.1.5 For the purpose of this assessment, the Site has been divided into three areas:
- ‘the West Area’ comprising the existing Cruachan Power Station including the upper compound area, below ground works (headrace and tailrace tunnels, access tunnels, pressure shaft, power station), inlet and outlet structures and the new jetty along the northern shoreline of Loch Awe;
  - ‘the Access Track’ comprising the existing access track routing from the A85 to the upper reservoir which will be upgraded; and
  - ‘the East Area’ comprising the lower compound area off the A85.

## 1.2 Objective

- 1.2.1 As the installed capacity of the project will exceed 50 MW, an application for the project will be made to the Scottish Ministers under Section 36 of the Electricity Act 1989, together with a request for the granting of deemed planning permission. Scottish Ministers will determine the Section 36 application. As the host Local Planning Authority (LPA), Argyll and Bute Council will have responsibility for processing any deemed planning conditions attached to any consent granted.
- 1.2.2 The objective of this report is to review readily available information in the public domain to identify and assess the existing ground conditions on the Site and in the immediate surrounding area. It also aims to identify potential geoenvironmental and ground stability hazards that may require management as well as potential constraints to the project.
- 1.2.3 The report includes preliminary advice on the ground and groundwater conditions at the Site. Guidance on the use of this report is presented in a note after the text of this report.

1.2.4 The principal planning objective is to identify unacceptable risks to human health, buildings and other property and the natural and historical environment from the potential contaminated condition of the land so that appropriate action can be considered and taken to address those risks.

1.2.5 Further information on the requirements the Scottish Government and the current National Planning Framework (NPF) in respect of ground conditions is presented in our guide entitled Stantec Guide: Methodology for Assessment of Land Contamination (Scotland), a copy of which is presented in **Appendix A**.

### **1.3 Proposed Development**

1.3.1 The Site has been proposed for the 'Cruachan Expansion Project' 600 megawatts (MW) generating station pumped storage development on the northern banks of Loch Awe in Argyll and Bute.

1.3.2 The Cruachan Expansion Project will provide a new underground power station and associated infrastructure to increase generating capacity at the existing Cruachan Power Station which is one of four large-scale pumped storage facilities in the UK and currently operates with a nominal maximum output of 440 MW in full generation mode (with an average annual generation output from 2014 to 2017 of 315 GWh/year).

1.3.3 The proposed development will comprise the following main elements:

- Upper Inlet-Outlet Structure – a concrete structure below minimum operating water level in Cruachan Reservoir, which will direct water into the headrace tunnel. The concrete intake will include a wheeled gate operated by a hydraulic cylinder, together with stop logs for maintenance, both located within a common gate shaft, within the western flank of Beinn a Bhuidh
- Headrace Tunnel – a concrete lined low pressure tunnel will convey water from Cruachan Reservoir to a high pressure shaft.
- Pressure Shaft – at the downstream end of the low pressure headrace tunnel there will be a concrete lined vertical shaft to conduct water to the high pressure tunnel. Access to the top bend of the shaft will be provided for maintenance and inspection from ground surface.
- High Pressure Tunnel, Penstock and Bifurcations – from the bottom of the pressure shaft there will be a concrete (and steel lined) high pressure tunnel leading to a series of steel-lined bifurcations conducting water to the pump-turbines.
- Power Station – a series of underground caverns will contain reversible pump-turbines and motor-generators together with associated equipment such as transformers and switchgear.
- Tailrace Tunnel – a concrete-lined surge shaft and concrete-lined low pressure tunnel will conduct water between the reversible pump turbines and Loch Awe, the lower reservoir.
- Lower Inlet-Outlet Structure – an inlet / outlet structure will be located on the shore of Loch Awe, together with fish screens.
- Access Tunnels – various tunnels will be provided for accessing the underground power station and various caverns and galleries and will day-light (emerge) at a low level near the A85, together with ventilation shafts and tunnels at various locations.



- Interconnection Tunnels – interconnecting tunnels will be provided to link the new power station with the existing power station and new main access tunnel with the existing access tunnel to improve safety and operability of both underground stations.
- Access Roads and Infrastructure – various access improvements, including upgrading of existing access track to the upper reservoir area, temporary re-alignment of the A85, creation of temporary storage areas alongside the A85, development of railhead infrastructure at Loch Awe and other temporary and permanent access and infrastructure works.
- Jetty – a large platform of reclaimed land (jetty) will be created along the northern shoreline of Loch Awe, just to the east of the existing facilities. The A85 will be temporarily realigned to travel along the jetty whilst the tailrace and access tunnels are constructed. Once the A85 is rerouted to its original alignment, the jetty will be used as an area to temporarily store tunnel spoil prior to disposal offsite.
- Temporary compound areas – the upper compound area comprising a new construction site in the proximity of Cruachan Dam (adjacent to the existing access road). There would also be offices, small workshops and storage together with emergency accommodation (in case of bad weather) at the upper reservoir site. A lower compound area located approximately 6km east of Cruachan Power Station near to the junction of the A85 and B9077. The lower construction compound may provide residential accommodation, offices, laydown areas, workshops, maintenance and storage yards and ancillary facilities such as fuel storage and vehicle parking.

1.3.4 As set out above, a large proportion of the proposed development works will happen below ground level.

## **1.4 Report Contents**

1.4.1 This report presents a desk study, which comprises the following:

- A preliminary investigation in general accordance with LC:RM and BS 10175 comprising a desk-based study of published and readily available public information (see below for sources of information accessed) and site reconnaissance (a Site walkover);
- A Tier 1 Preliminary Risk Assessment (PRA), which is a qualitative assessment of data to develop an outline conceptual model;
- A preliminary ground stability appraisal; and
- The report includes preliminary advice on the ground and groundwater conditions at the Site. In addition, the report makes reference to the potential use of infiltration drainage systems at the Site.

1.4.2 Information on the methodology adopted by Stantec is presented below and guidance on the use of this report is provided in **Section 9**.

## **1.5 Methodology**

### **Ground Conditions – Contamination**

1.5.1 The underlying principle is the evaluation of pollutant linkages to assess whether the presence of a source of contamination could potentially lead to harmful consequences. A pollutant linkage consists of the following three elements:

- A source of contamination or hazard that has the potential to cause harm or pollution;

- A pathway for the hazard to move along / generate exposure; and
- A receptor which has the potential to be affected by the hazard.

1.5.2 For each potential pollutant linkage identified the risk is estimated through consideration of the magnitude of the potential consequences and the likelihood or probability of an event occurring.

### **Ground Conditions – Ground Stability**

- 1.5.3 A preliminary assessment of potential ground instability issues has been undertaken based on research and visual observations made during Stantec's Site walkover. Available published geological information has been obtained and reviewed, together with data acquired from public databases.
- 1.5.4 This report presents a review of the acquired information and gives comments with respect to potential constraints to the general site infrastructure design and construction. Further information on the approach adopted by Stantec in the Stantec Guide: Methodology for Assessing Land Contamination, a copy of which is presented in **Appendix A**.

## **1.6 Sources of Information**

- 1.6.1 The following publicly available sources of information were used in the preparation of this report:
- A walkover survey was undertaken by a Stantec engineer on 28 March 2022 to observe existing conditions both on the Site and surrounding the land. Photographs are presented in **Appendix B**;
  - Groundsure Reports for 'the west' area (i.e. the Cruachan Reservoir, jetty area and access track) (GSIP-2022-12632-9903) and GSIP-2022-12632-9901 for the 'east area' (i.e the lower compound) including historical maps, aerial photography and environmental data searches, and this information is presented in its entirety in **Appendix C**;
  - Geology maps and borehole records held by the British Geological Survey (BGS) accessed via their website and Geological Survey of Scotland 1:63,360/1:50,000 geological map series;
  - Scottish Environment Protection Agency (SEPA) Water Environment Hub and Water Classification Hub was reviewed for surface and groundwater quality;
  - A review of the BRE Report BR211 (2015) Radon: Protective measures for new buildings (including supplementary advice for extensions, conversions and refurbishment projects);
  - Review of the Stantec Natural Cavity and Artificial non-coal (underground) mining cavity databases;
  - Review of risk map records of Regional Unexploded Bomb Risk held by Zetica;
  - Scotland's Environment was consulted regarding significant environmental features and historical structures;
  - Various historical reports available from the Client including several Cruachan Hydroelectric Power Station inspection reports.
  - The Geology of the Cruachan Underground Power Station for Edmund Nuttall, Sons & Co by the Imperial College London, 1964.

- Communication and requests for environmental information pertinent to the Site were made to Argyll and Bute Council Environmental Health West department and SEPA. Regulator correspondence is presented in **Appendix D**.

## **1.7 Previous Investigations**

- 1.7.1 Several Cruachan Hydroelectric Power Station rock engineering inspection reports have been prepared by Halcrow Group Limited and were available for review. The reports cover the following areas of the existing Cruachan Power Station (Cruachan 1): the access tunnel, the machine hall and machine hall west hook adits, the strainer gallery access adit and strainer gallery adit to base of cable shaft and the surge chamber lower access adit.
- 1.7.2 The scope of the inspection reports was to provide general background data relating to the geological setting of each of the areas noted above. In particular, the rock engineering inspection reports were reviewed for information on baseline groundwater observations and groundwater chemistry.
- 1.7.3 In 2022, Stantec undertook a non-intrusive assessment of the potential acid generating (PAG) geology at Cruachan. Sulphide minerals, such as pyrite in the rock that will be excavated from the tunnels and cavern at the proposed development, can be found disseminated throughout the rock, along open fissures, and in enclosed veins. Where present, these may oxidise naturally over time when exposed to air and water to generate sulphuric acid and dissolved iron and other minerals through a process known as acid rock drainage (ARD).
- 1.7.4 In summary, it was recommended that the underground excavation works will require a preliminary ARD management plan which can be further developed by the Contractor responsible for the excavation works. Further work was recommended to understand the potential at the Site for the geology to generate acidic leachates and acid rock drainage and to evaluate the appropriate material reuse geotechnically as fill materials and also as concrete aggregates.

## 2 Site Setting

### 2.1 Site Location

- 2.1.1 The Site is located approximately 21km east of Oban on the northern banks of Loch Awe and to the north of the A85 in Argyll and Bute (hereafter referred to as “the Site”). The nearest postcode to the Site is PA33 1AN and the existing Cruachan Powerhouse national grid reference (NGR) is NN 080 277.
- 2.1.2 The Site location is illustrated in **Figure 1** and a description of the Site is provided in **Section 2.2** below.

### 2.2 General Description

- 2.2.1 Cruachan Power Station is a pumped storage hydroelectric facility located in the west of the Site. The facility comprises the following main components:
- The Cruachan Reservoir (upper head pond) with a storage capacity of 11.1 million m<sup>3</sup>. The impounding reservoir is formed in a natural corrie on the southwest facing slope of Ben Cruachan. The reservoir is impounded by a massive concrete mixed gravity and buttress dam across the natural outlet to the Cruachan Burn. The reservoir receives natural inflows from its 5.7 km<sup>2</sup> direct catchment and is supplemented by a series of indirect catchments that discharge at three principal locations around the shoreline of the upper reservoir;
  - Twin 4.6 m diameter headrace tunnels that bifurcate to four steel-lined unit penstocks;
  - An underground cavern power station housing two 100 MW and two 120 MW reversible Francis pump-turbines and motor-generators. The powerhouse complex consists of the Machine Hall, two transformer galleries and the downstream surge shaft and expansion tunnels. The Machine Hall and Transformer halls house the main generation equipment and station transformers and are linked by various access tunnels and secondary facilities. The 275 kV high-voltage cables from the two main station transformers rise to the surface in a cable and ventilation shaft to a surface switchyard and then connection to the national grid via overhead transmission lines.
  - A single 6.8 m horseshoe shaped tailrace tunnel and inlet/outlet structure on the bank of Loch Awe.
  - The power waterways comprise the inlet/outlet at the upper dam, the high pressure penstocks that supply the pump-turbines, the draft tube tunnels, lower surge chamber and tailrace tunnel and inlet/outlet structure at Loch Awe.
- 2.2.2 An access track to the Cruachan Dam begins at St Conans Road in Lochawe then routing east to west before turning north to the dam. Falls of Cruachan Station and the Cruachan Visitor Centre are in the south of the Site immediately north and south of the A85.
- 2.2.3 To the east of Loch Awe, lies the East Area of the Site which is currently hummocky grassland. Two overhead electricity transmission lines pass through the centre of the East Area on an east to west axis.
- 2.2.4 A Site walkover description is in **Section 4.2** below.

## **2.3 Topography**

- 2.3.1 No topographic survey is available at the time of writing. The topography described here has primarily been based upon the available OS mapping and the Stantec site walkover.
- 2.3.2 In the west of the Site, the Cruachan Reservoir and the base of Cruachan Dam are located within Coire Cruachan which is approximately 400m above Ordnance Datum (AOD) according to OS mapping. The ground levels fall steeply in a southerly direction from the base of the dam wall (390m AOD) to the A85 at approximately 40m AOD. A bathymetry survey completed in October 2020 (Stantec, 2020) indicates that the profile of the valley below normal loch level falls steeply (at about 45°), consistent with the topography above the A85.
- 2.3.3 Ground levels to the north and south of the access track are generally steep (45% in areas) until the access road meets the village of Lochawe.
- 2.3.4 The upper compound area is located on a slope falling north east to south west. Broadly, the northern half of the upper compound area is on an approximate slope of 23% whereas the southern half is more gently sloping approximately 16%.
- 2.3.5 The area being considered for the lower compound area (north of Lochawe and the A85) has an approximate slope of 16% falling in a south easterly direction.

# 3 Environmental Setting

## 3.1 Introduction

- 3.1.1 The information from published and publicly available information sources is summarised below and is used to provide context for the ground stability appraisal in **Section 4** and identify potential receptors in the Tier 1 PRA presented in **Section 5**.

## 3.2 Geological Setting

- 3.2.1 Information on the geological setting summarised below is primarily based on information held by the British Geological Survey (BGS).

### Review of Published Geology

- 3.2.2 The BGS GeoIndex Onshore mapping and the 1:50,000 scale geological series Scotland, Dalmally, Sheet 45E (BGS, 1992) indicate the following geological sequence underlying the Site:

#### Superficial Deposits

- 3.2.3 The Site is largely shown to be absent of superficial deposits suggesting that bedrock is at or near to the surface.
- 3.2.4 The far north of Cruachan Reservoir and the East Area are shown to be underlain by Hummocky (Moundy) Glacial Deposits described by the BGS as 'Lithologically diverse and complex glacial deposits that have characteristic moundy topographic form. Composed of rock debris, clayey till and poorly- to well-stratified sand and gravel'.

#### Solid Geology

- 3.2.5 The published BGS geological mapping indicates that the project is located on the contact between the Dalradian Group of metasediments known as Ardrishaig Phyllite Formation of Neoproterozoic age to the southwest, and the late Devonian Quarry Intrusion to the northeast which is part of the Etive Pluton. This contact is observed at the Site in surface outcrops and within existing underground workings within the Cruachan Power Station as a change from a Phyllite to a Quartz-Diorite across a contact zone where apparent xenoliths of the country rock (phyllites) were present within the Quartz-Diorite.
- Lorn Plateau Volcanic Formation – Andesite and Basalt described as mainly basalts, including orthopyroxene-bearing types, with rare rhyolites, dacites, tuffs, agglomerates and some intercalated conglomerate;
  - Ardrishaig Phyllite Formation - Quartzite, Metalimestone and Phyllitic Semipelite across the south west of the Site in the area of the tunnels and new jetty;
  - Quarry Intrusion – Quartz-Diorite in the area of the upper compound area.
  - Monzodiorite Facies, Cruachan Intrusion in the far north of Cruachan Reservoir
- 3.2.6 The access track routes through the Easdale Slate Formation – Pelite, Graphitic and the Islay Quartzite – Semipelite.

- 3.2.7 Glen Coe Quartzite Member – Quartzite beneath the lower compound area.

Historical BGS Boreholes

- 3.2.8 The BGS borehole record viewer (BGS, 2022) was reviewed. The borehole scans are delivered under the Open Government Licence, subject to the following acknowledgement accompanying any reproduced BGS materials: "Contains British Geological Survey materials © UKRI [2020]".
- 3.2.9 The BGS contains one confidential borehole log onsite located at the existing outlet which is held on record by Stantec and is summarised in **Table 3.1** below.

Table 3.1 Summary of Ground Conditions based on BGS Borehole Records

Depth Top to Base (m bgl)	General Description from Log
0 - 366	'Bore in the Quarry Intrusion of the Etive Granite Complex, this rock is diorite or quartz-diorite and varied only slightly throughout the bore. Variations are of grainsize, colour-index, and relative size of phenocrysts. Jointing is dominantly steep (between 50 degrees and vertical) and the joints are incipient or sealed. They are usually fairly close set, probably about 18 inches (0.46m) apart. Except from a few feet here and there the rock is sound.'

Literature

- 3.2.10 Imperial College London was commissioned by Edmund Nuttall & Sons to examine and report on the engineering geology in the underground works areas of the existing (then under construction) Cruachan Power Station. A summary of the geology is provided below.
- 3.2.11 The underground works are sited within the Etive Granite Complex. The boundary between the Granite and the phyllites is visible in the access and tailrace tunnels. The Granite Complex is composed of medium and coarse-grained rocks ranging in mineralogical composition from quartz-diorite to basic diorite. Although the rock is strictly not a granite it behaves from an engineering point of view in a similar manner to granite. The granite is cut by many well-defined fractures.
- 3.2.12 The existing Cruachan Power Station is cut by a fault zone about 30m wide at the level of the machine hall containing belts of sheared broken rock and clayey, chlorite-covered joints. Groundwater inflows, which were noted to be minor, appear to be associated with the rock in the vicinity of the fault zone.

Peat Probing Exercise

- 3.2.13 Limited peat probing of the East Area was undertaken by Stantec during the Site walkover to provide a preliminary understanding of the presence and extent of peat at the East Area. Peat depths were generally found to be shallow and between 0m to 0.5m below ground level (bgl) however some areas of localised deeper peat were encountered particularly in the northern corner of the East Area to depths of more than 2m bgl. In the central portion of the East Area, peat depths were up to 2m bgl.
- 3.2.14 For the West Area at the lower inlet/outlet it was confirmed that no peat is present due to the presence of existing Cruachan Power Station infrastructure, road and railway, very steep slopes and bedrock at surface. For the West Area at the upper compound area it was confirmed that in-situ peat is not present. During the walkover it was observed that the ground conditions at the site presently comprise a thickness of soft mixed material comprising organic soil with gravel and cobbles. At the proposed locations it is understood that in-situ soil was removed to form a temporary compound area for a recent filming project at the location.

- 3.2.15 A peat probing exercise was commissioned by Stantec and undertaken by SKF in April 2022 at the East Area being considered for the lower compound area. Here it was confirmed that a layer of peat or thin organic soil is present across the Site. This is illustrated on the Peat Survey plan in **Figure 2**. The peat was recorded to be variable in thickness across the Site, ranging up to a maximum thickness of 2.20m at a single location, a general peat depth of <1.00m has been encountered.
- 3.2.16 A detailed peat probing survey on a 10m grid peat was undertaken and is summarised in the following table showing the number of locations and corresponding percentage of the total results, for each depth category.

Table 3.2 Summary of Organic Soil and Peat Depth Probing Results

Surveyed Depth (m)	Number of Probe Points	Percentage of Total Probe Points
<0.5	705	77.73%
0.5 – 1.0	140	15.44%
1.0 – 1.5	52	5.73%
1.5 – 2.0	9	0.99%
2.0 – 2.2	1	0.11%

### **3.3 Geomorphological/Geological Designations**

- 3.3.1 Geodiversity can be defined as “the natural range (diversity) of geological (rocks, minerals, fossils), geomorphological (landforms, topography, physical processes), soil and hydrological features. It includes their assemblages, structures, systems and contributions to landscapes” (Gray, 2013). These protected sites include geological Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs), Geological Conservation Review (GCR) sites, Local Geology Sites (formerly known as RIGS – Regionally Important Geological and Geomorphological Sites).
- 3.3.2 According to NatureScot, the Site is within the Cruachan Reservoir GCR site (GCR no. 2501), although no details regarding the citation (the list of features for which an SSSI is notified) is available on the NatureScot website. There are no other geological designations onsite or in the vicinity of the Site.
- 3.3.3 Due to the presence of geological designations within the Site boundary, geodiversity will be taken forward in this assessment and will be considered a sensitive receptor.

### **3.4 Geochemical Setting**

#### **Ground Gases**

##### Natural Soil Gas – Radon

- 3.4.1 The Groundsure Report indicates the Site is in an area where the property is in a low probability radon area, as less than 1% of homes are above the action level. According to Groundsure, this data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy. Radon protection measures are not considered to be relevant to the Proposed Development. Radon is not identified as a potential human health hazard.



Landfills

- 3.4.2 Landfills have not been recorded onsite or in the vicinity of the Site.

Made Ground

- 3.4.3 Made Ground, including infilled ground, has the potential to generate ground gases depending on the nature, composition and thickness of the material. Made Ground is present (noted during site walkovers) in the areas of the Site previously used as a construction compound area during the development of Cruachan Power Station. This location is proposed for the lower compound area where temporary construction offices is proposed. If present, ground gas has the potential to accumulate in enclosed spaces and present human health hazards through inhalation. The exact nature and extent of this Made Ground and the potential for generating ground gases is to be confirmed through intrusive investigation. Ultimately, the risks posed by ground gases (if present) will be dependent on whether above ground enclosed spaces with potential for human occupation are proposed as part of the development.

Superficial Deposits

- 3.4.4 Superficial deposits are largely shown to be absent from the Site except for the far north of Cruachan Reservoir and the East Area where Hummocky Glacial Deposits have been mapped. The superficial deposits are not likely to be a source of ground gas.

Mine Gas

- 3.4.5 There are no records of mines (coal or non-coal) onsite or within 1km of the Site.

**BGS Estimated Soil Chemistry**

- 3.4.6 The Groundsure Report reports the estimated soil chemistry on the Site (based on BGS Estimated Soil Chemistry values) to be:

- Arsenic: 15 to 25mg/kg;
- Cadmium: no data;
- Chromium: between 20 and 90 mg/kg;
- Lead: 100 mg/kg;
- Bioaccessible lead: between 60 and 100 mg/kg;
- Nickel: between 15 - 30 mg/kg.

- 3.4.7 None of the estimated metal concentrations noted above have the potential to exceed published evaluation criteria for the anticipated end land use scenario, the most relevant to the proposed development being either commercial industrial or public open space (park). Note that the BGS estimated soil chemistry data assume that the soils present are 'natural'.

### 3.5 Hydrogeological Setting

3.5.1 The following table summarises information regarding hydrogeology and groundwater vulnerability based on available information.

Table 3.3 Summary of Hydrogeology and Groundwater Vulnerability Related Information

Item and Source	Details
<p><b>Aquifer Classification</b>  Groundsure Report, SEPA, Scotland's Environment, BGS Hydrogeological Map of Scotland (1:625,000 scale)</p>	<p>According to SEPA's water classification hub for groundwater, there is no superficial aquifer beneath the Site.</p> <p>The Site is underlain by bedrock aquifers according to SEPA. Broadly to the south of Cruachan Reservoir is the Oban and Kintyre (ID 150698) and Cruachan Reservoir and land to the north is the Upper Glen Coe bedrock aquifer (ID 150693). According to SEPA, both are in Good condition in the year 2020 (the latest available data).</p> <p>The aquifers are recorded to be low productivity aquifers where small amounts of groundwater are in/near the surface weathered zone and fractures. Flow is virtually all through fractures and other discontinuities.</p>
<p><b>Depth to Groundwater</b></p>	<p>The depth of the groundwater from the surface is unknown at the time of writing.</p> <p>Groundwater does seep into the access tunnel through the structures in the rock. This is deep in the context of potential groundwater and does not correspond to the depth to the groundwater but a depth that groundwater is present and being expressed due to the presence of the tunnel.</p>
<p><b>Groundwater Flow Direction</b>  Judgement</p>	<p>Generally anticipated to follow local topography descending southwards to Loch Awe.</p>
<p><b>Groundwater Abstraction</b>  Groundsure Report, Local Authority, SEPA</p>	<p>The Groundsure Report does not provide information on groundwater abstraction.</p> <p>An information request was issued to the LPA and SEPA. A response from SEPA is pending at the time of writing.</p> <p>The LPA noted four know private water supplies (PWS) listed below (site reference, source name, eastings northings, class).</p> <ul style="list-style-type: none"> <li>• AABOL0001, Cruachan Power Station, 207900 726800, A1</li> <li>• AABOL0010, Cruachan Construction Site, 20790 726800, A1</li> <li>• AABOL0011, Lochawe Village Supply, 211411 727022, B</li> </ul>

Item and Source	Details
	<ul style="list-style-type: none"> <li>AABOL0699, Railway Cottages, 207900 726900, B</li> </ul> <p>Fourteen additional PWS were mentioned, primarily cottages located in and near to Lochawe (see <b>Appendix D</b>).</p> <p>It is not known which of these abstractions area from surface water or groundwater.</p>
Groundwater Vulnerability Groundsure Report	<p>The underling bedrock Oban and Kintyre aquifer and Upper Glen Coe aquifers have a low permeability.</p> <p>The superficial soils in the East Area are noted to be between very low and highly permeable.</p>
Groundwater Flood Risk* Groundsure Report	<p>The Groundsure Report suggests that the highest risk of groundwater flooding at the Site is low (on a scale of negligible to high). The highest risk within 50m is also low.</p>
Nitrate Vulnerable Zones (NVZ) Groundsure Report	<p>The Site is not within a NVZ.</p>
Drinking Water Protected Area (groundwater) <a href="https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/">https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/</a>	<p>The vast majority of Scotland falls within a groundwater Drinking Water Protected Area and the Site is no exception.</p>
* The scope of this report does not include a flood risk assessment.	

### 3.6 Hydrological Setting

#### 3.6.1 The following table summarises the information regarding hydrology.

Table 3.4 Summary of Surface Water Related Information

Item and Provenance	Description
<p>Features</p> <p>Groundsure Report and SEPA (<a href="https://www.sepa.org.uk/data-visualisation/water-environment-hub/">https://www.sepa.org.uk/data-visualisation/water-environment-hub/</a>)</p>	<p>Loch Awe (ID: 100585) is located immediately south of the Site and flows in a westerly direction. The water quality of Loch Awe has been classified by SEPA as Moderate ecological overall condition in 2020 (the latest available data). The reason for the Moderate ecological condition is not known.</p> <p>The Allt Mhoille (ID 10293) to the east of the Site is part of the River Awe catchment and has been classified by SEPA as Good ecological overall condition in 2020 (the latest available data).</p>

	<p>Allt Cruachan enters the Site from the north, flow southwards into Cruachan Reservoir, then Cruachan Reservoir south to Loch Awe.</p> <p>Several small watercourses also pass through the Site broadly flowing southwards.</p>
<p>Abstractions Groundsure Report, SEPA, Local Authority</p>	<p>An information request was issued to the LPA and SEPA. A response from SEPA is pending at the time of writing.</p> <p>The LPA noted four known PWS listed below (site reference, source name, eastings northings, class).</p> <p>AABOL0001, Cruachan Power Station, 207900 726800, A1</p> <p>AABOL0010, Cruachan Construction Site, 20790 726800, A1</p> <p>AABOL0011, Lochawe Village Supply, 211411 727022, B</p> <p>AABOL0699, Railway Cottages, 207900 726900, B</p> <p>Fourteen additional PWS were mentioned, primarily cottages located in and near to Lochawe (see <b>Appendix D</b>).</p> <p>It is not known which of these abstractions area from surface water or groundwater.</p>
<p>Discharge Consents Groundsure Report</p>	<p>The Groundsure Report does not provide information on discharge consents.</p> <p>An information request was issued to SEPA. A response from SEPA is pending at the time of writing.</p>
<p>Drinking Water Protected Area (Surface Water) <a href="https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/">https://www.gov.scot/publications/drinking-water-protected-areas-scotland-river-basin-district-maps/</a></p>	<p>The East Area is shown to fall within a Surface Water Drinking Water Protected Area. DWPA mapping appears to surround the Allt Mhoille (east of the Site) and Loch Awe to the south.</p>
<p>River Flood Risk* Groundsure Report, SEPA</p>	<p>Groundsure and SEPA indicates very localised flooding may occur at Allt Cruachan in the west and along the eastern Site boundary at the Allt Mhoille. The highest flood risk onsite and within 50m of the Site boundary is estimated to be 1 in 30 year (3.33%) greater than 1m.</p>
<p>* The scope of this report does not include a flood risk assessment.</p>	

3.6.2 Given the relatively close proximity of the Loch Awe and the Allt Mhoille to the Site, and the drinking water protected area (surface water), the risk assessment will consider surface water as a receptor.

### **3.7 Archaeological Setting and Property – Building Effect**

- 3.7.1 A preliminary appraisal of readily available sources of information has been undertaken to determine whether archaeological settings and property requires consideration within the ground condition assessment. The statement regarding the archaeological setting does not purport to be an archaeological risk assessment which might require a separate commission.
- 3.7.2 There are three listed buildings within the Site boundary, namely the Falls of Cruachan Railway Viaduct (category A), Cruachan Dam (category B), and the Turbine Hall at Cruachan Power Station (category A). Approximately 60m east is St Conan's (category A).
- 3.7.3 There are scheduled monuments, conservation areas, world heritage sites or registered parks/gardens onsite or in the vicinity of the Site.
- 3.7.4 Given the presence of category A and B listed buildings onsite, property (buildings) has been identified as a receptor and is taken forward for further consideration in this assessment.

### **3.8 Ecological Setting**

- 3.8.1 A preliminary appraisal of readily available sources of information has been undertaken to determine whether ecology as a resource requires consideration within a ground condition assessment. The statement regarding ecological systems does not purport to be an ecological risk assessment which might require a separate commission.
- 3.8.2 There are four ecological designations in the proximity of the Site, named and briefly described below:
- Coille Leitire biological Site of Special Scientific Interest (SSSI) in the south of the Site (north of the A85 and railway line) notified for some of the most extensive areas of upland oak woodland in the Lorn and North Argyll area;
  - Loch Etive Woods Special Areas of Conservation (SAC) in the south east of the Site designated for blanket bog; mixed woodland on base rich soils associated with rocky slopes; western acidic oak woodland; alder woodland on floodplains and otters;
  - Glen Etive and Glen Fyne Special Protection Areas (SPA) across the western and northern portion of the Site for regularly supporting a population of European importance of the Annex 1 species golden eagle; and
  - Coille Driseig and Coille Leitire designated Ancient Woodland in the south and south east of the Site (north of the A85) for ancient woodlands of semi-natural origin.
- 3.8.3 Based on the presence of several ecological designations within the Site boundary, ecology has been identified as a sensitive receptor and is taken forward for further consideration in this assessment.

### **3.9 Property – Animal or Crop Effect**

- 3.9.1 Crops are not present at the Site. Although farm animals are currently using the Site, they will not be present during the development of the project (during the use of the compound areas and the construction of Cruachan 2). They may however be reintroduced following the completion of the project.
- 3.9.2 Due to the absence crops (current and future end use) onsite and in the vicinity, property (crop) will be eliminated as a receptor from this assessment. As animals may be reintroduced to the Site once Cruachan 2 is operational, therefore animals have been taken forward as a receptor.

# 4 Land Use Information (Hazard Identification)

## 4.1 Introduction

- 4.1.1 Land use is used to inform the hazard identification element of the Tier 1 PRA (contamination). This section presents a summary of the current and historical land uses on the Site and in the immediate surrounding area as identified from historical Ordnance Survey (OS) mapping records and aerial images provided by Groundsure (Groundsure, 2022) and during the Site walkover. Copies of the extracts from the current and historical OS maps are presented in [Appendix C](#).
- 4.1.2 The historical review of the Site was supplemented by Google Earth historical aerial imagery available for the area. No comment was made on maps or aerial photographs that provide no additional information compared to the ones discussed in the section below.

## 4.2 Walkover Inspection

- 4.2.1 A Site walkover inspection was undertaken by Stantec on in March 2022, the salient points are summarised below. A photographic record taken during the walkover is presented in [Appendix B](#).
- 4.2.2 The site walkover included the East Area, the Access Track and the West Area (up to Cruachan Dam).

### East Area

- 4.2.3 The ground conditions are hummocky across the East Area and the ground levels generally fall to the south east towards Loch Awe. Soils were waterlogged at the time of the walkover and several localised areas of peat were noted in the east area (further details on peat probing area in [Section 3.2](#) above).
- 4.2.4 The East Area was accessed off the A85. Close to the Site access, at least two old concrete pads/platforms were encountered along with an old drum (use unknown) and a manhole cover. These are possible remnants from the historical Cruachan 1 compound area.
- 4.2.5 In the centre of the East area close to the A85 was a stream and a plastic pipe possibly supplying water to the dwellings downstream at Lochawe. Adjacent to the A85 was a pipeline leading to an old unfilled chamber.

### West Area

- 4.2.6 The ground conditions are hummocky across the West Area and the ground levels generally fall in a southerly direction. This area is known to have been used recently, as a compound area for a filming crew. During the preliminary peat probing (undertaken at the time of the walkover) there was evidence of the displacement and reinstatement of peat in this area.

## 4.3 Review of Historical Mapping

- 4.3.1 The historical land use of the Site and surrounding area has mainly been obtained from reviewing historical Ordnance Survey (OS) maps and historical building plans supplied by Landmark Information Group (Groundsure, 2022), which is presented in [Appendix C](#).

- 4.3.2 The available historical OS map editions supplied by the Groundsure Report cover the period between 1870 and 2022, inclusive. A summary of the historical mapping and aerial photography review is in **Table 4.1** below. Pertinent features shown on the historical maps have been reproduced in extracts below the table.
- 4.3.3 It should be noted that there is a large gap in historical mapping between 1900 and 1973, likely to be due to the Site's location in a rural part of Scotland for which coverage is limited. It should be further noted that 1:2500 scale, which provide greater detail than the 1:10560 and 1:10000 scale maps, are not available for the West Area and most of the Access Track. The 1:2500 scale maps are only available from the 2000s and are therefore of limited use.

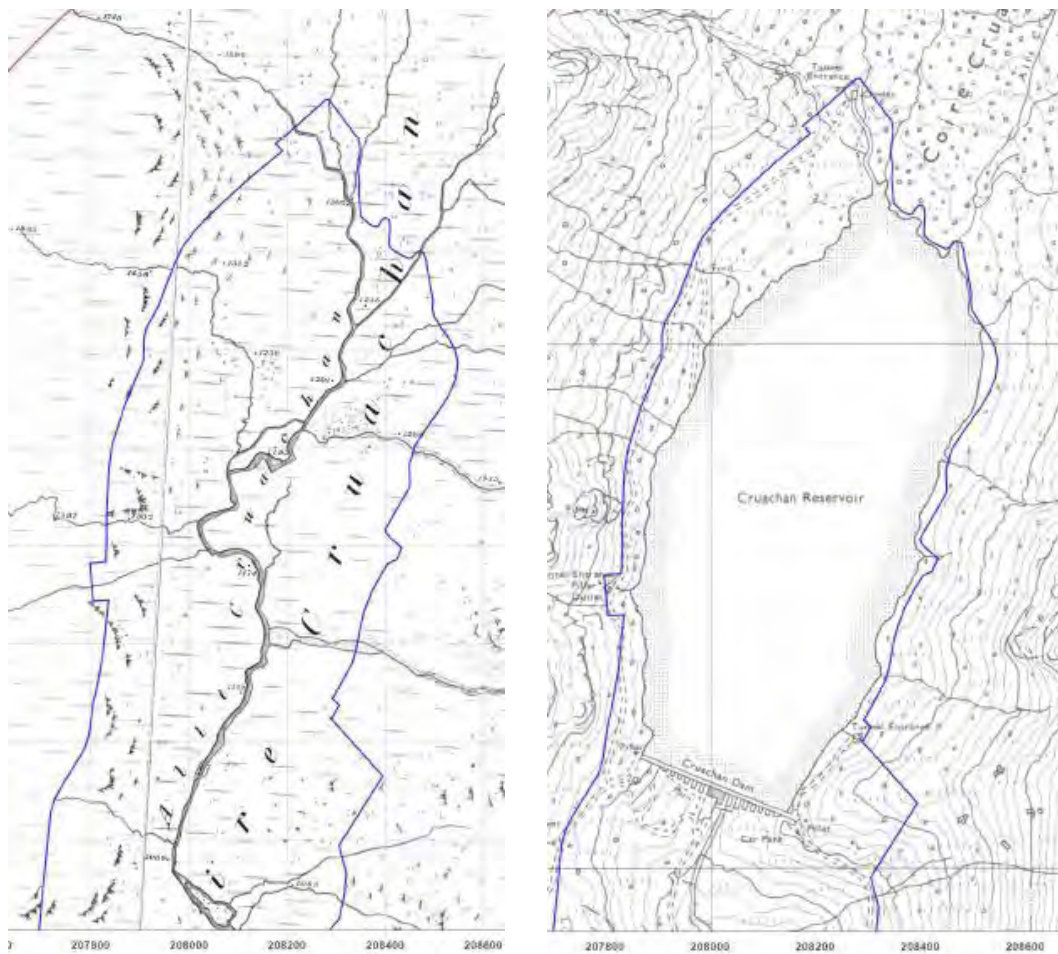
Table 4.1 Summary of Historical Land Uses

Dates/ Sources	Onsite	Offsite
1:10,560 – 1870	<p><u>East Area:</u>  Rough pasture/heathland onsite.  Several watercourses flowing through the Site.  Road/track shown along south east boundary.  Telegraph line along the south east boundary.</p> <p><u>West Area and Access Track:</u>  A track is shown broadly following the present-day access track.  Waterfall (later labelled the Falls of Cruachan) shown in present-day location.  Sheepfold onsite on present-day access track.</p>	<p><u>East Area:</u>  Rough pasture/heathland surrounding the Site.  Allt Mhoille located immediately east.  Castle (ruins) ~400m north east.  Sheepfold ~250m north, adjacent to the Allt Mhoille.  Sheepfold ~50m south east  Four square shaped buildings labelled 'Corries' (structures of some type) ~250m north.  'Drishaig' building and gardens ~100m south east</p> <p><u>West Area and Access Track:</u>  Rough pasture/heathland surrounding the Site.</p>
1:10,560 – 1900	<p><u>East Area:</u>  Mineral railway enters northern corner passing along west boundary and exiting in the south.  Possible buildings/hard standing shown on south east boundary.</p> <p><u>West Area and Access Track:</u>  Track (Old Military Road) constructed.  Callander &amp; Oban Railway and Falls of Cruachan station constructed.</p>	<p><u>East Area:</u>  Ben Cruachan Quarry ~4600m north west.  Callander &amp; Oban Railway and Lochawe station constructed ~70m south.</p> <p><u>West Area and Access Track:</u>  Callander &amp; Oban Railway constructed.</p>
1:10,000 – 1973-1976	<p><u>East Area:</u>  Mineral railway now labelled as a track.  Electrical transmission line (ETL) cuts through Site on NE to SW axis.  Cruachan Buildings are labelled on the south west Site boundary.</p> <p><u>West Area and Access Track:</u>  Cruachan Power Station has been constructed and the north of the</p>	<p><u>East Area:</u>  Four disused quarries in the area of Ben Cruachan Quarry ~480m north west at the closest point.  A reservoir is noted in the location of one of the former quarries.  Hotel constructed ~ 30m south west.</p> <p><u>West Area and Access Track:</u>  no significant change</p>

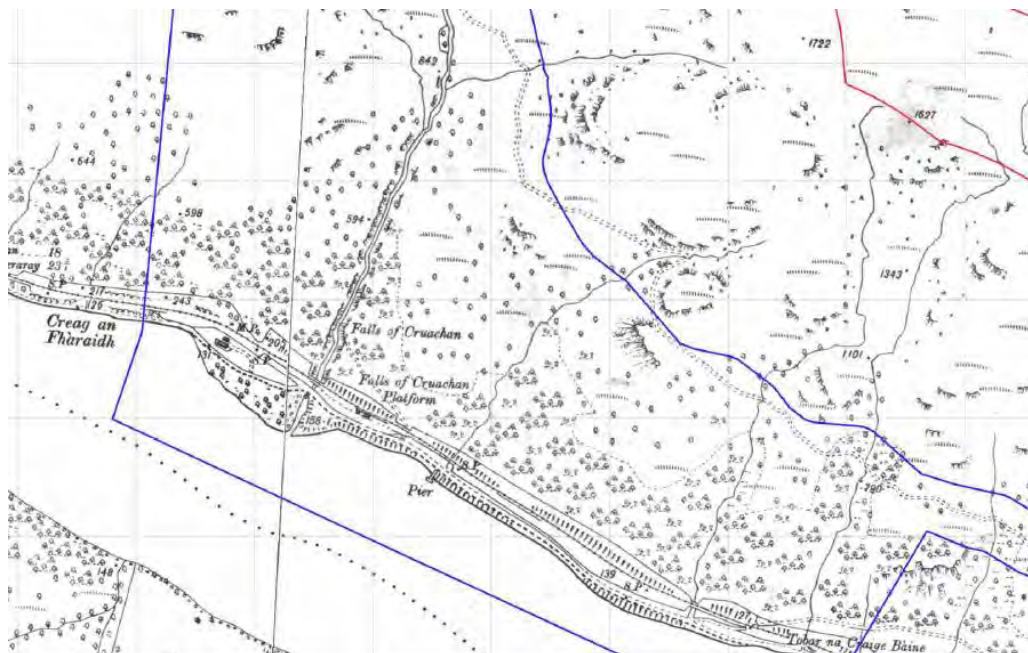
	<p>Site has been flooded to form Cruachan Reservoir.</p> <p>Pit (disused) is labelled adjacent to the access track.</p> <p>Access track has been constructed.</p> <p>Electricity substation in Lochawe (SE of access track)</p>	
1:2,500 – 1984	<p><u>East Area:</u> no significant change</p> <p><u>West Area and Access Track:</u> Electricity substation adjacent to the dwellings at St Conran's Road.</p>	<p><u>East Area:</u> Pit disused ~ 70m east.</p> <p><u>West Area and Access Track:</u> Filling station ~80m south of access track. Quarry disused ~100m south of access track. Sewage works ~60m south of access track.</p>
1:2,500 – 1995	<p><u>East Area:</u> no significant change</p> <p><u>West Area and Access Track:</u> no significant change</p>	<p><u>East Area:</u> no significant change</p> <p><u>West Area and Access Track:</u> no significant change</p>
1:10,000 – 2001	<p><u>East Area:</u> no significant change</p> <p><u>West Area and Access Track:</u> Sheepfold no longer labelled but building still shown.</p>	<p><u>East Area:</u> no significant change</p> <p><u>West Area and Access Track:</u> no significant change</p>
1:10,000 – 2010	<p><u>East Area:</u> no significant change</p> <p><u>West Area and Access Track:</u> no significant change</p>	<p><u>East Area:</u> no significant change</p> <p><u>West Area and Access Track:</u> no significant change</p>
1:10,000 – 2022	<p><u>East Area:</u> no significant change</p> <p><u>West Area and Access Track:</u> no significant change</p>	<p><u>East Area:</u> no significant change</p> <p><u>West Area and Access Track:</u> no significant change</p>

- 4.3.4 Although not shown on the historical mapping or aerial photography, a compound area associated with the construction of Cruachan 1 is known to have been situated in the East area.
- 4.3.5 The following extracts have been taken from the historical mapping and show the locations of some of the pertinent features identified in **Table 4.1** above.

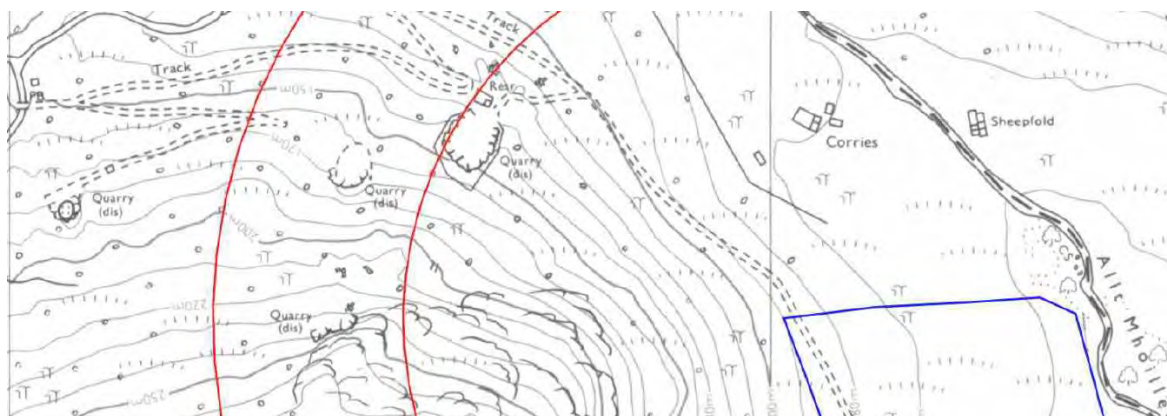




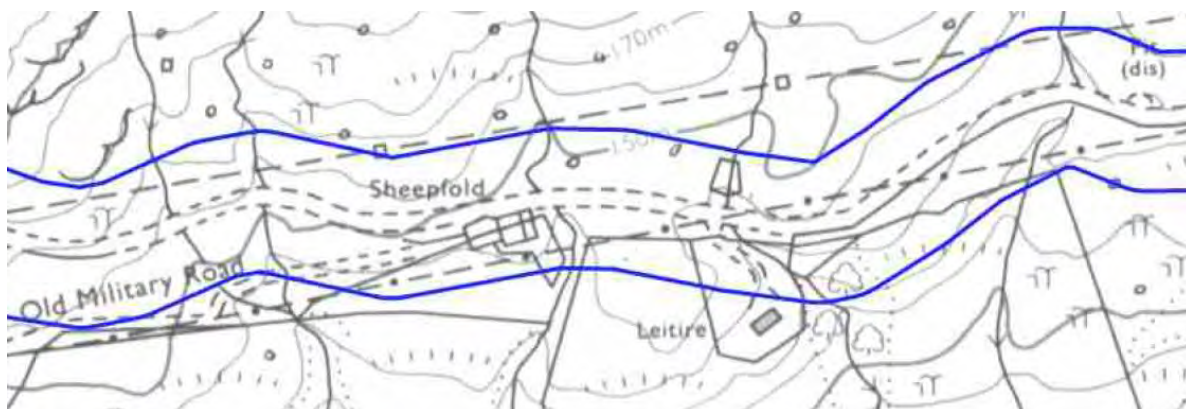
Extract 1 Historical maps dated 1870 1:10,560 (left) and 1973 1:10,000 (right) showing the area of Cruachan Reservoir before and after the flooding of Cruachan 1 took place



Extract 2 Historical map dated 1900 (1:10,560) showing the Falls of Cruachan before Cruachan 1 was constructed



Extract 3 Historical map dated 1973 – 1976 (1:10,000) showing the East Area (blue outline) and the locations of the four disused quarries (one labelled a reservoir)



Extract 4 Historical map dated 1973 – 1976 (1:10,000) showing the access track and the locations of the disused pit (top right hand site) and old military road

#### 4.4 Review of Historical Imagery on Google Earth

- 4.4.1 Google Earth aerial imagery available from 2006 to 2020 has been reviewed. There are no noteworthy differences from the review of historical maps in [Section 4.3](#) above.
- 4.4.2 Of note, the four disused quarries to the north west of the East Area are visible on the aerial images.

#### 4.5 Review of Database Searches

- 4.5.1 Information on the industrial setting of the Site is presented in the Groundsure Report (Groundsure, 2022) and reproduced in [Appendix C](#). The results of the database searches provided in the Groundsure Report relating to land-use are summarised in the following table and discussed in the following sections.

Table 4.2 Summary of Environmental Database Searches

Data Type	Number on Site	Number within 250 m of Site
<b>Waste Regulation</b>		
Landfill Sites	0	0

Waste Sites	0	0
Licensed Waste Management Facilities	0	0
<b>Statutory Permits/Authorisations</b>		
Pollution Prevention and Control(1)	0	0
Radioactive Substance Authorisations	0	0
Planning Hazardous Substances	0	0
COMAH Sites(2)	0	0
NIHHS Sites(3)	0	0
<b>Recorded Pollution / Potential Pollution</b>		
Substantiated Pollution Incidents	0	0
Contaminated Land(4)	0	0
<b>Potential Contaminative Uses</b>		
Fuel Stations	1	1(1)
Energy Features	1	0
Industrial Land Uses (Past)	12(1)	5
Industrial Land Uses (Current)	8	15
Historical Tanks	1	0
<b>Notes:</b> 1) Includes Integrated Pollution Controls, Integrated Pollution Prevention and Control, Local Authority Integrated Pollution Prevention and Control and Local Authority Pollution Prevention and Control permits. 2) COMAH denotes Control of Major Accident Hazards 3) NIHHS denotes Notification of Installations Handling Hazardous Substances 4) Sites determined as Contaminated Land under Part 2A of the Environmental Protection Act		

### Historical Landfill Sites

- 4.5.2 The Groundsure Report does not identify any recorded landfill or waste sites onsite or in the vicinity of the Site.

### Pollution Prevention and Control

- 4.5.3 There are no PPC permits (current or historical) onsite or within 500m of the Site according to Groundsure.

### Fuel Station

- 4.5.4 The Groundsure Report indicates that there is one historical fuel station approximately 60m south east of the Site dated 1982.



### Industrial Land Uses

- 4.5.5 There are relatively few industrial land uses in the locality of the Site (except for the existing Cruachan Power Station).
- 4.5.6 In the East Area a tank is shown adjacent to the onsite track where the overhead transmission line on the Groundsure Report dated 1982. It is not currently known whether the tank has been decommissioned or is still present and the nature and exact location of this tank is unknown, for example whether the tank is above or below the ground, the condition of the tank (if still present), containment measures and what was/is stored in the tank.
- 4.5.7 A historical sewage treatment works is noted by Groundsure in the west of Lochawe (offsite ~60m south east of the Site).
- 4.5.8 A cutting is noted offsite in the location of the railway line at village of Lochawe.
- 4.5.9 As noted previously, several quarries are recorded on historical mapping, four offsite to the north west of the East Area, at least one to the east beyond Allt Mhoille and one approximately 75m south of the access track in Lochawe. A disused pit is adjacent to the access track.

### 4.6 Review of Unexploded Bomb Risk Map

- 4.6.1 A preliminary unexploded ordnance (UXO) identification has been undertaken through review of the Unexploded Bomb (UXB) risk map (Zetica, 2022). The map indicates the UXBs risk for the Site and local area is low.
- 4.6.2 A detailed UXO risk assessment for the project is not required.

### 4.7 Consultation with Regulators

- 4.7.1 Environmental information requests were submitted to SEPA and Argyll and Bute Council on 05 April 2022. Requests for information and responses from the regulators are included in **Appendix D**.
- 4.7.2 At the time of writing, Stantec is awaiting a response from SEPA.
- 4.7.3 Argyll and Bute Council responded on 14 April 2022, as summarised below:
- No Part IIA designated contaminated land;
  - No known contamination issues relating to the site and surrounding area (i.e. within 500m;
  - There is no information available relating to existing/historical above and below ground storage tanks;
  - There is no information available relating to historical ground investigation, geoenvironmental studies and remediation reports;
  - No available records relating to landfill sites or waste sites;
  - No available records relating to ground gas emissions.

### 4.8 Internet Searches Using Site Address and Postcode

- 4.8.1 Internet searches using the postcode did not reveal additional information relating to ground conditions.

# 5 Ground Stability Appraisal

## 5.1 Introduction

- 5.1.1 This study utilises the guidance given in NHBC Standards Chapter 4.1 Land Quality – Managing Ground Conditions. A preliminary assessment of potential ground instability issues has been undertaken based on walkover information and readily available published geological information together with data acquired from public databases, which equate to the NHBC Initial Assessment (desk study).
- 5.1.2 An assessment of potential geological hazards that may give rise to instability or adverse foundation or construction conditions as supplied by the BGS from its National Geoscience Information Service (NGIS) is presented in the Groundsure Report reproduced in [Appendix C](#).
- 5.1.3 The generic assessment in the Groundsure Report is generated automatically based on digital geological maps and the scope and the accuracy is limited by the methods used to create the dataset and is therefore only indicative for the search area. The information contained in the Groundsure Report has been reviewed and, where considered necessary, reassessed considering the specific information available for the Site.

## 5.2 Coal Mining (Past, Present and Proposed)

- 5.2.1 The Site is not located within a Coal Mining Affected Area (Coal Authority, 2022) and therefore review and assessment of risks from such past activities has not been undertaken.

## 5.3 Natural and Mining Cavities

- 5.3.1 According to the BGS GeoIndex, there are no non-coal mining plans available for the Site and the surrounding area.
- 5.3.2 The National Natural and Mining (non-coal) Cavities Databases, maintained and updated by Stantec, have been searched for relevant natural and non-coal mining cavity records. There are no natural or non-coal mining cavity records in close proximity to the Site.
- 5.3.3 The Groundsure Report indicates that the northern portion of the Site, including Cruachan Reservoir and the upper compound area, may be affected by sporadically underground mining of vein minerals. The area shown by Groundsure appears to be consistent with the Cruachan Intrusion, Meall Odhar Intrusion (Monzogranite) and Diorites strata.

## 5.4 Recorded Surface Ground Workings

- 5.4.1 One BritPit is recorded approximately 90m south of the site called Creag a 'Chuil, now ceased, noted to be a surface mineral working.
- 5.4.2 A sewage treatment works is noted by Groundsure in the west of Lochawe (offsite ~60m south east of the Site).
- 5.4.3 The Cruachan Reservoir has been recorded as surface ground workings by Groundsure.
- 5.4.4 The disused pit adjacent to the access track (see [Section 4.3](#) above) was first mapped in 1973 to 1976. Further details around the nature of the pit are unavailable. The pit is located at the Carn Mairg Quartzite Formation (described by the BSG as massive white pebbly quartzite and rusty gritty psammite). The pit may have been used for local extraction of stone for the track or other local use.

## 5.5 Potential for Compressible Ground Stability Hazards

- 5.5.1 The Groundsure Report records that the compressible ground stability hazard potential across most of the Site is **Negligible** (compressible strata not thought to occur). At the far north east corner of the east Site, the risk is **Moderate** relating to the presence of Alluvium. Stantec generally concurs with this assessment.
- 5.5.2 Notably, the area being considered for the lower compound area is not within the Alluvium and should not be affected by compressible ground stability hazards.
- 5.5.3 Peat can be soft and is highly compressible in nature, and when loaded, can present differential ground settlement hazards. As set out in **Section 3.2** above, peat probing has been undertaken at the Site. Peat was recorded to be variable in thickness across the areas of proposed development at the Site, ranging up to a maximum thickness of 2.20m at a single location, a general peat depth of <1.00m has been encountered.
- 5.5.4 In the West Area, it is understood that in-situ soil was removed to form a temporary compound area for a recent filming project at the location.

## 5.6 Potential for Running Sand Stability Hazards

- 5.6.1 The Groundsure Report records the onsite potential for running sands stability hazards to be **Negligible to Low**. Stantec concurs with this assessment

## 5.7 Potential Shrinking or Swelling Clay Stability Hazards

- 5.7.1 The Groundsure Report records the onsite shrinking or swelling clay stability hazard potential to be **Negligible to Very Low**. Stantec concurs with this assessment.

## 5.8 Potential for Ground Dissolution Stability Hazards

- 5.8.1 The Groundsure Report records the onsite ground dissolution stability hazard potential as **Negligible**. Stantec concurs with this assessment.

## 5.9 Potential for Landslide Ground Stability Hazards

- 5.9.1 The Groundsure Report records the onsite landslide ground stability hazard potential to be **Negligible to Moderate**. Very localised areas of Moderate hazard potential are shown in the east Site, associated with the hummocky terrain. The remainder and the vast majority of the Site is shown as **Low to Very Low** hazard potential. Stantec concurs with this assessment.

# 6 Land Contamination Risk Assessment

## 6.1 Approach and Outline Conceptual Model

- 6.1.1 The land contamination risk assessment presented in this chapter is a Tier 1 PRA, which uses published information. A summary of the guidance for the assessment of land contamination and the approach developed and adopted by Stantec is presented in **Appendix A**.
- 6.1.2 A conceptual model identifies the types and locations of potential contamination sources, the identification of potential receptors and the identification of potential transport/migration pathways.
- 6.1.3 This project is unusual in that the majority of the development work will effectively take place below ground.
- 6.1.4 Guidance requires a risk assessment to include the following steps:
- Identify the hazard - establish contaminant sources;
  - Assess the hazard - use a source-pathway-receptor (S-P-R) pollutant linkage approach to find out if there is the potential for unacceptable risk;
  - Estimate the risk - predict what degree of harm or pollution might result and how likely it is to occur; and
  - Evaluate the risk - decide whether a risk is unacceptable.
- 6.1.5 The findings for each step are summarised in the following subsections.

## 6.2 Hazard Identification (Sources of Contamination)

### Naturally Occurring Geochemical Hazards

- 6.2.1 Radon has not been identified as a naturally occurring ground gas requiring gas protection measures. The estimated natural soil chemistry information (Groundsure Report, 2022) does not indicate the presence of elevated concentrations of metals.

### Potential Sources of Contamination and Contaminants of Concern

- 6.2.2 Part of the East Area is understood to have been previously used as a 'camp' area for the development of Cruachan Power Station in the 1960's. It is unknown the extent and type of works undertaken at that 'camp'. Made Ground including concrete platforms were recorded during the Site walkover and it is possible that this area was used to store substances as well as being utilised as a camp and administration area. At least one drum was noted during the Site walkover. A tank has been recorded by Groundsure however details on this tank are unknown at the time of writing.
- 6.2.3 The West of the Site has previously been subject to heavy engineering including tunnelling and the construction of Cruachan Dam/Reservoir. Potential contamination associated with Cruachan Power Station would mainly include leaks and spillages of oils/fluids used in machinery in the underground

power station (generators and turbines) and Potentially Acid Generating Rock (PAG) associated with the geology. It is noted that the newly formed jetty area on Loch Awe will be used as an area to temporarily store tunnel spoil prior to disposal offsite. If the geology is PAG, then leachate management would be required to protect the water environment (primarily Loch Awe). This will be assessed in the EIA for the development.

- 6.2.4 The quarries identified in the historical mapping may have been backfilled. The nature of this infill material, if present, would be unknown and may contain contaminants. The series of four quarries to the north west of the East Area are considered to be at a distance whereby contamination is unlikely to affect the end users (construction workers).
- 6.2.5 The potential for very localised contamination in soils related to leaks and / or spills from the historical railway land is considered to be **Low**.
- 6.2.6 The Groundsure Report recorded a former filling station and a sewage treatment works in proximity to the Access Track. Although ~80m and ~60m from the Site, the filling station and sewage treatment works are both south of the Site and down hydraulic gradient. If contamination is present from leaks and spillages, it is unlikely to affect the Site. The potential is considered to be **Low**.
- 6.2.7 Cruachan 1 (existing hydro power facility)- leaks and spills from operational machinery and possible asbestos in the existing belowground buildings.
- 6.2.8 The indicative criteria for classifying hazards from Very Low to Very High are presented in Table 1 of **Appendix A**.
- 6.2.9 The sources of potential contamination (SPCs) identified and associated contaminants of concern are presented in **Table 6.1** below. Contaminants of concern associated with each of the SPC have been derived from the Department of Environment (DoE) Industry Profiles (Department of Environment, 1995) and Annex A of BS ISO 18400-202:2018 (British Standards Institution, 2018).

Table 6.1 Sources of Potential Contamination

SPC Reference	Description, Hazard Score <sup>1</sup> Location	Potential Contaminants of Concern
1	Historical construction compound areas (2) Onsite East and West Areas	Dependent on infill material: Asbestos, heavy metals, inorganics, polycyclic aromatic hydrocarbons (PAHs), petroleum hydrocarbons, and possible ground gases (carbon dioxide and methane).
2	Disused pit (2) Onsite Access Track	Dependent on infill material: Asbestos, heavy metals, inorganics, PAHs, petroleum hydrocarbons and possible ground gases (carbon dioxide and methane).
3	Railway land (2) Onsite East Area and West Area	Asbestos, herbicides, heavy metals, sulphates, PAHs, chlorinated aliphatic hydrocarbons, polychlorinated biphenyls (PCBs) and possible ground gases (carbon dioxide and methane).
4	Cruachan Power Station ('Cruachan 1') (2) Onsite West Area	Metals, oil/fuel hydrocarbons, PAHs, PCBs, metals, inorganics, asbestos



SPC Reference	Description, Hazard Score <sup>1</sup> Location	Potential Contaminants of Concern
6	Recorded tank (details not available) (2) Onsite East Area	Heavy metals, PAHs, petroleum hydrocarbons, volatile organic compounds and semi-volatile organic compounds (VOCs and SVOCs)
7	Historical electricity substation (2) Onsite Access Track	PCBs, asbestos
8	Former filling station (3) Offsite S of Access Track	Heavy metals, asbestos, pH, oil/fuel hydrocarbons, aromatic hydrocarbons, PAHs, chlorinated aliphatic hydrocarbons, organolead compound, VOCs and SVOCs
9	Historical quarries (2) Offsite NW of East Area	If backfilled, potentially: Asbestos, heavy metals, inorganics, PAHs, petroleum hydrocarbons, sulphates and possible ground gases (carbon dioxide and methane).
10	Historical sewage treatment works (3) Offsite S of Access Track	Oil/fuel hydrocarbons, chlorinated aliphatic/aromatic hydrocarbons, PCBs, metals, inorganics (NO <sub>3</sub> , SO <sub>4</sub> , S <sub>2</sub> ), asbestos and pH

<sup>1</sup> hazard score shown in brackets is from the methodology in **Appendix A** Error! Reference source not found.

- 6.2.10 The hazard scores used in the table above are based on the contaminative potential of these land uses as established in Table 1 of the Stantec Methodology in **Appendix A**.

## 6.3 Hazard Assessment

- 6.3.1 To determine whether the identified hazards pose a risk it is necessary to identify the presence of potential receptors and pathways by which these receptors can be exposed to the hazard.

### Identification of Potential Pathways

- 6.3.2 Potential hazards require a pathway connecting the source (if present) to potential receptors to impact upon the receptors. These pathways are capable of conveying the potential contaminants identified. Pathways may be anthropogenic (artificial) or natural.
- 6.3.3 Anthropogenic pathways are artificial routes capable of conveying contaminants and include such routes as surface water drains, high permeability backfill materials, poorly consolidated Made Ground, foundations, and persons disturbing contamination sources in such a way as to liberate contaminants.
- 6.3.4 The potential for contamination (if present) associated with the anticipated onsite and offsite infilled Made Ground materials to leach or migrate via groundwater flow is only considered to be likely in the East Area.
- 6.3.5 In the East Area, the potential for contaminated onsite Made Ground (if present) to be ingested, inhaled or absorbed by humans is considered possible during the construction phase of the project.
- 6.3.6 Ground gas and vapours, for example methane and carbon dioxide from Made Ground and peat, can migrate through fissures, voids and services and has the potential to enter buildings, such as the temporary construction buildings at the proposed upper and lower compounds areas. Ground gases can accumulate in enclosed spaces and present potential health hazards when inhaled, but only if

there is a mechanism via which they could enter the enclosed space. This would not be the case, for example, at a portacabin type structure that was raised up from the ground surface.

- 6.3.7 Table 3 of the methodology presented in **Appendix A** describes the possible pathways for each receptor type.

### Receptor Identification

- 6.3.8 Potential receptors identified by this assessment and determination of the sensitivity/value are presented in **Table 6.2** below.

Table 6.2 Potential Receptors

Receptor	Present? Y/N	Receptor/Sensitivity
Human Health - Current Users	Yes – employees of Cruachan 1 in the West Area only (East Area not currently in use and use of the access track is transient)	4
Human Health - Future Users	Yes – employees of Cruachan 1 and 2	4
Human Health - Neighbours	Yes – neighbouring properties (residential and commercial) at Lochawe adjacent to the Access Track and East Area	4
Human Health - Construction Workers	Yes – temporarily during construction phase	4
Water Environment (Shallow Groundwater)	No – superficial aquifers not recorded	Eliminated from assessment
Water Environment (Deep Groundwater)	Yes – the Oban and Kintyre and Cruachan Reservoir bedrock groundwater bodies both in Good condition according to SEPA and low productivity aquifers.	4
Water Environment (Surface Water)	Yes – the adjacent Loch Awe, Allt Mhoille and Allt Cruachan. Allt Mhoille (adjacent to the East Area) is within a drinking water protected area and is in Good condition according to SEPA. Loch Awe is in Moderate condition according to SEPA.	4
Property – Buildings onsite	Yes – nationally important listed buildings and Cruachan 1 building structures present (West Area only)	3
Property – Buildings offsite	Yes – adjacent commercial and residential at Lochawe village (Access Track and East Area only)	1
Property – Animals/ Crop	Yes – animals only	1
Ecological Systems and Geodiversity	Several designations including SSSI, SAC, SPA, GCR site and ancient woodland (West Area and Access Track only)	4

## 6.4 Risk Estimation

- 6.4.1 When there is a pollutant linkage (and therefore some measure of risk) it is necessary to determine whether the risk is significant and therefore whether further action is required. Risk estimation involves predicting the likely consequence (what degree of harm the receptor might suffer) and the probability that the consequences will arise (how likely the outcome is given the likely scale of contamination and the probability of exposure).
- 6.4.2 Preliminary risk estimation is based on the evaluation of available data, which has been summarised and presented in this report. Without actual data from physical site investigation work, there is always a degree of uncertainty regarding the actual presence of potentially harmful contamination. Based on the current and known historical land uses, the potential for the Site to be affected by contamination (if present) is considered overall to be **Low**. There may be localised areas of **Moderate** potential due to historical land use as previous construction compound areas (i.e. East Area and West Area).
- 6.4.3 The tables in **Appendix E** presents the classification of risk, which is a combination of consequence and probability for each potential pollutant linkage identified for the sources in **Table 6.2** above.
- Human health (onsite current users) – engineers and maintenance workers at Cruachan 1. The risk to current onsite current users is **Low**;
  - Human health (onsite future users) – engineers and maintenance workers at Cruachan 1 and 2. Once the development has been constructed, the risk to future users is considered to be **Low**;
  - Human health (neighbouring sites) – the risk to offsite users such as adjacent residential properties is estimated to be **Very Low to Low**;
  - Human health (construction workers) – most of the groundwork will involve tunnelling at depth through the bedrock and contact with superficial deposits and groundwater (where contamination is most likely to be present) will be very limited. Exposure to soils will likely be short term. During the construction of the upper and lower compound areas, the risk to construction workers is estimated to be **Low** for most of the Site and **Low to Moderate** for the lower compound area associated with the historical compound;
  - Groundwater (bedrock) – SEPA data indicates that there is no superficial aquifer below the site. The Oban and Kintyre, and the Upper Glen Coe bedrock aquifers are low productivity with flow through fractures, classified by SEPA as Good. The risk to groundwaters is anticipated to be **Low**;
  - Surface Water – Loch Awe, Allt Mhoille and Allt Cruachan are onsite or immediately adjacent to the Site. The risk is anticipated to be **Low to Moderate**;
  - Property (buildings onsite and offsite) – the risk to properties is anticipated to be **Very Low**;
  - Property (animals) – the risk to animals is anticipated to be **Very Low**; and
  - Ecological/Geodiversity Setting – the risk to ecological designated sites is anticipated to be **Low to Moderate**.
- 6.4.4 The definitions of probability and consequence are in Table 4 and Table 5 of **Appendix A** (respectively).
- 6.4.5 Possible pollutant linkages are determined using professional judgement. If a linkage is considered plausible with some associated risk, even if estimated to be low, it is considered that this represents a

potentially 'unacceptable risk' and therefore requires further consideration. Risk reduction can be achieved through implementation of remediation or mitigation measures or through further tiers of assessment following collection of site-specific data.

## 6.5 Risk Evaluation

- 6.5.1 In the absence of mitigation, possible pollutant linkages have been identified for future site users, neighbours, construction workers, surface water, groundwater, buildings, and ecological/geodiversity setting.
- 6.5.2 The Tier 1 Risk Assessment has shown that the estimated geoenvironmental risks for the Site as a whole are generally **Low**. However, **Moderate** estimated geoenvironmental risks for the Site with the potential to cause harm to human health during construction are considered to be associated with localised made ground/leaks/spills associated with the historic construction compound. It is important to highlight that this risk evaluation assumes that development and construction would disturb the existing ground at those locations.
- 6.5.3 The actual ground conditions and soil chemistry are unknown. Therefore, prior to the development the Site should be subjected to an intrusive ground investigation to determine and assess the actual soil characteristics and the presence of possible Made Ground. Moreover, a ground investigation will also be required to characterise geotechnical conditions for the proposed development including foundations, the sites groundwater regime, access road, construction compounds, drainage design, earthworks.
- 6.5.4 A soil screening exercise is recommended in conjunction with a ground investigation across the Site to assess the estimated risk of Low to Moderate to surface water from ground conditions.
- 6.5.5 The Contractor should be made aware of the likely areas of possible Made Ground. The Contractor will prepare documents (risk assessment and method statements (RAMS) and implement measures to address the requirements of health and safety legislation, such as the Construction (Design and Management) Regulations (CDM 2015).
- 6.5.6 The following good practice and hygiene measures are typically implemented on development sites and assumed to be the minimum:
- Designated eating and drinking area(s) and these are kept clean (free of dirt / dust);
  - Provision of hand washing facilities; and
  - Toolbox box talks, induction awareness and regular refresher talks.

# 7 Conclusions and Recommendations

## 7.1 Conclusions

### Geoenvironmental

- 7.1.1 A Tier 1 preliminary land contamination risk assessment has been undertaken and an outline conceptual model has been produced. The primary sources of potential contamination (SPC) identified in the East Area relate to historical land use as a construction compound area for the existing Cruachan Power Station as well as historical railway land and a recorded storage tank (use of the tank is unknown). In the West Area, the main SPCs are operational activities from the existing Cruachan Power Station and the potential leaching PAG geology (although the potential presence of PAG geology is to be confirmed). Along the access track, a disused pit are shown which have the potential to present localised contamination issues. Offsite SPCs include historical quarries to the north west of the East area, and a former filling station and sewage treatment works to the south (although the latter two SPCs are not considered likely as they are located downgradient of the Site).
- 7.1.2 The estimated risk to receptors is generally estimated to be Very Low to Low for human health, except for construction workers where a Low to Moderate risk is estimated. Regarding the Water Environment, a Low risk is estimated for groundwaters. A Low to Moderate risk is estimated for surface water and ecological receptors relating to the proximity of Loch Awe, Allt Mhoille and Allt Cruachan and biological designations which are largely associated with the waterbodies.

### Geotechnical

- 7.1.3 A preliminary assessment of potential ground instability issues has been undertaken based on walkover information and readily available published geological information.
- 7.1.4 The Site is not considered to be at risk from ground dissolution, shrinking or swelling clays or running sands.
- 7.1.5 For the West Area it was confirmed that in-situ peat is not present. During the walkover it was observed that the ground conditions at the Site presently comprise a thickness of soft mixed material comprising organic soil with gravel and cobbles. At the proposed locations it is understood that in-situ soil was removed to form a temporary compound area for a recent filming project at the location.
- 7.1.6 For the East Area it was confirmed that a layer of peat or thin organic soil is present across the Site. The peat was recorded to be variable in thickness across the site, ranging up to a maximum thickness of 2.20m at a single location, a general peat depth of <1.00m has been encountered. Consideration of this hazard will be used to inform earthworks, the development layout (areas of deep peat will be excluded from development) and the foundation design of the lower compound area.
- 7.1.7 The geotechnical properties of the soil and bedrock materials will require assessment prior to the development.
- 7.1.8 Geotechnical issues with respect to the proposed development will be managed through appropriate foundation, structural and drainage design and are not considered to be inherent to this environmental assessment.

## **7.2 Uncertainties and Data Gaps**

- 7.2.1 Whilst the information used in this assessment is considered robust and suitable for purpose, no recent or development specific ground investigation data is available, therefore the actual ground conditions beneath the Site require investigation. There is a reasonable level of confidence that the information presented in this report provides a good understanding of the likely ground conditions and enables identification of potential risks. However, further work is recommended to refine the Conceptual Model for the Site and reduce uncertainty.
- 7.2.1 Historical maps and aerial photographs used as part of the studies provide a 'snapshot' in time about conditions or activities at the Site, and as such cannot be relied upon as indicators of any events or activities that may have taken place at other times. There is a large gap in the historical mapping (73 years) where no maps are available which is likely to be due to the Site's location in a rural part of Scotland where coverage is limited. It should be further noted that 1:2500 scale, which provide greater detail than the 1:10560 and 1:10000 scale maps, are not available for the West Area and most of the Access Track. The 1:2500 scale maps are only available from the 2000s. It is therefore possible that some land uses which may be of relevance to this assessment have not been identified.
- 7.2.2 SEPA have been contacted for environmental information about the Site. It is understood that freedom of information requests to SEPA are currently on hold due to the December 2020 cyber-attack on SEPA. Data on land contamination (including ground investigated or designated under Part IIA), landfill sites, abstractions, discharge consents, explosive sites, PPC activities/permits, radioactive substances, enforcement and prohibition notices and plans showing potentially contaminative land uses (current and past) at the Site were all included on the Stantec information request to SEPA.

## **7.3 Recommendations and Further Work**

- 7.3.1 Further investigations are recommended for two principal reasons:
- Geotechnical: To determine whether the ground conditions pose a risk to ground stability and to inform foundation and drainage design;
  - Geoenvironmental: To assess the potential presence of groundwater and soil contamination.
- 7.3.2 It is recommended that a preliminary intrusive ground investigation will be primarily driven by geotechnical considerations but will be designed to cover both geotechnical and geoenvironmental factors is undertaken including:
- Confirm the site geology, in particular the presence and characteristics of the mapped superficial geology, together with the underlying bedrock strata.
  - Deep cored boreholes, insitu testing, laboratory testing and geophysical surveys to inform the detailed design of the underground structures.
  - Targeted boreholes, trial pits, insitu and laboratory testing to inform the design of proposed above ground structures, buildings and roads.
  - Shallow boreholes or trial pits with associated testing to provide information on the ground conditions, to inform the detailed design of the upper and lower compound areas and areas of access road improvements;
  - A combined targeted and non-targeted sampling strategy should be adopted with representative samples being collected for geotechnical and geoenvironmental laboratory analysis.

- Selected boreholes will be installed with monitoring wells for groundwater monitoring and sampling. If substantial Made Ground or organic soils are encountered, there may be a requirement for a gas monitoring programme and risk assessment.
  - Ground gas surveys and risk assessment may be required at specific areas of the site, however, this will be dependent on the proposed development, and whether any enclosed spaces are anticipated to be constructed.
  - A watercourse runs adjacent to the east of the East Area as well as the Falls of Cruachan in the West Area and Loch Awe to the south. Works to be undertaken in close proximity to the watercourse is likely to be registered with SEPA under the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended).
- 7.3.3 It is possible that basic mitigation measures, such as health and safety for construction workers and removal or capping of contamination impacted soils (if present), for example around the Eastern area at the historical construction compound area, could be required.
- 7.3.4 Development of a Peat Management Plan including peat slide risk assessment, if required, to effectively mitigate the impact on peat soil at the site.

## 8 References

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## 9 Figures

Figure 1 – Site Location and Proposed Development Plan

Figure 2 – Peat Survey

# 10 Essential Guidance for Report Readers

This report has been prepared within an agreed timeframe and to an agreed budget that will necessarily apply some constraints on its content and usage. The remarks below are presented to assist the reader in understanding the context of this report and any general limitations or constraints. If there are any specific limitations and constraints, they are described in the report text.

The opinions and recommendations expressed in this report are based on statute, guidance, and best practice current at the time of its publication. Stantec UK does not accept any liability whatsoever for the consequences of any future legislative changes or the release of subsequent guidance documentation, etc. Such changes may render some of the opinions and advice in this report inappropriate or incorrect and the report should be returned to us and reassessed if required for re-use after one year from date of publication. Following delivery of the report, Stantec has no obligation to advise the Client or any other party of such changes or their repercussions.

Some of the conclusions in this report may be based on third party data. No guarantee can be given for the accuracy or completeness of any of the third-party data used. Historical maps and aerial photographs provide a “snapshot” in time about conditions or activities at the site and cannot be relied upon as indicators of any events or activities that may have taken place at other times.

The conclusions and recommendations made in this report and the opinions expressed are based on the information reviewed and/or the ground conditions encountered in exploratory holes and the results of any field or laboratory testing undertaken. There may be ground conditions at the site that have not been disclosed by the information reviewed or by the investigative work undertaken. Such undisclosed conditions cannot be taken into account in any analysis and reporting.

It should be noted that this report is a land condition assessment and does not purport to be an ecological, flood risk or archaeological survey and additional specific surveys may be required.

This report has been written for the sole use of the Client stated at the front of the report in relation to a specific development or scheme. The conclusions and recommendations presented herein are only relevant to the scheme or the phase of project under consideration. This report shall not be relied upon or transferred to any other party without the expressed written authorisation of Stantec. Any such party relies upon the report at its own risk.

The interpretation carried out in this report is based on scientific and engineering appraisal carried out by suitably experienced and qualified technical consultants based on the scope of our engagement. We have not taken into account the perceptions of, for example, banks, insurers, other funders, lay people, etc., unless the report has been prepared specifically for that purpose. Advice from other specialists may be required such as the legal, planning and architecture professions, whether specifically recommended in our report or not.

Public or legal consultations or enquiries, or consultation with any Regulatory Bodies (such as the Scottish Environmental Protection Agency (SEPA) or Local Authority) have taken place only as part of this work where specifically stated.


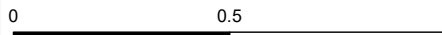
# Figures

Figure 1 – Site Location and Proposed Development Boundary

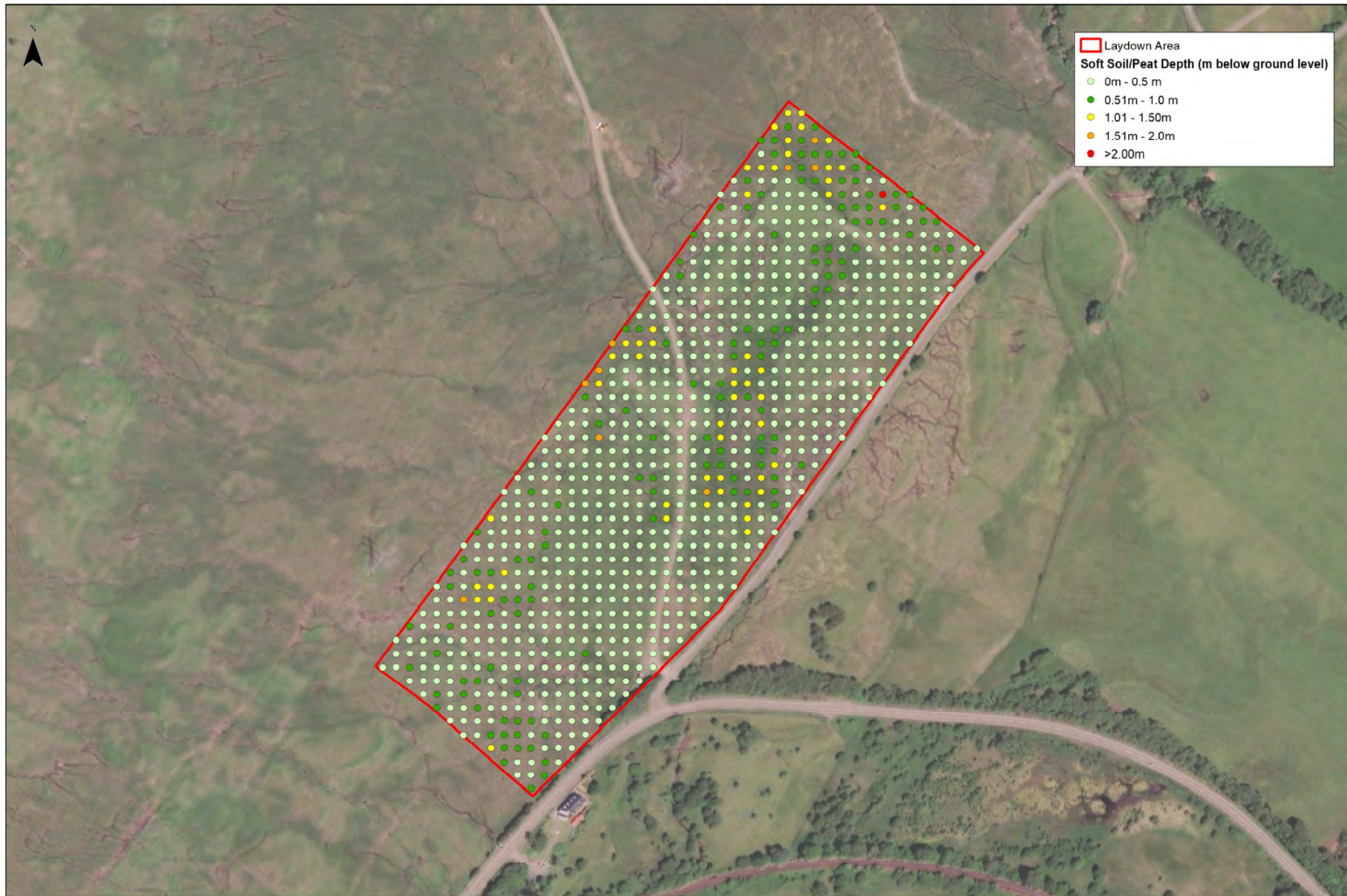
Figure 2 – Peat Survey





	Client  Drax Generation Enterprise Ltd	<b>CRUACHAN EXPANSION PROJECT</b> Site Location Plan	 © Crown copyright and database rights [2021] Ordnance Survey 0100031673 Contains public sector information licensed under the Open Government Licence v3.0.	1:17,500 @ A3	Date: 03/03/2022
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# Appendix A Stantec Guide: Methodology for Assessment of Land Contamination (Scotland)



# Stantec Guide: Methodology for Assessment of Land Contamination (Scotland)

## 1 INTRODUCTION

This document defines the approach adopted by Stantec in relation to the assessment of land contamination in Scotland. The aim is for the approach to (i) be systematic and objective, (ii) provide for the assessment of uncertainty and (iii) provide a rational, consistent, transparent framework.

When preparing our methodology we have made reference to various technical guidance documents and legislation referenced in Section 7 of which the principal documents are (i) Contaminated Land Statutory Guidance (Scottish Executive, 2006), (ii) online guidance Land Contamination: Risk Management (LCRM) accessed from GOV.UK which (in England) is expected to replace the Contaminated Land Research (CLR) Report 11: Model Procedures for the Management of Contamination CLR 11 (EA 2004)\*, (iii) Contaminated land risk assessment: A guide to good practice (C552) (CIRIA 2001), (iv) Scottish Planning Policy (SPP 2014) and Planning Advice Note 33, Development of Contaminated Land (PAN 33), (v) BS 10175: 11+A2:2017 Investigation of potentially contaminated sites – Code of practice, and (vi) the series of British Standards on Soil Quality BS 18400.

**\*At the time of writing there has been no formal decision about the adoption of LCRM over CLR 11 in Scotland. Until such a time that a decision is made, Stantec has opted to work to LCRM in Scotland. It should be noted that LCRM is currently due to be revised following consultation and CLR 11 is achieved.**

## 2 DEALING WITH LAND CONTAMINATION

Government policy on land contamination aims to prevent new contaminated land from being created and promotes a risk-based approach to addressing historical contamination. With regard to historical contamination, regulatory intervention is held in reserve for land that meets the legal definition and cannot be dealt with through any other means, including through planning. Land is only considered to be “contaminated land” in the legal sense if it poses an unacceptable risk.

UK legislation on contaminated land is principally contained in Part 2A of the Environmental Protection Act, 1990 (which was inserted into the 1990 Act by section 57 of the Environment Act 1995). Part 2A was introduced in Scotland on 14 July 2000 and provides a risk-based approach to the identification and remediation of land where contamination poses an unacceptable risk to human health or the environment. The Model Procedures for the Management of Land Contamination (CLR 11), were developed to provide the technical framework for applying a risk management process when dealing with land affected by contamination. The process involves identifying, making decisions on, and taking appropriate action to deal with land contamination in a way that is consistent with government policies and legislation within the UK. The approach, concepts and principles for land contamination management promoted by LCRM are applied to the determination of planning applications. The guidance given in LC:RM follows the same principles.

Other legislative regimes may also provide a means of dealing with land contamination issues, such as the regimes for waste, water, environmental permitting, and environmental damage.

Further, the law of statutory nuisance may result in contaminants being unacceptable to third parties whilst not attracting action under Part 2A or other environmental legislation.

### 2.1 Part 2A

The Regulations and Statutory Guidance that accompanied the Act, include the Contaminated Land (Scotland) Regulations 2005 and the Contaminated Land Statutory Guidance (for Scotland) 2006.

Part 2A defines contaminated land as “*land which appears to the Local Authority in whose area it is situated to be in such a condition that, by reason of substances in, on or under the land that significant harm is being caused, or there is a significant possibility that such harm could be caused, or pollution of controlled waters (known as “the water environment” in Scotland) is being, or likely to be, caused (Significant Harm of other receptors including human health (SPOSH) and Significant Possibility of Significant Pollution (SPOSP))*”.

Harm is defined as “*harm to the health of living organisms or other interference with the ecological systems of which they form part, and in the case of man, includes harm to his property*”.

Part 2A provides a means of dealing with unacceptable risks posed by land contamination to human health and the environment, and under the guidance enforcing authorities should seek to find and deal with such land. It states that “*under Part 2A the starting point should be that land is not contaminated land unless there is reason to consider otherwise. Only land where unacceptable risks are clearly identified, after a risk assessment has been undertaken in accordance with the Guidance, should be considered as meeting the Part 2A definition of contaminated land*”. Further the guidance makes it clear that “*regulatory decisions should be based on what is reasonably likely, not what is hypothetically possible*”.

The overarching objectives of the Government’s policy on contaminated land and the Part 2A regime are:

- “(a) To identify and remove unacceptable risks to human health and the environment.
- (a) To seek to ensure that contaminated land is made suitable for its current use.
- (b) To ensure that the burdens faced by individuals, companies and society as a whole are proportionate, manageable and compatible with the principles of sustainable development”.

The enforcing authority may need to decide whether and how to act in situations where decisions are not straight forward, and where there is uncertainty. “*In so doing, the authority should use its judgement to strike a reasonable balance between: (a) dealing with risks raised by contaminants in land and the benefits of remediating land to remove or reduce those risks; and*



## Stantec Guide: Methodology for Assessment of Land Contamination (Scotland)

*(b) the potential impacts of regulatory intervention including financial costs to whoever will pay for remediation, health and environmental impacts of taking action, property blight, and burdens on affected people". The authority is required to "take a precautionary approach to the risks raised by contamination, whilst avoiding a disproportionate approach given the circumstances of each case". The aim is "that the regime produces net benefits, taking account of local circumstances".*

The guidance recognises that *"normal levels of contaminants in soils should not be considered to cause land to qualify as contaminated land, unless there is a particular reason to consider otherwise"*.

Normal levels are quoted as:

- "a) natural presence of contaminants' such as from underlying geology 'that have not been shown to pose an unacceptable risk to health and the environment*
- b) ...low level diffuse pollution, and common human activity..."*

Similarly, the guidance states that significant pollution of the water environment is required for land to be considered contaminated and the *"fact that substances are merely entering water"* or *"where discharge from land is not discernible at a location immediately downstream"* does not constitute contaminated land.

To help achieve a more targeted approach to identifying and managing contaminated land in relation to the risk (or possibility) of harm to human health, the revised Statutory Guidance (in England and Wales) presented a new four category system for considering land under Part 2A, ranging from Category 4, where there is no risk that land poses a significant possibility of significant harm (SPOSH), or the level of risk is low, to Category 1, where the risk that land poses a SPOSH is unacceptably high.

For land that cannot be readily placed into Categories 1 or 4 further assessment is required. If there is a sufficiently strong case that the risks are of sufficient concern to cause significant harm/pollution or have the significant possibility of significant harm/pollution the land is to be placed into Category 2. If the concern is not met land is considered Category 3.

The technical guidance clearly states that the currently published Soil Guidance Value's (SGV's) and Generic Assessment Criteria (GAC's) represent *"cautious estimates of level of contaminants in soils"* which should be considered *"no risk to health or, at most, a minimal risk"*. These values do not represent the boundary between categories 3 and 4 and *"should be considered to be comfortably within Category 4"*.

At the end of 2013 technical guidance in support of Defra's revised Statutory Guidance (SG) was published and then revised in 2014 (CL:AIRE 2014) which provided:

- A methodology for deriving C4SLs for four generic land-uses comprising residential, commercial, allotments and public open space; and

- A demonstration of the methodology, via the derivation of C4SLs for six substances – arsenic, benzene, benzo(a)pyrene, cadmium, chromium (VI) and lead.

In addition to the C4SLs, CIEH/LQM published Suitable 4 Use Levels (S4ULs) for 82 substances in 2015.

At the time of writing, it is understood that the acceptance of C4SLs and S4ULs is at the discretion of Scottish Local Authorities, but that these criteria are likely to be accepted in Tier 2 screening providing adequately justified. For more detail on assessment criteria, please refer to the Stantec document entitled "Rationale for Selection of Evaluation Criteria Used in Tier 2 (Generic) Land Contamination Risk Assessment (Scotland)".

### 2.2 Planning

The Local Authority Planning Department is responsible for the control of development, and in doing so it has a duty to take account of all material considerations, including contamination. Government guidance is provided in Planning Advice Note 33, Development of Contaminated Land (PAN 33).

PAN 33 defines the potential characteristics of contaminated land and describes the 'Source, Pathway, Receptor' model (See Section 3, below for more detail).

The level at which contamination is deemed to be unacceptable, or, gives rise to adverse effects under a planning context has not been identified but is envisaged to be more precautionary than the level required to determine land as contaminated under Part 2A.

A site containing contaminants may not be likely to cause significant harm in its current use, but if a different use were proposed, then the potential for significant harm may be enhanced.

The principal planning objective is to ensure that any unacceptable risks to human health, buildings and other property and the natural and historical environment from the contaminated condition of the land are identified so that appropriate action can be considered and taken to address those risks. In order to grant planning permission, the Local Authority (LA) has to be satisfied that there is sufficient information about the condition of the land, its impacts and the availability of viable remedial options.

A key distinction between the Soil Guideline Values (SGVs) and the C4SLs is the level of risk that they describe. As described by the Environment Agency (2009a):

*"SGVs are guidelines on the level of long-term human exposure to individual chemicals in soil that, unless stated otherwise, are tolerable or pose a minimal risk to human health."*

Note that it is understood that the acceptance of C4SLs and S4ULs is at the discretion of Scottish Local Authorities (see the last paragraph in Section 2.1 for more information).

# Stantec Guide: Methodology for Assessment of Land Contamination (Scotland)

## 2.3 Building Control

The building control department of the local authority or private sector approved inspectors are responsible for the operation and enforcement of the Building (Scotland) Regulations 2004 to protect the health, safety and welfare of people in and around buildings. This requires the protection of buildings and associated land from the effects of contamination, to be applied (non-exclusively) in all changes of use from commercial or industrial premises, to residential property.

## 3 APPROACH

As with CLR11 the guidance given in LC:RM presents three stages of risk management:

- (a) Stage 1 - Risk Assessment;
- (b) Stage 2 - Options Appraisal; and
- (c) Stage 3 - Remediation.

Each stage has three tiers. The three tiers of Stage 1 Risk Assessment are:

- Tier 1 - Preliminary Risk Assessment (PRA) - first tier of RA that develops the outline conceptual model (CM) and establishes whether there are any potentially unacceptable risks.
- Tier 2 - Generic Quantitative Risk Assessment (GQRA) - carried out using generic assessment criteria and assumptions to estimate risk.
- Tier 3 - Detailed Quantitative Risk Assessment (DQRA) - carried out using detailed site-specific information to generate Site Specific Assessment Criteria (SSAC) as risk evaluation criteria.

For each tier of a Stage 1 - Risk Assessment you must:

1. Identify the hazard - establish contaminant sources.
2. Assess the hazard - use a source-pathway-receptor (S-P-R) pollutant linkage approach to find out if there is the potential for unacceptable risk.
3. Estimate the risk - predict what degree of harm or pollution might result and how likely it is to occur.
4. Evaluate the risk - decide whether a risk is unacceptable.

A Stantec Preliminary Investigation report normally comprises a desk study, walkover site reconnaissance and preliminary risk assessment (PRA). The project specific proposal defines the actual scope of work which might include review of ground investigation data in which case the report includes a GQRA.

Risk estimation involves identifying the magnitude of the potential consequence (taking into account both the potential severity of the hazard and the sensitivity of the receptor) and the magnitude of the likelihood i.e. the probability (taking into account the presence of the hazard and the receptor and the integrity of the pathway). This approach is promoted in current guidance such as R&D 66 (NHBC 2008).

For a PRA, Stantec's approach is that if a pollution linkage is identified then it represents a potentially unacceptable risk which either (1) remediation / direct risk management or (2) progression to further tiers of risk assessment (GQRA and DQRA) requiring additional data collection and enabling refinement of the CM using the site specific data.

## 4 IDENTIFICATION OF POLLUTANT LINKAGES AND CONCEPTUAL MODEL (CM)

For all Tiers the underlying principle to ground condition assessment is the identification of *pollutant linkages* in order to evaluate whether the presence of a source of contamination could potentially lead to harmful consequences. A pollutant linkage consists of the following three elements:

- A source/hazard – a substance or situation which has the potential to cause harm or pollution;
- A pathway – a means by which the hazard moves along / generates exposure; and
- A receptor/target – an entity which is vulnerable to the potential adverse effects of the hazard.

The *Conceptual Model* identifies the types and locations of potential contaminant sources/hazards and potential receptors and potential migration/transportation pathway(s). The CM is refined through progression to further tiers of risk assessment (GQRA and DQRA) requiring additional data collection.

### 4.1 Hazard Identification

A hazard is a substance or situation that has the potential to cause harm. Hazards may be chemical, biological or physical.

In a PRA the potential for hazards to be present is determined from consideration of the previous or ongoing activities on or near to the site in accordance with the criteria presented in the **Table 1**.

Based on the land use information Contaminants of Potential Concern (COPC) are identified. The COPC direct the scope of the collection of site-specific data and the analytical testing selected for subsequent Tiers.

At Tier 2 the site-specific data is evaluated using appropriate published assessment criteria (refer to Stantec document entitled Rationale for the Selection of Evaluation Criteria for a Generic Quantitative Risk Assessment (GQRA)). In general, published criteria have been developed using highly conservative assumptions and therefore if the screening criterion is not exceeded (and if enough samples from appropriate locations have been analysed) then the COPC is eliminated as a potential Hazard. It should be noted that exceedance does not necessarily indicate that a site is contaminated and/or unsuitable for use only that the COPC is retained as a potential Hazard. Published criteria are generated using models based on numerous and complex assumptions. Whether or not these assumptions are appropriate or sufficiently protective requires confirmation on a project by project basis. Manipulation of the default assumptions would normally form part of a Tier 3 Detailed Quantitative Risk Assessment (DQRA).

## Stantec Guide: Methodology for Assessment of Land Contamination (Scotland)

When reviewing or assessing site specific data Stantec utilise published guidance on comparing contamination data with a critical concentration (CL:AIRE/CIEH 2008) which presents a structured process for employing statistical techniques for data assessment purposes.

### 4.2 Receptor and Pathway Identification

For all Tiers the potential receptors (for both on site and adjoining land) that will be considered are:

- Human Health – including current and future occupiers, construction and future maintenance workers and neighbouring properties/third parties;
- Ecological Systems; <sup>\*1</sup>
- The Water Environment <sup>\*2</sup> – including surface water and groundwater;
- Property - Animal or Crop (including timber; produce grown domestically, or on allotments, for consumption; livestock; other owned or domesticated animals; wild animals which are the subject of shooting or fishing rights); and
- Property – Buildings (existing and proposed) (including any structure or erection, and any part of a building including any part below ground level, but does not include plant or machinery comprised in a building, or buried services such as sewers, water pipes or electricity cables including archaeological sites and ancient monuments).

<sup>\*1</sup> International or nationally designated sites (as defined in the statutory guidance (Defra Circular 04/12)) “in the local area” will be identified as potential ecological receptors. A search radius of 1, 2 or 5km will be utilised depending on the site specific circumstances (see also pathway identification). The Environment Agency has published an ecological risk assessment framework (EA 2008) which promotes (as opposed to statutorily enforces) consideration of additional receptors to include locally protected sites and protected or notable species. These additional potential receptors will only be considered if a Phase 1 habitat survey, undertaken in accordance with guidance (JNCC 1993), is commissioned and the data provided to Stantec. It should be noted that without such a survey the Tier 1 risk assessment may conclude that the identification of potential ecological receptors is inconclusive (refer to Stantec Specification for Phase 1).

<sup>\*2</sup> the definition of “pollution of controlled water” was amended by the introduction of the Water Environment and Water Services (Scotland) Act 2003. The water environment is defined as all surface water, groundwater and wetlands. For the purposes of Part 2A groundwater does not include waters above the saturated zone and our assessment does not therefore address perched water other than where development causes a pathway to develop.

If a receptor is taken forward for further assessment it will be classified in terms of its sensitivity, the criteria for which are presented in **Table 2**. Table 2 has been generated using descriptions of environmental receptor importance/value given in various guidance documents including R&D 66 (NHBC 2008) and Transport Analysis Guidance (based on DETR 2000). Human health and buildings classifications have been generated by Stantec using the attribute description for each class.

The exposure pathway and modes of transport that will be considered are presented in **Table 3**.

### 4.3 Note Regarding Ecological Systems

The Environment Agency (EA) has developed an ecological risk assessment framework which aims to provide a structured approach for assessing the risks to ecology from chemical contaminants in soils (EA 2008). In circumstances where contaminants in water represent a potential risk to aquatic ecosystems then risk assessors will need to consider this separately.

The framework consists of a three-tiered process:

- Tier 1 is a screening step where the site soils chemical data is compared to a soil screening value (SSV)
- Tier 2 uses various tools (including surveys and biological testing) to gather evidence for any harm to the ecological receptors
- Tier 3 seeks to attribute the harm to the chemical contamination

Tier 1 is preceded by a desk study to collate information about the site and the nature of the contamination to assess whether pollutant linkages are feasible. The framework presents ten steps for ecological desk studies and development of a CM as follows.

- 1 Establish Regulatory Context
- 2 Collate and Assess Documentary Information
- 3 Summarise Documentary Information
- 4 Identify Potential Contaminants of Concern
- 5 Identify Likely Fate Transport of Contaminants
- 6 Identify Potential Receptors of Concern
- 7 Identify Potential Pathways of Concern
- 8 Create a Conceptual Model
- 9 Identify Assessment and Measurement Endpoints
- 10 Identify Gaps and Uncertainties

The information in a standard PRA covers Steps 1 to 4 inclusive. Step 5 considers fate and transport of contaminants and it should be noted that our standard report adopts a simplified approach considering only transport mechanisms. A simplified approach has also been adopted in respect of Steps 6 and 7 receptors (a detailed review of the ecological attributes has not been undertaken) and pathways (a food chain assessment has not been undertaken). Step 9 is outside the scope of our standard PRA.

It should be noted that the PRA report will present an assessment for ecological systems (where identified as a receptor for a land contamination assessment) considering the viability of the mode of transport given the site-specific circumstances and not specific pathways. The PRA may conclude that the risk to potential ecological receptors is inconclusive.

### 4.4 Note regarding the Water Environment

The water environment is rivers, estuaries, coastal waters, lakes and groundwater, but not perched waters.

The EU Water Framework Directive (WFD) aims to protect and enhance the quality of surface freshwater, groundwater and dependent ecosystems, estuaries and coastal waters. The WFD was transposed into UK law in 2003 (Statutory Instruments 2003). Member

# Stantec Guide: Methodology for Assessment of Land Contamination (Scotland)

states must aim to reach good chemical and ecological status as defined in the Directive by 2015.

The EU Groundwater Daughter Directive (GWDD) was enacted by the Groundwater Regulations (2009), which were subsumed by the Water Environment and Water Services (Scotland) Act 2003 ("the WEWS Act") which provides essential clarification including on the four objectives specifically for groundwater quality in the WFD:

- Achieve 'Good' groundwater chemical status by 2015, commonly referred to as 'status objective';
- Achieve Drinking Water Protected Area Objectives;
- Implement measures to reverse any significant and sustained upward trend in groundwater quality, referred to as 'trend objective'; and
- Prevent or limit the inputs of pollutants into groundwater, commonly referred to as 'prevent or limit' objectives

The Water Act 2003 (Commencement No.11) Order 2012 amends the test for 'contaminated land' which relates to water pollution so that pollution of controlled waters (known as "the water environment" in Scotland) must now be "significant" to meet the definition of contaminated land.

River Basin Management Plans (RBMP) have been developed by SEPA for the River Basin Districts in Scotland.

These RBMP's establish the current status of waters within the catchments of the respective Districts and the current status of adjoining waters identified. As part of a Tier 2 risk assessment water quality data is screened against the WFD assessment criteria. Compare to the RBMP's current status of waters for the catchment under consideration would form part of a Tier 3 assessment.

## 5 RISK ESTIMATION

Risk estimation classifies what degree of harm might result to a receptor (defined as consequence) and how likely it is that such harm might arise (probability). At Tier 1 the consequence classification is generated by multiplying the hazard classification score and the receptor sensitivity score. This approach follows that presented in the republished R&D 66 (NHBC 2008).

The criteria for classifying probability are set out in **Table 4** and have been taken directly from Table 6.4 CIRIA C552 (CIRIA 2001). Probability considers the integrity of the exposure pathway.

The consequence classifications detailed in **Table 5** have been adapted from Table 6.3 presented in C552 and R&D 66 (Annex 4 Table A4.3).

The Tier 1 risk classification is estimated for each pollutant linkage using the matrix given in **Table 6** which is taken directly from C552 (Table 6.5). Subsequent Tiers refine the CM through retention or elimination of potential hazards and pollutant linkages.

## 6 RISK EVALUATION

Evaluation criteria are the parameters used to judge whether particular harm or pollution needs further assessment or is unacceptable. The evaluation criteria used will depend on:

- the reasons for doing the risk assessment and the regulatory context such as Part 2A
- the CM and pollutant linkages present
- any criteria set by regulators
- any advisory requirements such as from Public Health England (Public Health Scotland will become operational in 2020 and consequentially this guidance may be updated to incorporate any new/changes to requirements)
- the degree of confidence and precaution required
- the level of confidence required to judge whether a risk is unacceptable
- how you've used or developed more detailed assessment criteria in the later tiers of risk assessment
- the availability of robust scientific data
- how much is known - for example, about the pathway mechanism and how the contaminants affect receptors
- any practical reasons such as being able to measure or predict against the criteria

In order to put the Tier 1 risk classification into context the likely actions are described in **Table 7** which is taken directly from Table 6.6 of C552 (CIRIA 2001).

## 7 REFERENCES

BS 10175:2011+A2:2017 Investigation of potentially contaminated sites. Code of Practice

CIRIA (2001) Contaminated land risk assessment – a guide to good practice C552.

CIRIA (2008) Assessing risks posed by hazardous ground gases to buildings C655.

CL:AIRE/EIH (2008) Guidance on Comparing Soil Contamination Data with a Critical Concentration. Published by Contaminated Land: Applications in Real Environments (CL:AIRE).

CL:AIRE (2013) SP1010 – Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination. Final Project Report published by Contaminated Land: Applications in Real Defra (2012) Environments (CL:AIRE) 20th December 2013.

EA (2004) Contaminated Land Research (CLR) Report 11: The Model Procedures for the Management of Land Contamination CRL 11 by the Environment Agency (EA).

EA (2019) Land Contamination: Risk Management published by the Environment Agency.

EA (2008) Ecological Risk Assessment Science Report Series SC070009 published by the Environment Agency (EA).

## **Stantec Guide: Methodology for Assessment of Land Contamination (Scotland)**

JNCC (1993) Handbook for Phase 1 Habitat Survey – A Technical for Environmental Audit prepared by the Joint Nature Conservancy Council (JNCC).

NHBC Standards, 2016.

NHBC/EA/CIEH (2008) R&D Publication 66 Guidance for the safe development of housing on land affected by contamination.

Scottish Executive (2006) Environmental Protection Act 1990: Part IIA Contaminated Land Statutory Guidance: Edition 2 (Paper SE/2006/44).

Scottish Government (2000) Planning Advice Note 33, Development of Contaminated Land (PAN 33).

Scottish Government (2014), Scottish Planning Policy.

SEPA (2009) Groundwater Protection Policy for Scotland v3.

SEPA (2014) Position Statement WAT-PS-10-01 Assigning Groundwater Assessment Criteria for Pollutant Inputs v3.0.

SEPA (2019) Supporting Guidance (WAT-SG-53) Environmental Quality Standards and Standards for Discharges to Surface Waters v7.

The Building (Scotland) Regulations 2004.

The Contaminated Land (Scotland) Regulations 2005.

The EU Groundwater Daughter Directive (2006/118/EC).

The EU Water Framework Directive (2000/60/EC).

The Scotland River Basin District (Status) Directions 2014.

The Water Act 2003 (Commencement No.11) Order 2012.

The Water Environment and Water Services (Scotland) Act 2003.

## Stantec Guide: Methodology for Assessment of Land Contamination (Scotland)

**Table 1: Indicative Criteria for Classifying Hazards / Potential for Generating Contamination**

Classification/Score	Potential for generating contamination/gas based on land use
Very Low 1	Land Use: residential, retail or office use, agriculture Contamination: limited Gas generation potential: soils with low organic content
Low 2	Land Use: recent small scale industrial and light industry Contamination: locally slightly elevated concentrations Gas generation potential: soils with high organic content (limited thickness)
Moderate 3	Land Use: railway yards, collieries, scrap yards, engineering works Contamination: possible widespread slightly elevated concentrations and locally elevated concentrations Gas generation potential: dock silt and substantial thickness of organic alluvium/peat
High 4	Land Use: heavy industry, non-hazardous landfills Contamination: possible widespread elevated concentrations Gas generation potential: shallow mine workings, pre-1960's landfill
Very High 5	Land Use: Hazardous waste landfills, gas works, chemical works Contamination: Likely widespread elevated concentrations Gas generation potential: Landfill post-1960

*“Greenfield” is land which has not been developed or used for commercial agriculture (no use of agrochemicals) – without a source/hazard this are no plausible pollutant linkages and therefore no risk.*

**Table 2: Criteria for Classifying Receptor Sensitivity/Value**

Classification/Score	Definition
Very Low 1	Receptor of limited importance <ul style="list-style-type: none"> <li>Groundwater: Very Low productivity and / or SEPA overall classification Poor</li> <li>Surface water: Water body within 25m or eliminate and/or SEPA overall classification Bad</li> <li>Ecology: No local designation</li> <li>Buildings: Replaceable</li> <li>Human health: Unoccupied/limited access</li> </ul>
Low 2	Receptor of local or county importance with potential for replacement <ul style="list-style-type: none"> <li>Groundwater: Low productivity and / or SEPA overall classification Poor</li> <li>Surface water: Immediately adjacent and/or SEPA overall classification Poor</li> <li>Ecology: Local designations and local habitat resources</li> <li>Buildings: Local value</li> <li>Human health: Minimum score 4 where human health identified as potential receptor</li> </ul>
Moderate 3	Receptor of local or county importance with potential for replacement <ul style="list-style-type: none"> <li>Groundwater: Moderate productivity and / or SEPA overall classification Good</li> <li>Surface water: Immediately adjacent and/or SEPA overall classification Moderate</li> <li>Ecology: County wildlife sites, National Scenic Areas (NSA)</li> <li>Buildings: Area of Historic Character or proposed new buildings*</li> <li>Human health: Minimum score 4 where human health identified as potential receptor</li> </ul>
High 4	Receptor of country or regional importance with limited potential for replacement <ul style="list-style-type: none"> <li>Groundwater: High productivity and / or SEPA overall classification Good with no known abstractions</li> <li>Surface water: Immediately adjacent and/or SEPA classification overall Good</li> <li>Ecology: Nationally designated sites i.e. Site of Special Scientific Interest (SSSI), National Nature Reserve (NNR), Marine Protected Areas (MPA), Marine Consultation Areas (MCAs) and other relevant designations</li> <li>Buildings: Conservation Area</li> <li>Human health: Minimum score 4 where human health identified as potential receptor</li> </ul>
Very High 5	Receptor of national or international importance <ul style="list-style-type: none"> <li>Groundwater: High productivity and / or SEPA overall classification Good with known existing or proposed abstractions</li> <li>Surface water: Water body onsite and/or SEPA overall classification High</li> <li>Ecology: Internationally designated sites such as Special Areas of Conservation (SAC and candidates), Special Protection Areas (SPA and potentials) or wetlands of international importance (RAMSAR)</li> <li>Buildings: World Heritage Site</li> <li>Human health: Residential, open spaces and uses where children are present</li> </ul>

\* Minimum score 3 where a new building is proposed

## Stantec Guide: Methodology for Assessment of Land Contamination (Scotland)

**Table 3: Exposure Pathway and Modes of Transport**

Receptor	Pathway	Mode of transport
<b>Human health</b>	Ingestion	Fruit or vegetable leaf or roots
		Contaminated water
		Soil/dust indoors
		Soil/dust outdoors
	Inhalation	Particles (dust / soil) – outdoor
		Particles (dust / soil) - indoor
		Vapours - outdoor - migration via natural or anthropogenic pathways
		Vapours - indoor - migration via natural or anthropogenic pathways
	Dermal absorption	Direct contact with soil
		Direct contact with waters (swimming / showering)
		Irradiation
<b>Groundwater</b>	Leaching	Gravity / permeation
	Migration	Natural – groundwater as pathway Anthropogenic (e.g. boreholes, culverts, pipelines etc.)
<b>Surface Water</b>	Direct	Runoff or discharges from pipes
	Indirect	Recharge from groundwater
	Indirect	Deposition of windblown dust
<b>Buildings</b>	Direct contact	Sulphate attack on concrete, hydrocarbon corrosion of plastics
	Gas ingress	Migration via natural or anthropogenic paths
<b>Ecological systems</b>	See Notes	Runoff/discharge to surface water body
	See Notes	Windblown dust
	See Notes	Groundwater migration
	See Notes	At point of contaminant source
<b>Animal and crop</b>	Direct	Wind blown or flood deposited particles / dust / sediments
	Indirect	Plants via root up take or irrigation. Animals through watering
	Inhalation	By livestock / fish - gas / vapour / particulates / dust
	Ingestion	Consumption of vegetation / water / soil by animals

**Table 4: Classification of Probability**

Classification	Definition
<b>High likelihood</b>	There is a pollution linkage and an event either appears very likely in the short-term and almost inevitable over the long-term, or there is already evidence at the receptor of harm / pollution.
<b>Likely</b>	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short-term and likely over the long-term.
<b>Low likelihood</b>	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place and is less likely in the shorter-term.
<b>Unlikely</b>	There is a pollution linkage, but circumstances are such that it is improbable that an event would occur even in the very long-term.



## Stantec Guide: Methodology for Assessment of Land Contamination (Scotland)

**Table 5: Classification of Consequence (score = magnitude of hazard Table 1 and sensitivity of receptor Table 2)**

Classification / Score	Examples
<b>Severe</b> <b>17 - 25</b> <b>(3 out of 25 outcomes)</b>	<p>Human health effect - exposure likely to result in "significant harm" as defined in the Defra (2012) Part 2A Statutory Guidance <sup>1</sup>.</p> <p>Water environment effect - short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Equivalent to EA Category 1 incident (persistent and/or extensive effects on water quality leading to closure of potable abstraction point or loss of amenity, agriculture or commercial value. Major fish kill.</p> <p>Ecological effect - short-term exposure likely to result in a substantial adverse effect.</p> <p>Catastrophic damage to crops, buildings or property</p>
<b>Medium</b> <b>11 - 16</b> <b>(7 out of 25 outcomes)</b>	<p>Human health effect - exposure could result in "significant harm" <sup>1</sup>.</p> <p>Water environment effect - equivalent to EA Category 2 incident requiring notification of abstractor</p> <p>Ecological effect - short-term exposure may result in a substantial adverse effect.</p> <p>Damage to crops, buildings or property</p>
<b>Mild</b> <b>4 - 9</b> <b>(7 out of 25 outcomes)</b>	<p>Human health effect - exposure could result in "significant harm" <sup>1</sup>.</p> <p>Water environment effect - equivalent to EA Category 3 incident (short lived and/or minimal effects on water quality).</p> <p>Ecological effect - unlikely to result in a substantial adverse effect.</p> <p>Minor damage to crops, buildings or property. Damage to building rendering it unsafe to occupy (for example foundation damage resulting in instability).</p>
<b>Minor</b> <b>1 - 4</b> <b>(8 out of 25 outcomes)</b>	<p>No measurable effect on humans. Protective equipment is not required during site works.</p> <p>Equivalent to insubstantial pollution incident with no observed effect on water quality or ecosystems.</p> <p>Repairable effects to crops, buildings or property. The loss of plants in a landscaping scheme. Discolouration of concrete.</p>

Note <sup>1</sup>: Significant harm includes death, disease, serious injury, genetic mutation, birth defects or impairment of reproductive function. The local authority may also consider other health effects to constitute significant harm such as physical injury; gastrointestinal disturbances; respiratory tract effects; cardio-vascular effects; central nervous system effects; skin ailments; effects on organs such as the liver or kidneys; or a wide range of other health impacts. Whether or not these would constitute significant harm would depend on the seriousness of harm including impact on health, quality of life and scale of impact.

**Table 6: Classification of Risk (Combination of Consequence Table 5 and Probability Table 4)**

	Consequence			
Probability	Severe	Medium	Mild	Minor
<b>High likelihood</b>	Very high	High	Moderate	Low
<b>Likely</b>	High	Moderate	Moderate/Low	Low
<b>Low likelihood</b>	Moderate	Moderate/Low	Low	Very low
<b>Unlikely</b>	Low	Low	Very low	Very low

**Table 7: Description of Risks and Likely Action Required**

Risk Classification	Description
<b>Very high risk</b>	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, OR, there is evidence that severe harm to a designated receptor is currently happening. This risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation is likely to be required in the short term.
<b>High risk</b>	<p>Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability.</p> <p>Urgent investigation (if not undertaken already) is required and remedial works may be necessary in the short-term and are likely over the longer-term.</p>
<b>Moderate risk</b>	<p>It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild.</p> <p>Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer-term.</p>
<b>Low risk</b>	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
<b>Very low risk</b>	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.

# Appendix B Photographic Record





Photograph 1: Lower Compound Area taken looking westwards. The ground levels are hummocky and undulate. Overhead transmission lines are visible.



Photograph 2: Lower Compound Area looking towards the A85. Drain evident in the foreground.

		<p><b>CRUACHAN EXPANSION PROJECT, ARGYLL AND BUTE</b></p> <p><b>PHOTOGRAPHIC RECORD</b></p>	Appendix C	
			Date	11/05/2022
			Drawn by	RM
			Checked by	GS
			Revision	0





Photograph 3: Lower Compound Area taken looking southwards showing one of several streams along with a dwelling and overhead transmission line

Photograph 4: Lower Compound Area showing waterlogged soils at the time of the site walkover (undertaken in March 2022)

		<p><b>CRUACHAN EXPANSION PROJECT, ARGYLL AND BUTE</b></p> <p><b>PHOTOGRAPHIC RECORD</b></p>	Appendix	C
			Date	11/05/2022
			Drawn by	RM
			Checked by	GS
			Revision	0





Photograph 5: Lower Compound Area showing manhole and waterlogged soils



Photograph 6: Lower Compound Area showing waterlogged soils at the time of the site walkover (undertaken in March 2022)

		<div>CRUACHAN EXPANSION PROJECT, ARGYLL AND BUTE</div> <div>PHOTOGRAPHIC RECORD</div>	Appendix	C
			Date	11/05/2022
			Drawn by	RM
			Checked by	GS
			Revision	0





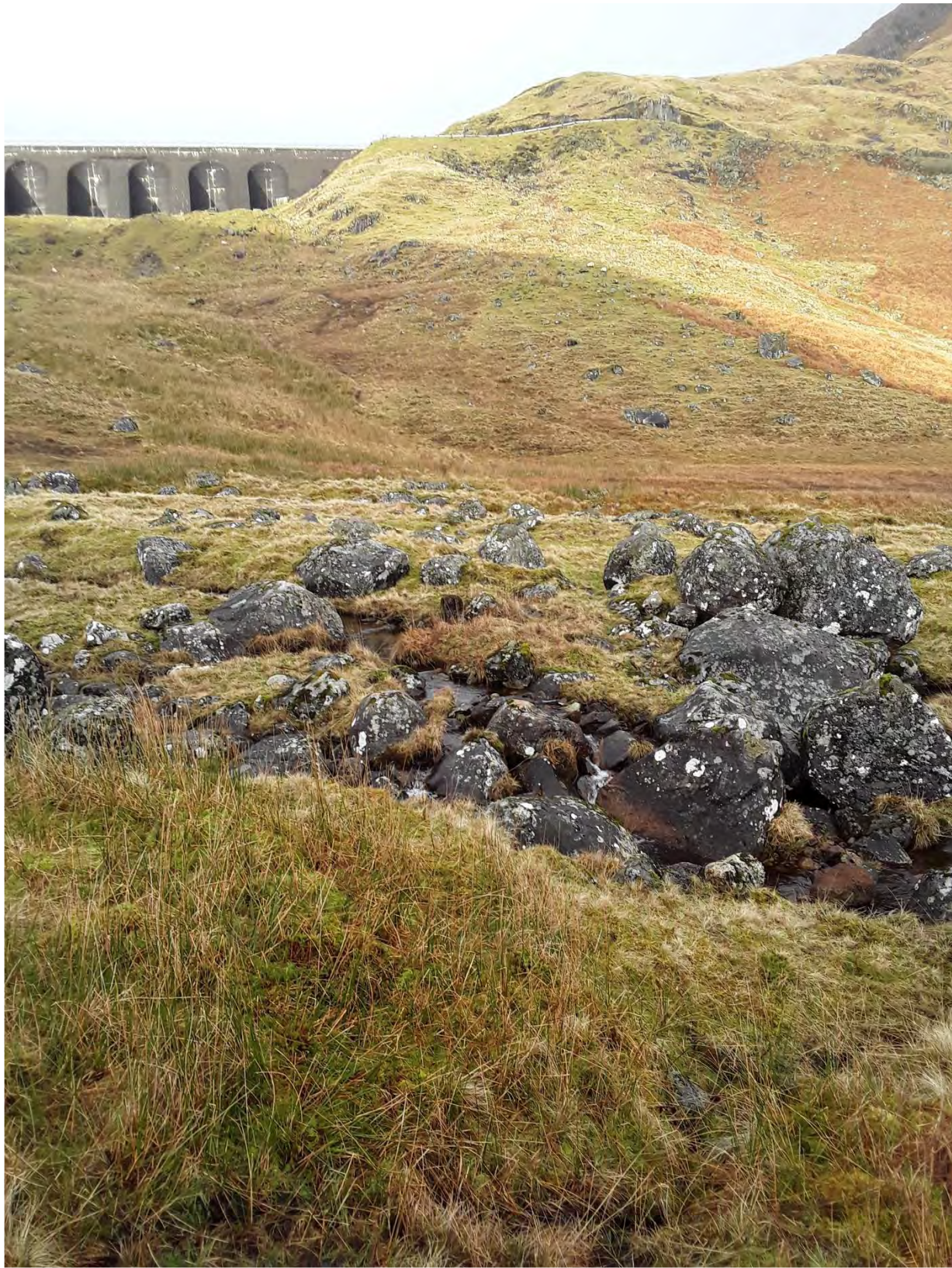
Photograph 7: Upper Compound Area taken looking northwards towards Cruachan Dam and the access track



Photograph 8: Upper Compound Area showing hummocky, waterlogged soils at the time of the site walkover (undertaken in March 2022)

Appendix	C
Date	11/05/2022
Drawn by	RM
Checked by	GS
Revision	0





Photograph 9: Upper Compound Area showing the Falls of Cruachan watercourse and the dam in the background



Photograph 10: Upper Compound Area showing waterlogged area at the time of the site walkover (undertaken in March 2022)

		<p><b>CRUACHAN EXPANSION PROJECT, ARGYLL AND BUTE</b></p> <p><b>PHOTOGRAPHIC RECORD</b></p>	Appendix	C
			Date	11/05/2022
			Drawn by	RM
			Checked by	GS
			Revision	0



# Appendix C Groundsure Report

## Cruachan 2 East

### Order Details

**Date:** 07/04/2022  
**Your ref:** Cruachan 2 East  
**Our Ref:** GSIP-2022-12632-9901  
**Client:** Stantec UK Ltd

### Site Details

**Location:** 213089 728487  
**Area:** 47.67 ha  
**Authority:** [Argyll and Bute Council](#)



**Summary of findings**

p. 2

**Aerial image**

p. 7

**OS MasterMap site plan**

N/A: >10ha

[groundsure.com/insightuserguide](https://groundsure.com/insightuserguide)

Contact us with any questions at:

[info@groundsure.com](mailto:info@groundsure.com)

08444 159 000

## Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
<b><u>11</u></b>	<b><u>1.1</u></b>	<b><u>Historical industrial land uses</u></b>	0	1	0	6	-
<b><u>12</u></b>	<b><u>1.2</u></b>	<b><u>Historical tanks</u></b>	1	0	0	0	-
12	1.3	Historical energy features	0	0	0	0	-
13	1.4	Historical petrol stations	0	0	0	0	-
13	1.5	Historical garages	0	0	0	0	-
13	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
<b><u>14</u></b>	<b><u>2.1</u></b>	<b><u>Historical industrial land uses</u></b>	0	1	0	6	-
<b><u>15</u></b>	<b><u>2.2</u></b>	<b><u>Historical tanks</u></b>	1	0	0	0	-
15	2.3	Historical energy features	0	0	0	0	-
15	2.4	Historical petrol stations	0	0	0	0	-
16	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
17	3.1	Active or recent landfill	0	0	0	0	-
17	3.2	Historical landfill (BGS records)	0	0	0	0	-
17	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
17	3.4	Licensed waste sites	0	0	0	0	-
17	3.5	Historical waste sites	0	0	0	0	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
<b><u>18</u></b>	<b><u>4.1</u></b>	<b><u>Recent industrial land uses</u></b>	4	2	2	-	-
19	4.2	Current or recent petrol stations	0	0	0	0	-
19	4.3	Electricity cables	0	0	0	0	-
19	4.4	Gas pipelines	0	0	0	0	-
19	4.5	Sites determined as Contaminated Land	0	0	0	0	-
20	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
20	4.7	Regulated explosive sites	0	0	0	0	-



20	4.8	Hazardous substance storage/usage	0	0	0	0	-
20	4.9	Part A(1), IPPC and Historic IPC Authorisations	0	0	0	0	-
20	4.10	Part B Authorisations	0	0	0	0	-
21	4.11	Pollution inventory substances	0	0	0	0	-
21	4.12	Pollution inventory waste transfers	0	0	0	0	-
21	4.13	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
22	5.1	Superficial aquifer	None (within 500m)				
<b>23</b>	<b>5.2</b>	<b><u>Bedrock aquifer</u></b>	Identified (within 500m)				
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
<b>25</b>	<b>6.1</b>	<b><u>Water Network (OS MasterMap)</u></b>	15	22	63	-	-
<b>33</b>	<b>6.2</b>	<b><u>Surface water features</u></b>	1	21	35	-	-
Page	Section	River flooding					
<b>34</b>	<b>7.1</b>	<b><u>River flooding</u></b>	1 in 30 year, Greater than 1.0m (within 50m)				
Page	Section	Coastal flooding					
36	8.1	Coastal flooding	Negligible (within 50m)				
Page	Section	Surface water flooding					
<b>37</b>	<b>9.1</b>	<b><u>Surface water flooding</u></b>	1 in 30 year, Greater than 1.0m (within 50m)				
Page	Section	Groundwater flooding					
<b>39</b>	<b>10.1</b>	<b><u>Groundwater flooding</u></b>	Low (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
40	11.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	0
41	11.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
41	11.3	Special Areas of Conservation (SAC)	0	0	0	0	0
<b>41</b>	<b>11.4</b>	<b><u>Special Protection Areas (SPA)</u></b>	0	0	0	1	0
42	11.5	National Nature Reserves (NNR)	0	0	0	0	0
42	11.6	Local Nature Reserves (LNR)	0	0	0	0	0
<b>42</b>	<b>11.7</b>	<b><u>Designated Ancient Woodland</u></b>	0	0	1	1	16
43	11.8	Biosphere Reserves	0	0	0	0	0



43	11.9	Forest Parks	0	0	0	0	0
43	11.10	Marine Conservation Zones	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
44	12.1	World Heritage Sites	0	0	0	-	-
44	12.2	Area of Outstanding Natural Beauty	0	0	0	-	-
44	12.3	National Parks	0	0	0	-	-
44	12.4	Listed Buildings	0	0	0	-	-
45	12.5	Conservation Areas	0	0	0	-	-
45	12.6	Scheduled Ancient Monuments	0	0	0	-	-
45	12.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
<b>46</b>	<b>13.1</b>	<b><u>Agricultural Land Classification</u></b>	Grade 5.3 (within 250m)				
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
<b>48</b>	<b>14.1</b>	<b><u>10k Availability</u></b>	Identified (within 500m)				
49	14.2	Artificial and made ground (10k)	0	0	0	0	-
50	14.3	Superficial geology (10k)	0	0	0	0	-
50	14.4	Landslip (10k)	0	0	0	0	-
51	14.5	Bedrock geology (10k)	0	0	0	0	-
51	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
<b>52</b>	<b>15.1</b>	<b><u>50k Availability</u></b>	Identified (within 500m)				
53	15.2	Artificial and made ground (50k)	0	0	0	0	-
53	15.3	Artificial ground permeability (50k)	0	0	-	-	-
<b>54</b>	<b>15.4</b>	<b><u>Superficial geology (50k)</u></b>	2	2	0	2	-
<b>55</b>	<b>15.5</b>	<b><u>Superficial permeability (50k)</u></b>	Identified (within 50m)				
55	15.6	Landslip (50k)	0	0	0	0	-
55	15.7	Landslip permeability (50k)	None (within 50m)				
<b>56</b>	<b>15.8</b>	<b><u>Bedrock geology (50k)</u></b>	3	2	7	9	-
<b>58</b>	<b>15.9</b>	<b><u>Bedrock permeability (50k)</u></b>	Identified (within 50m)				



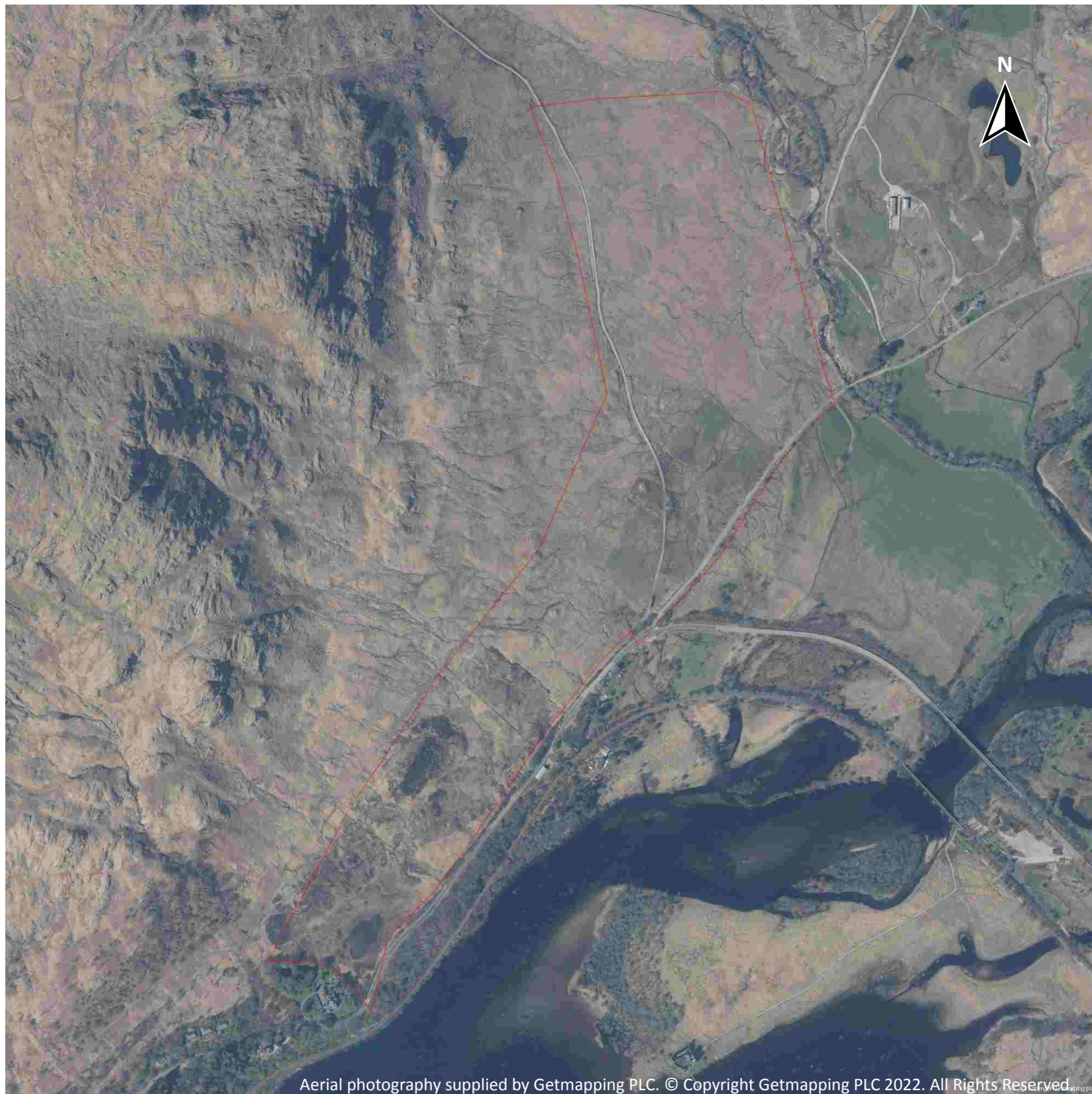
<b>58</b>	<b>15.10</b>	<b><u>Bedrock faults and other linear features (50k)</u></b>	0	0	1	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
59	16.1	BGS Boreholes	0	0	0	-	-
Page	Section	Natural ground subsidence					
<b>60</b>	<b>17.1</b>	<b><u>Shrink swell clays</u></b>	Very low (within 50m)				
<b>61</b>	<b>17.2</b>	<b><u>Running sands</u></b>	Low (within 50m)				
<b>63</b>	<b>17.3</b>	<b><u>Compressible deposits</u></b>	Moderate (within 50m)				
<b>65</b>	<b>17.4</b>	<b><u>Collapsible deposits</u></b>	Very low (within 50m)				
<b>67</b>	<b>17.5</b>	<b><u>Landslides</u></b>	Moderate (within 50m)				
<b>69</b>	<b>17.6</b>	<b><u>Ground dissolution of soluble rocks</u></b>	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
70	18.1	Natural cavities	0	0	0	0	-
<b>71</b>	<b>18.2</b>	<b><u>BritPits</u></b>	0	0	0	2	-
<b>71</b>	<b>18.3</b>	<b><u>Surface ground workings</u></b>	0	1	3	-	-
72	18.4	Underground workings	0	0	0	0	0
72	18.5	Historical Mineral Planning Areas	0	0	0	0	-
<b>72</b>	<b>18.6</b>	<b><u>Non-coal mining</u></b>	0	0	0	1	5
73	18.7	Mining cavities	0	0	0	0	0
73	18.8	JPB mining areas	None (within 0m)				
73	18.9	Coal mining	None (within 0m)				
73	18.10	Brine areas	None (within 0m)				
74	18.11	Gypsum areas	None (within 0m)				
74	18.12	Tin mining	None (within 0m)				
74	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
<b>75</b>	<b>19.1</b>	<b><u>Radon</u></b>	Less than 1% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
<b>76</b>	<b>20.1</b>	<b><u>BGS Estimated Background Soil Chemistry</u></b>	13	15	-	-	-
77	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-



77	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
78	21.1	Underground railways (London)	0	0	0	-	-
78	21.2	Underground railways (Non-London)	0	0	0	-	-
79	21.3	Railway tunnels	0	0	0	-	-
79	21.4	Historical railway and tunnel features	0	0	0	-	-
79	21.5	Royal Mail tunnels	0	0	0	-	-
79	21.6	Historical railways	0	0	0	-	-
<b><u>79</u></b>	<b><u>21.7</u></b>	<b><u>Railways</u></b>	0	3	12	-	-
80	21.8	Crossrail 1	0	0	0	0	-
80	21.9	Crossrail 2	0	0	0	0	-
81	21.10	HS2	0	0	0	0	-



## Recent aerial photograph



Capture Date: 21/04/2020

Site Area: 47.67ha



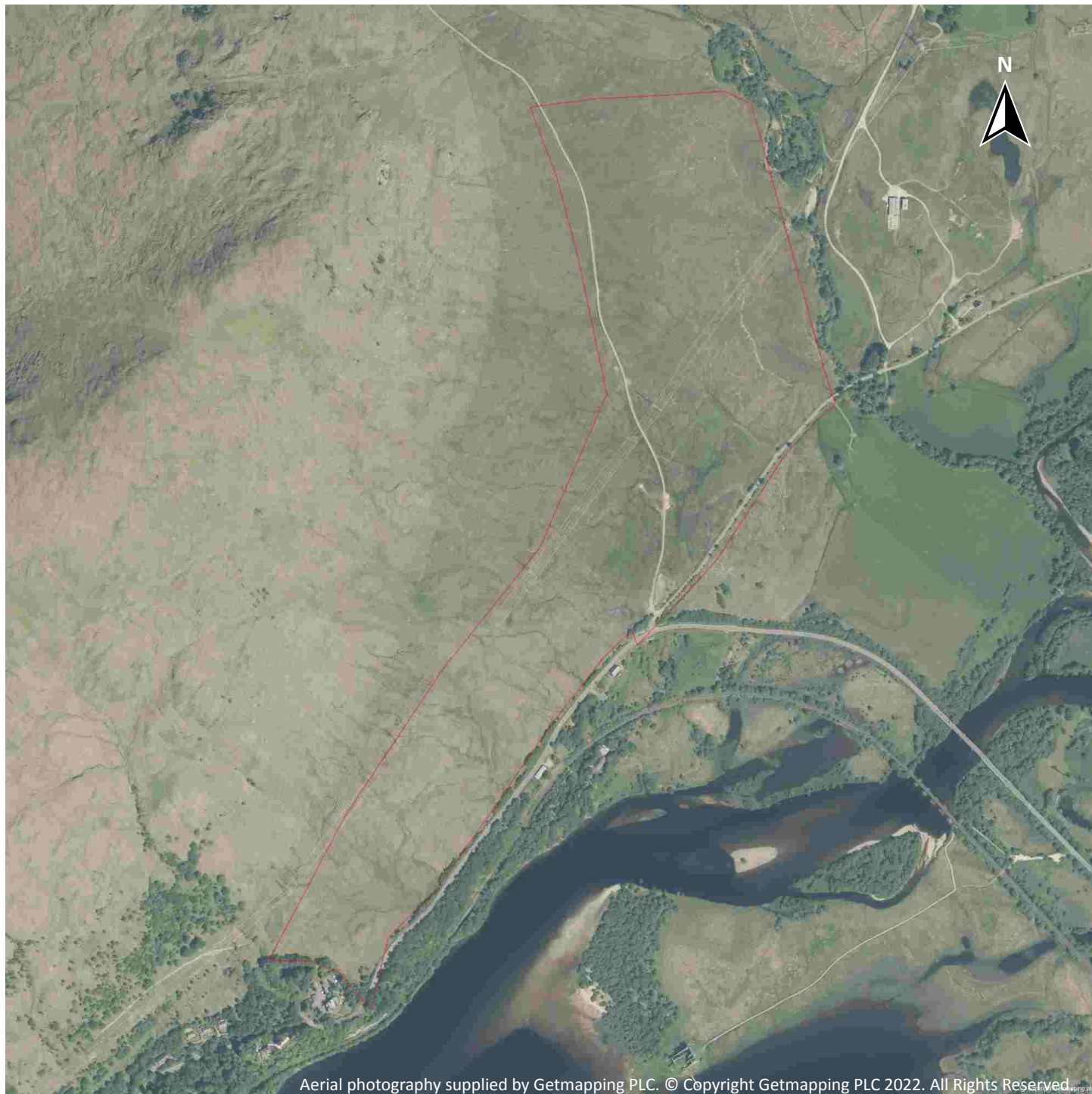
Contact us with any questions at:

[info@groundsure.com](mailto:info@groundsure.com)

08444 159 000

Date: 7 April 2022

## Recent site history - 2016 aerial photograph



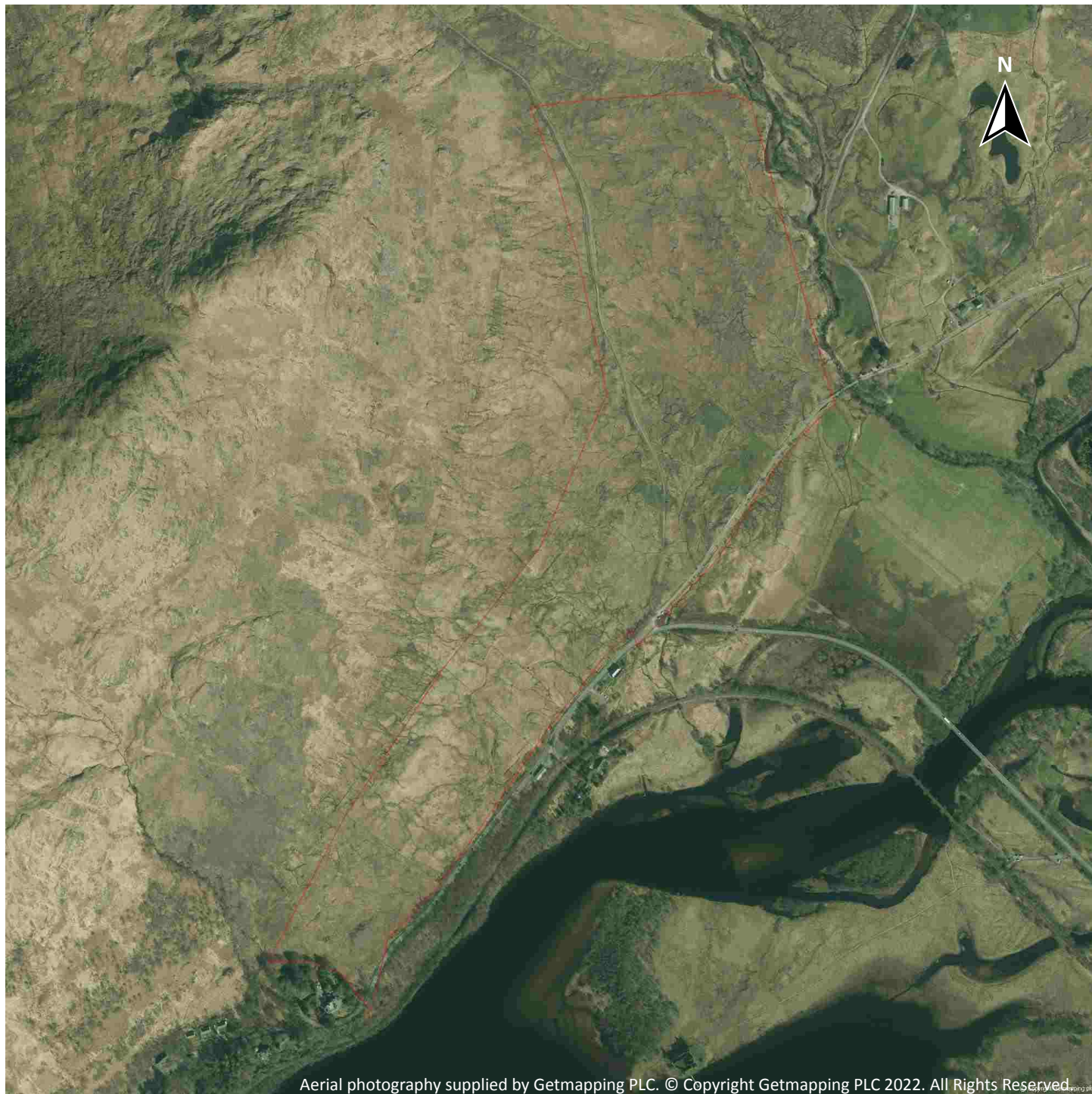
Capture Date: 02/06/2016

Site Area: 47.67ha





## Recent site history - 2010 aerial photograph



Capture Date: 11/04/2010

Site Area: 47.67ha



Contact us with any questions at:

[info@groundsure.com](mailto:info@groundsure.com)

08444 159 000

Date: 7 April 2022



## Recent site history - 2006 aerial photograph



Capture Date: 10/05/2006

Site Area: 47.67ha



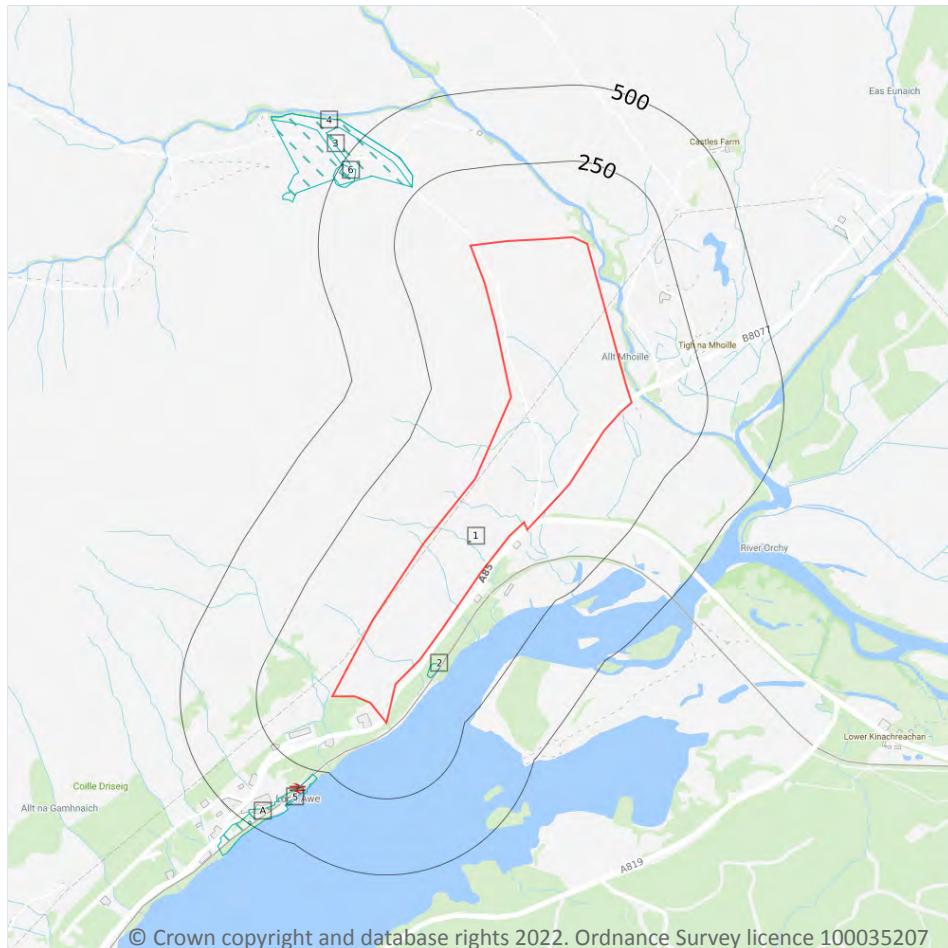
Contact us with any questions at:

[info@groundsure.com](mailto:info@groundsure.com)

08444 159 000

Date: 7 April 2022

## 1 Past land use



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks

### 1.1 Historical industrial land uses

#### Records within 500m

7

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 11**

ID	Location	Land use	Dates present	Group ID
2	39m SE	Cuttings	1900	72872



ID	Location	Land use	Dates present	Group ID
A	263m S	Railway Sidings	1900	75991
3	272m NW	Unspecified Quarry	1900	72393
4	272m NW	Mineral Railway Sidings	1900	73603
5	363m S	Railway Station	1900	74564
6	436m NW	Unspecified Disused Quarry	1976	72156
A	491m SW	Railway Building	1976	74045

*This data is sourced from Ordnance Survey / Groundsure.*

## 1.2 Historical tanks

### Records within 500m

**1**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 11**

ID	Location	Land use	Dates present	Group ID
<b>1</b>	<b>On site</b>	<b>Unspecified Tank</b>	<b>1982</b>	<b>8479</b>

*This data is sourced from Ordnance Survey / Groundsure.*

## 1.3 Historical energy features

### Records within 500m

**0**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

*This data is sourced from Ordnance Survey / Groundsure.*





## 1.4 Historical petrol stations

**Records within 500m****0**

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

*This data is sourced from Ordnance Survey / Groundsure.*

## 1.5 Historical garages

**Records within 500m****0**

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

*This data is sourced from Ordnance Survey / Groundsure.*

## 1.6 Historical military land

**Records within 500m****0**

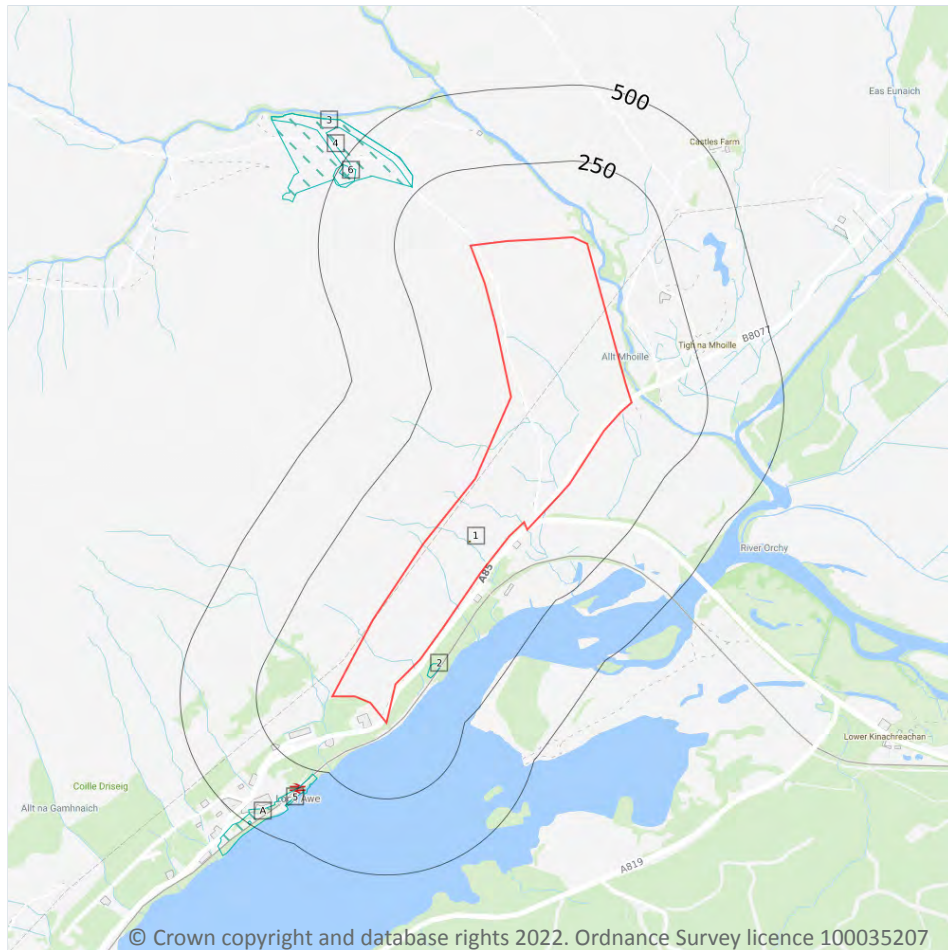
Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

*This data is sourced from Ordnance Survey / Groundsure / other sources.*





## 2 Past land use - un-grouped



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical tanks

### 2.1 Historical industrial land uses

#### Records within 500m

7

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 14**

ID	Location	Land Use	Date	Group ID
2	39m SE	Cuttings	1900	72872
A	263m S	Railway Sidings	1900	75991
3	272m NW	Mineral Railway Sidings	1900	73603



ID	Location	Land Use	Date	Group ID
4	272m NW	Unspecified Quarry	1900	72393
5	363m S	Railway Station	1900	74564
6	436m NW	Unspecified Disused Quarry	1976	72156
A	491m SW	Railway Building	1976	74045

*This data is sourced from Ordnance Survey / Groundsure.*

## 2.2 Historical tanks

<b>Records within 500m</b>	<b>1</b>
----------------------------	----------

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 14**

ID	Location	Land Use	Date	Group ID
1	On site	Unspecified Tank	1982	8479

*This data is sourced from Ordnance Survey / Groundsure.*

## 2.3 Historical energy features

<b>Records within 500m</b>	<b>0</b>
----------------------------	----------

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

*This data is sourced from Ordnance Survey / Groundsure.*

## 2.4 Historical petrol stations

<b>Records within 500m</b>	<b>0</b>
----------------------------	----------

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

*This data is sourced from Ordnance Survey / Groundsure.*

## 2.5 Historical garages

Records within 500m

0

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

*This data is sourced from Ordnance Survey / Groundsure.*

## 3 Waste and landfill

### 3.1 Active or recent landfill

Records within 500m

0

Active or recently closed landfill sites under Scottish Environment Protection (SEPA) regulation.

*This data is sourced from the Scottish Environment Protection Agency.*

### 3.2 Historical landfill (BGS records)

Records within 500m

0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

*This data is sourced from the British Geological Survey.*

### 3.3 Historical landfill (LA/mapping records)

Records within 500m

0

Landfill sites identified from Local Authority records and high detail historical mapping.

*This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.*

### 3.4 Licensed waste sites

Records within 500m

0

Active or recently closed waste sites under Scottish Environment Protection Agency (SEPA) regulation.

*This data is sourced from the Scottish Environment Protection Agency.*

### 3.5 Historical waste sites

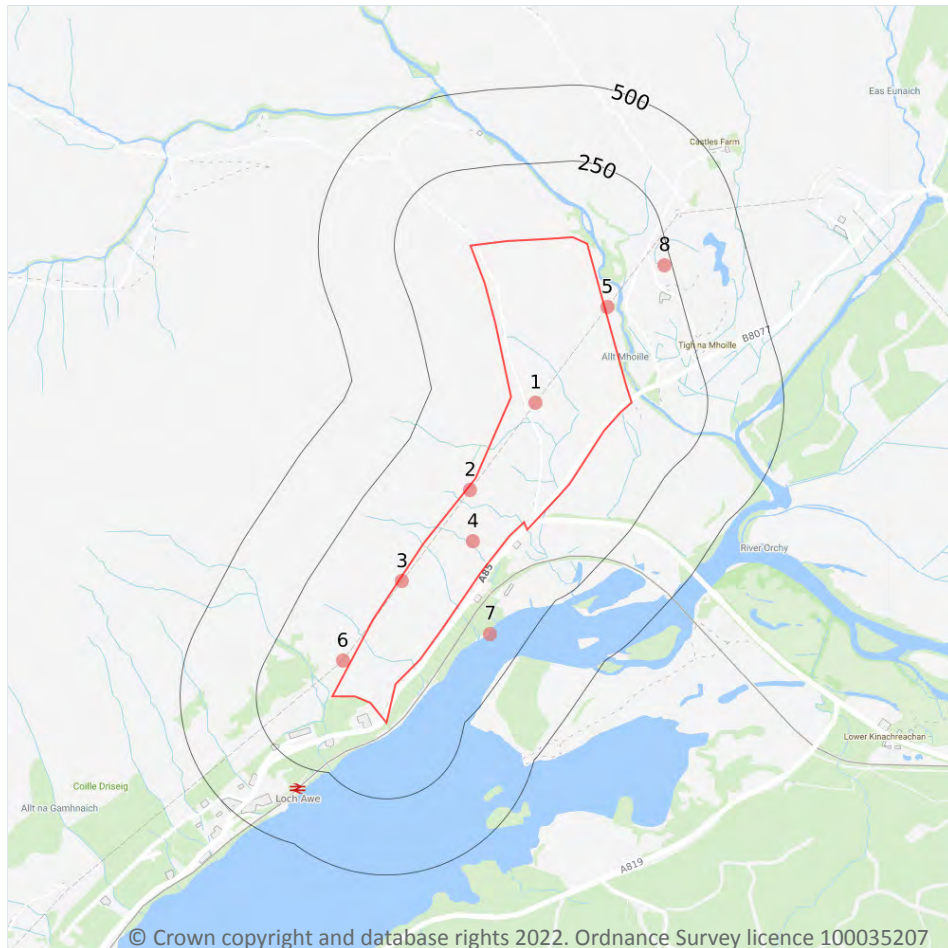
Records within 500m

0

Waste site records derived from Local Authority planning records and high detail historical mapping.

*This data is sourced from Ordnance Survey/Groundsure and Local Authority records.*

## 4 Current industrial land use



- Site Outline
- Search buffers in metres (m)
- Recent industrial land uses

### 4.1 Recent industrial land uses

Records within 250m

8

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 18**

ID	Location	Company	Address	Activity	Category
1	On site	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
2	On site	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
3	On site	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities



ID	Location	Company	Address	Activity	Category
4	On site	Tank	Argyll and Bute, PA33	Tanks (Generic)	Industrial Features
5	8m E	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
6	25m NW	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
7	139m SE	Landing Stages	Argyll and Bute, PA33	Moorings and Unloading Facilities	Water
8	227m E	Quarry	Argyll and Bute, PA33	Unspecified Quarries Or Mines	Extractive Industries

*This data is sourced from Ordnance Survey.*

## 4.2 Current or recent petrol stations

Records within 500m

0

Open, closed, under development and obsolete petrol stations.

*This data is sourced from Experian.*

## 4.3 Electricity cables

Records within 500m

0

High voltage underground electricity transmission cables.

*This data is sourced from National Grid.*

## 4.4 Gas pipelines

Records within 500m

0

High pressure underground gas transmission pipelines.

*This data is sourced from National Grid.*

## 4.5 Sites determined as Contaminated Land

Records within 500m

0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

*This data is sourced from Local Authority records.*



## 4.6 Control of Major Accident Hazards (COMAH)

Records within 500m

0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

*This data is sourced from the Health and Safety Executive.*

## 4.7 Regulated explosive sites

Records within 500m

0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

*This data is sourced from the Health and Safety Executive.*

## 4.8 Hazardous substance storage/usage

Records within 500m

0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

*This data is sourced from Local Authority records.*

## 4.9 Part A(1), IPPC and Historic IPC Authorisations

Records within 500m

0

Records of Part A installations regulated for the release of substances to the environment.

*This data is sourced from the Scottish Environment Protection Agency.*

## 4.10 Part B Authorisations

Records within 500m

0

Records of Part B installations regulated for the release of substances to the environment.

*This data is sourced from the Scottish Environment Protection Agency.*



#### 4.11 Pollution inventory substances

**Records within 500m****0**

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

*This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.*

#### 4.12 Pollution inventory waste transfers

**Records within 500m****0**

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

*This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.*

#### 4.13 Pollution inventory radioactive waste

**Records within 500m****0**

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

*This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.*





## 5 Hydrogeology - Superficial aquifer

### 5.1 Superficial aquifer

Records within 500m

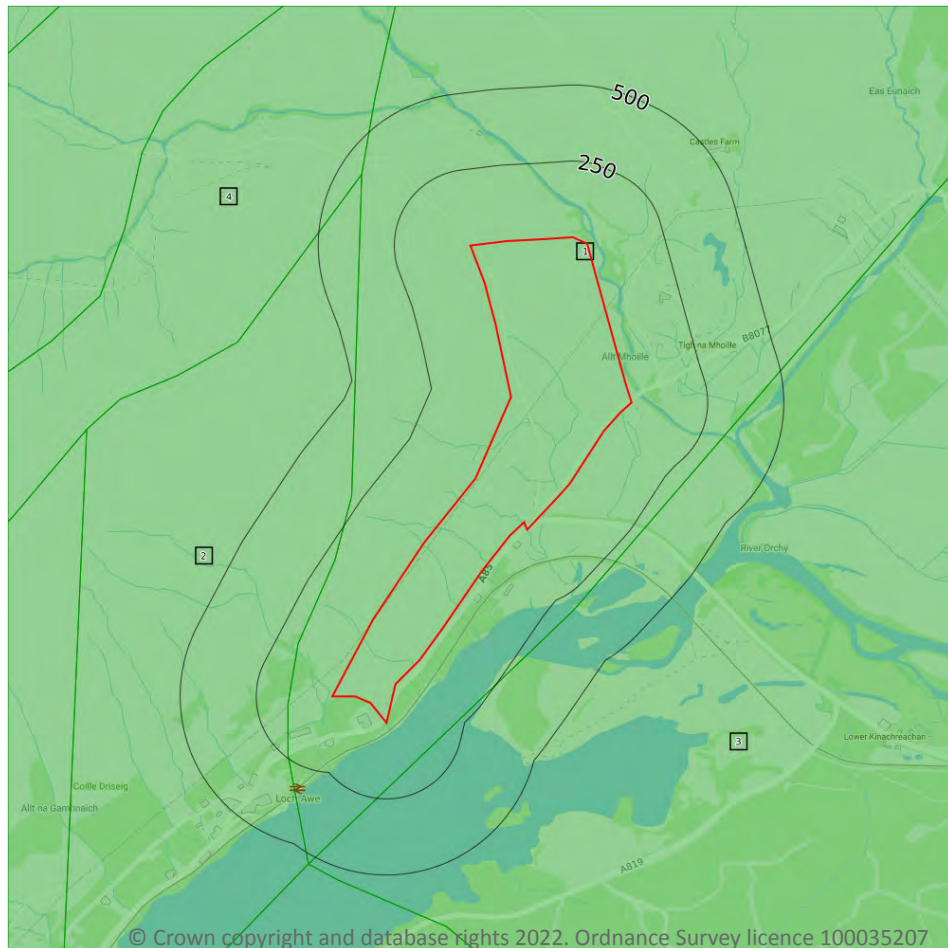
0

Records of groundwater classification within superficial geology.

*This data is sourced from the British Geological Survey.*



## Bedrock aquifer



- Site Outline**
- Search buffers in metres (m)**
- Highly productive - fissures/discontinuities
  - Highly productive - intergranular
  - Moderately productive - fissures/discontinuities
  - Moderately productive - intergranular
  - Low productive - fissures/discontinuities
  - Low productive - intergranular
  - No significant groundwater

### 5.2 Bedrock aquifer

#### Records within 500m

4

Records of groundwater classification within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 23**

ID	Location	Description	Flow	Summary	Rock description
1	On site	Low productivity aquifer	Flow is virtually all through fractures and other discontinuities	Small amounts of groundwater in near surface weathered zone and secondary fractures.	APPIN GROUP
2	140m W	Low productivity aquifer	Flow is virtually all through fractures and other discontinuities	Small amounts of groundwater in near surface weathered zone and secondary fractures.	APPIN GROUP

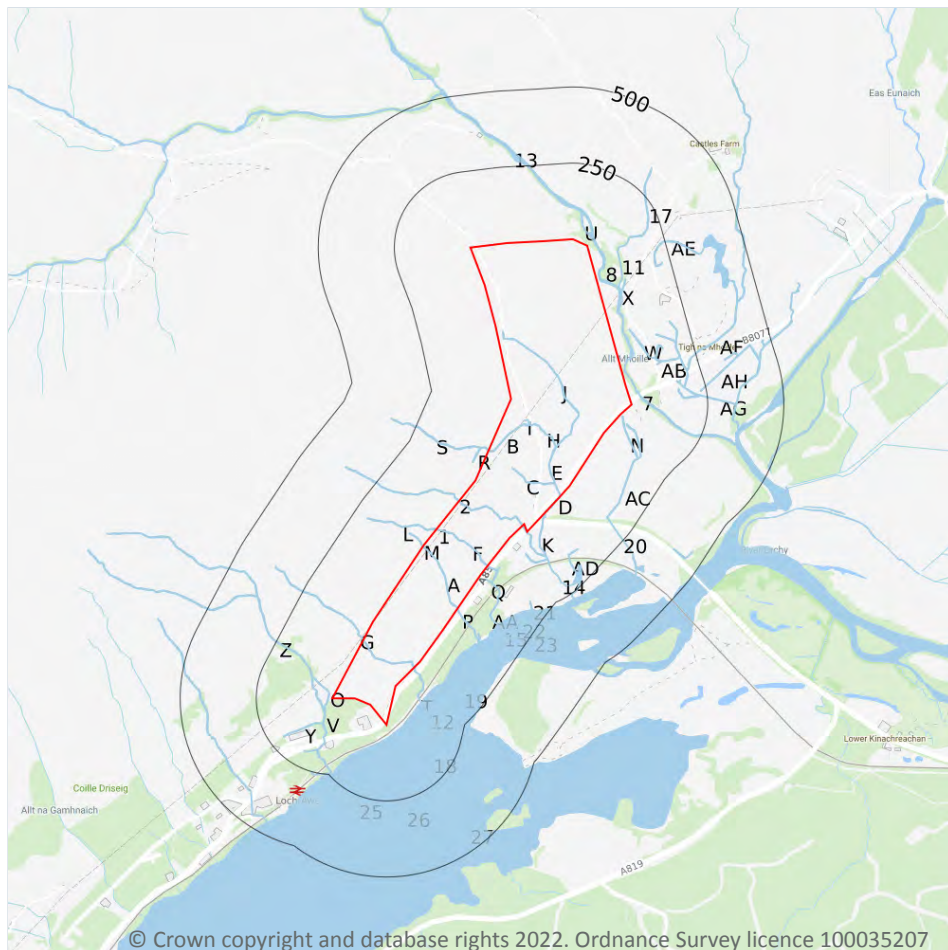


ID	Location	Description	Flow	Summary	Rock description
3	158m SE	Low productivity aquifer	Flow is virtually all through fractures and other discontinuities	Small amounts of groundwater in near surface weathered zone and fractures.	ARGYLL GROUP
4	427m NW	Low productivity aquifer	Flow is virtually all through fractures and other discontinuities	Small amounts of groundwater in near surface weathered zone and secondary fractures; rare springs.	UNNAMED IGNEOUS INTRUSION, LATE SILURIAN TO EARLY DEVONIAN

*This data is sourced from the British Geological Survey.*



## 6 Hydrology



### 6.1 Water Network (OS MasterMap)

Records within 250m

100

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 25**

ID	Location	Type of water feature	Ground level	Permanence	Name
1	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-

ID	Location	Type of water feature	Ground level	Permanence	Name
2	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
A	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
E	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
G	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
I	On site	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
I	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-





ID	Location	Type of water feature	Ground level	Permanence	Name
J	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
L	2m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
M	2m NW	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
D	3m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	4m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
K	7m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
M	7m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
N	8m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
7	10m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Mhoille
8	12m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Mhoille
O	12m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
P	13m SE	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
P	21m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
Q	23m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
R	26m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
S	26m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Q	33m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
N	35m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Q	35m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
U	37m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Mhoille
O	38m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
U	39m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Mhoille
Q	46m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
V	50m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
W	60m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
11	61m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
X	61m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Mhoille
X	63m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Q	68m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
K	70m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
T	78m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
V	88m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Y	88m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Z	92m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
12	93m E	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
13	96m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Mhoille
AA	97m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
K	101m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
P	101m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
K	113m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
14	115m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AB	116m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AB	118m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
P	119m SE	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AB	119m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
P	120m SE	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
P	121m SE	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
AC	133m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AB	135m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
15	136m SE	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
AB	139m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
17	142m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
AD	150m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AB	160m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
18	161m E	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
19	161m E	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
AB	163m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AB	171m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AB	171m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
20	172m SE	Marsh. An area that is predominantly waterlogged by freshwater.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
V	174m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
V	174m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
P	175m SE	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
21	180m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AB	182m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-





ID	Location	Type of water feature	Ground level	Permanence	Name
AB	182m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
22	188m SE	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
23	188m SE	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
V	192m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AB	192m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AB	193m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
V	195m SW	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AB	197m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AE	199m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AD	204m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AB	205m E	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
AB	205m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AF	211m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
AD	219m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AG	225m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AD	228m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AH	230m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
25	240m SW	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
V	240m SW	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
26	247m SE	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
27	247m SE	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe

*This data is sourced from the Ordnance Survey.*

## 6.2 Surface water features

**Records within 250m**

**57**

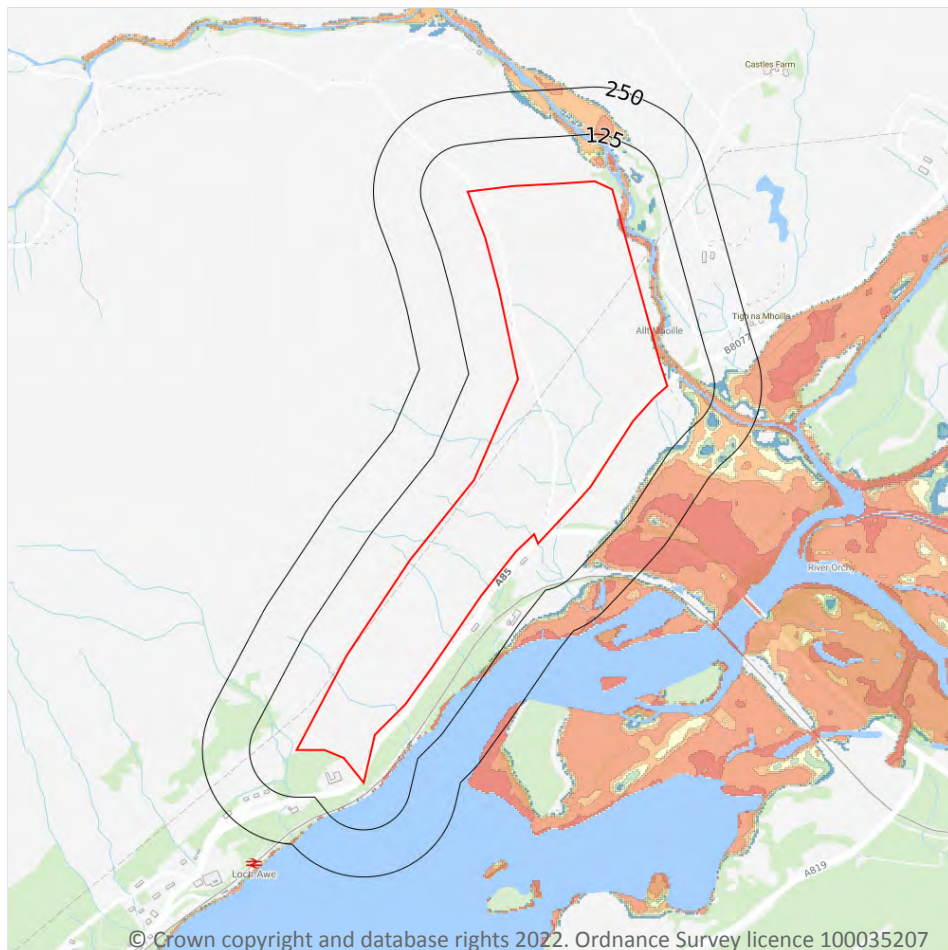
Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 25**

*This data is sourced from the Ordnance Survey.*



## 7 River flooding



— Site Outline

Search buffers in metres (m)

1 in 1000 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

### 7.1 River flooding

**Highest risk on site**

**1 in 30 year, Greater than 1.0m**

**Highest risk within 50m**

**1 in 30 year, Greater than 1.0m**

This is an assessment of flood risk for rivers in Scotland produced using modelled data, provided by Ambiental Risk Analytics. It also takes account of flood defence information provided by the Scottish Environment Protection Agency (SEPA). It shows the chance of flooding from rivers presented in the following categories:

- 1 in 30 year (3.33%)
- 1 in 100 year (1%)
- 1 in 250 year (0.4%)



- and 1 in 1,000 year (0.1%)

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site. The table below shows the maximum flood depths for a range of return periods for the site.

Features are displayed on the River flooding map on **page 34**

Return period	Maximum modelled depth
1 in 1000 year	Greater than 1.0m
1 in 250 year	Greater than 1.0m
1 in 100 year	Greater than 1.0m
1 in 30 year	Greater than 1.0m

*This data is sourced from Ambiantal Risk Analytics.*



## 8 Coastal flooding - Coastal flooding

### 8.1 Coastal flooding

Highest risk on site

Negligible

Highest risk within 50m

Negligible

This is an assessment of coastal flood risk in Scotland produced using modelled data, provided by Ambiental Risk Analytics. It also takes account of flood defence information provided by the Scottish Environment Protection Agency (SEPA). It shows the chance of coastal flooding presented in the following categories:

- 1 in 30 year (3.33%)
- 1 in 100 year (1%)
- 1 in 250 year (0.4%)
- and 1 in 1,000 year (0.1%)

The data shown on the map shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site. The table below shows the maximum flood depths for a range of return periods for the site.

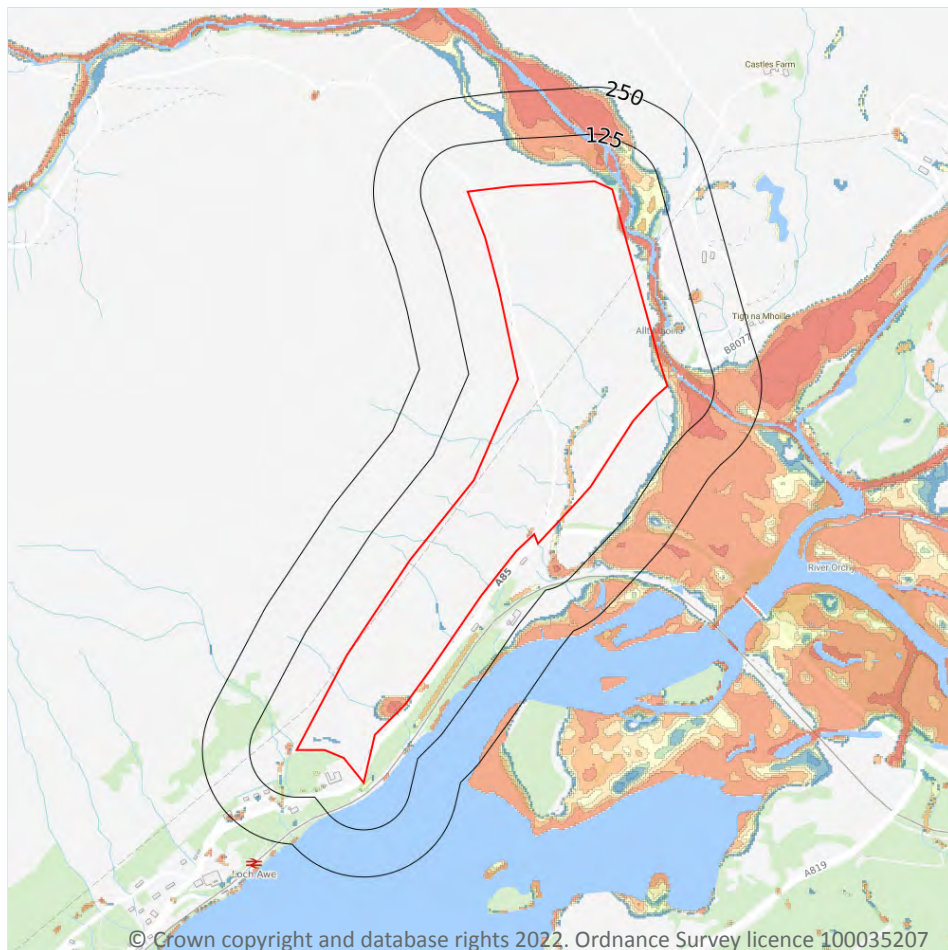
Return period	Maximum modelled depth
1 in 1000 year	Negligible
1 in 250 year	Negligible
1 in 100 year	Negligible
1 in 30 year	Negligible

*This data is sourced from Ambiental Risk Analytics.*





## 9 Surface water flooding



— Site Outline

Search buffers in metres (m)

1 in 1000 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

### 9.1 Surface water flooding

**Highest risk on site**

**1 in 30 year, Greater than 1.0m**

**Highest risk within 50m**

**1 in 30 year, Greater than 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 37**

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

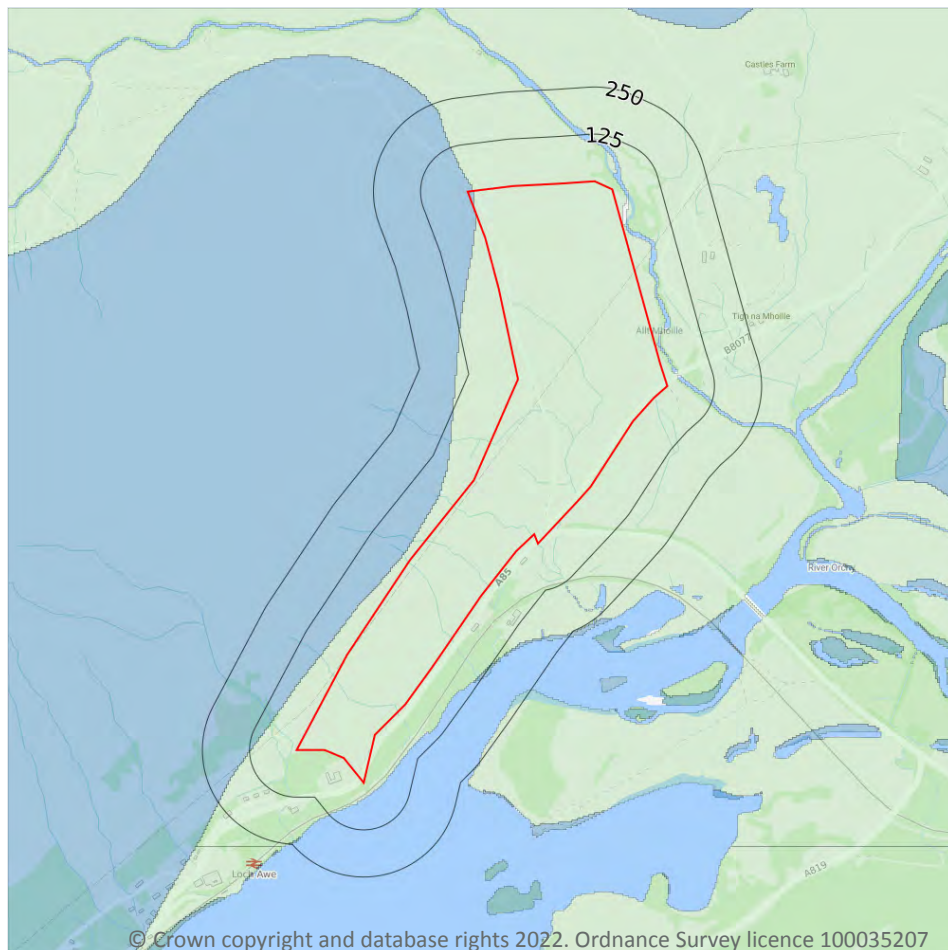
The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Greater than 1.0m
1 in 250 year	Greater than 1.0m
1 in 100 year	Greater than 1.0m
1 in 30 year	Greater than 1.0m

*This data is sourced from Ambiantal Risk Analytics.*



## 10 Groundwater flooding



— Site Outline  
Search buffers in metres (m)

- High
- Moderate - High
- Moderate
- Low
- Negligible

### 10.1 Groundwater flooding

Highest risk on site

Low

Highest risk within 50m

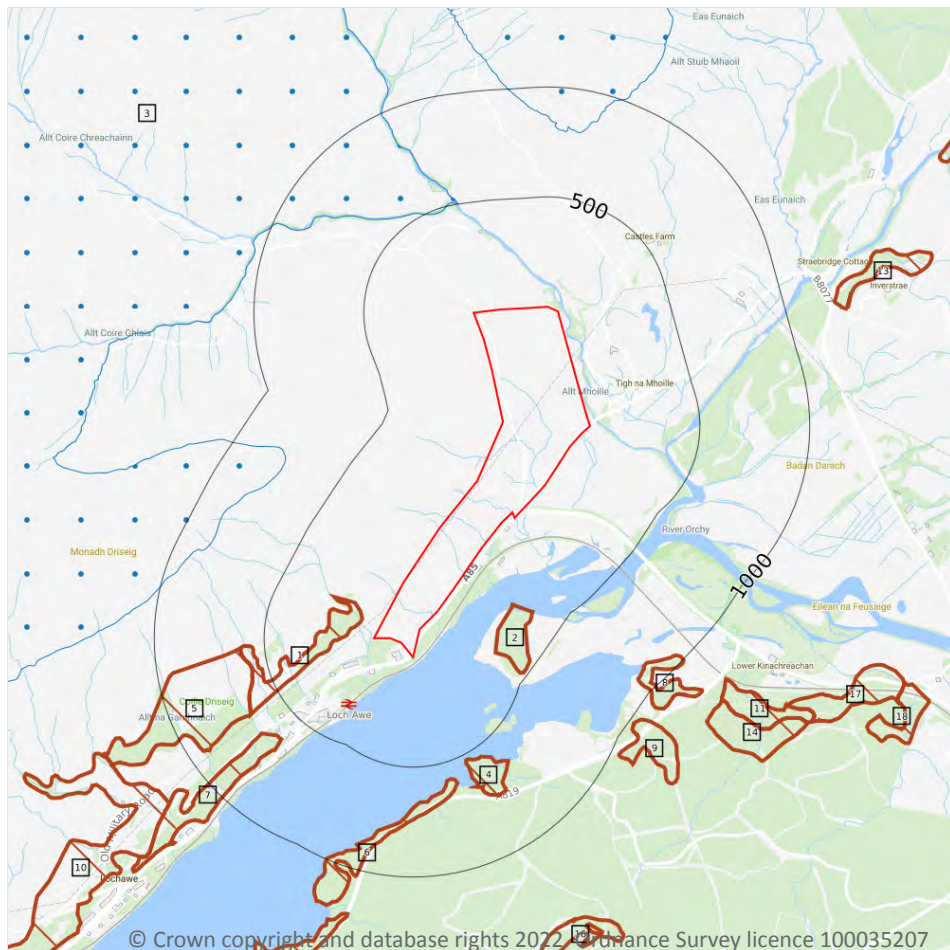
Low

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 39**

*This data is sourced from Ambiantal Risk Analytics.*

## 11 Environmental designations



- Site Outline
- Search buffers in metres (m)
- Sites of Special Scientific Interest (SSSI)
- + Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Designated Ancient Woodland

### 11.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m

0

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*



## 11.2 Conserved wetland sites (Ramsar sites)

Records within 2000m

0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 11.3 Special Areas of Conservation (SAC)

Records within 2000m

0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 11.4 Special Protection Areas (SPA)

Records within 2000m

1

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

Features are displayed on the Environmental designations map on **page 40**

ID	Location	Name	Species of interest	Habitat description	Data source
3	482m N	Glen Etive and Glen Fyne	Golden eagle	Inland rocks, Scree, Sands, Permanent Snow and ice; Humid grassland, Mesophile grassland; Inland water bodies (Standing water, Running water); Dry grassland, Steppes; Other arable land; Bogs, Marshes, Water fringed vegetation, Fens; Coniferous woodland; Improved grassland; Broad-leaved deciduous woodland; Mixed woodland; Alpine and sub-Alpine grassland; Heath, Scrub, Maquis and Garrigue, Phygrana	Scottish Natural Heritage

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*





## 11.5 National Nature Reserves (NNR)

Records within 2000m

0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 11.6 Local Nature Reserves (LNR)

Records within 2000m

0

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 11.7 Designated Ancient Woodland

Records within 2000m

18

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 40**

ID	Location	Name	Woodland Type
1	88m NW	Coille Driseig	Ancient (of semi-natural origin)
2	261m SE	Unknown	Ancient (of semi-natural origin)
4	527m SE	Unknown	Ancient (of semi-natural origin)
5	571m W	Coille Driseig	Ancient (of semi-natural origin)
6	580m S	Unknown	Ancient (of semi-natural origin)
7	623m SW	Coille Driseig	Ancient (of semi-natural origin)
8	892m SE	Unknown	Ancient (of semi-natural origin)
9	1022m SE	Unknown	Ancient (of semi-natural origin)
10	1197m SW	Coille Driseig	Ancient (of semi-natural origin)
11	1203m SE	Unknown	Ancient (of semi-natural origin)



ID	Location	Name	Woodland Type
12	1205m S	Unknown	Long-Established (of plantation origin)
13	1226m E	Unknown	Ancient (of semi-natural origin)
14	1252m SE	Unknown	Ancient (of semi-natural origin)
-	1391m S	Unknown	Ancient (of semi-natural origin)
16	1397m SE	Unknown	Ancient (of semi-natural origin)
17	1486m SE	Unknown	Other (on Roy map)
18	1830m SE	Unknown	Ancient (of semi-natural origin)
19	1873m E	Unknown	Ancient (of semi-natural origin)

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 11.8 Biosphere Reserves

**Records within 2000m**

**0**

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 11.9 Forest Parks

**Records within 2000m**

**0**

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

*This data is sourced from the Forestry Commission.*

## 11.10 Marine Conservation Zones

**Records within 2000m**

**0**

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*



## 12 Visual and cultural designations

### 12.1 World Heritage Sites

Records within 250m

0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

*This data is sourced from Historic England, Cadw and Historic Environment Scotland.*

### 12.2 Area of Outstanding Natural Beauty

Records within 250m

0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

### 12.3 National Parks

Records within 250m

0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

*This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.*

### 12.4 Listed Buildings

Records within 250m

0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.



*This data is sourced from Historic England, Cadw and Historic Environment Scotland.*

## 12.5 Conservation Areas

**Records within 250m**

**0**

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

*This data is sourced from Historic England, Cadw and Historic Environment Scotland.*

## 12.6 Scheduled Ancient Monuments

**Records within 250m**

**0**

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

*This data is sourced from Historic England, Cadw and Historic Environment Scotland.*

## 12.7 Registered Parks and Gardens

**Records within 250m**

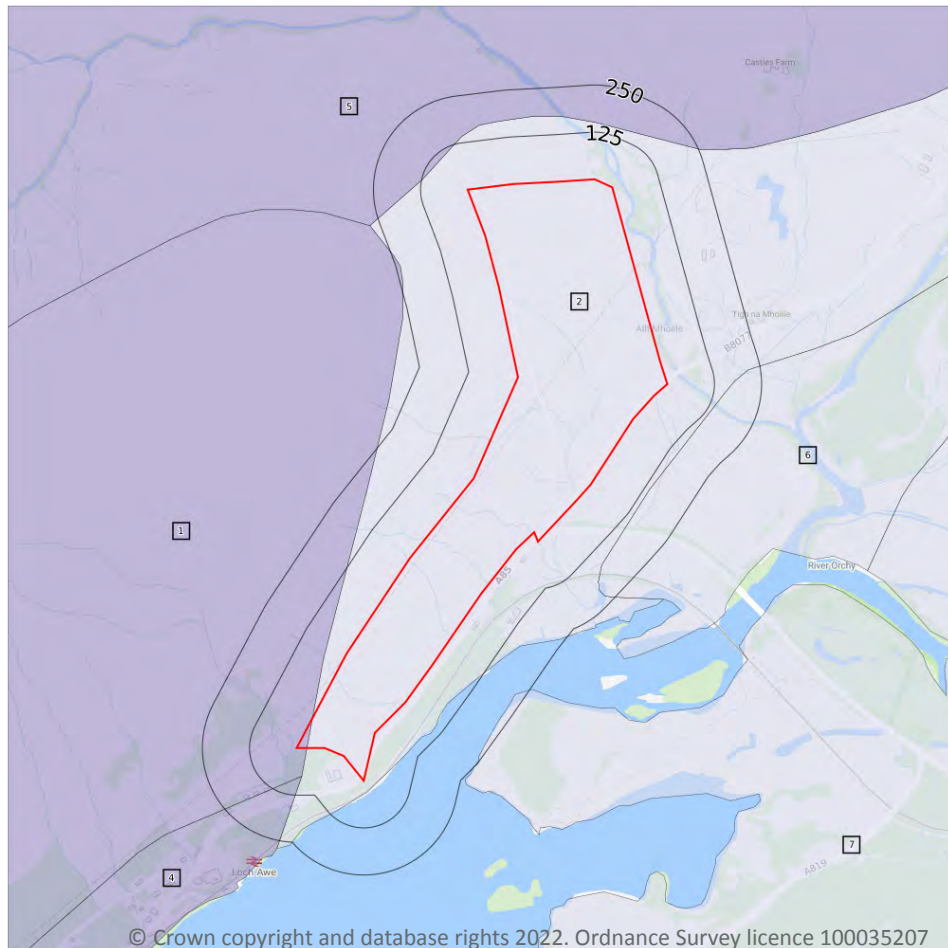
**0**

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

*This data is sourced from Historic England, Cadw and Historic Environment Scotland.*



## 13 Agricultural designations



- Site Outline
- Search buffers in metres (m)
- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 4 - good quality
- Grade 5 - moderate quality
- Grade 6 - poor quality
- Grade 7 - very poor quality

### 13.1 Agricultural Land Classification

Records within 250m

6

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 46**

ID	Location	Classification	Description
1	On site	Grade 6.2	Land Suited only to Improved Grassland and Rough Grazings
2	On site	Grade 5.3	Land Suited only to Improved Grassland and Rough Grazings
4	75m S	Grade 6.1	Land Suited only to Improved Grassland and Rough Grazings



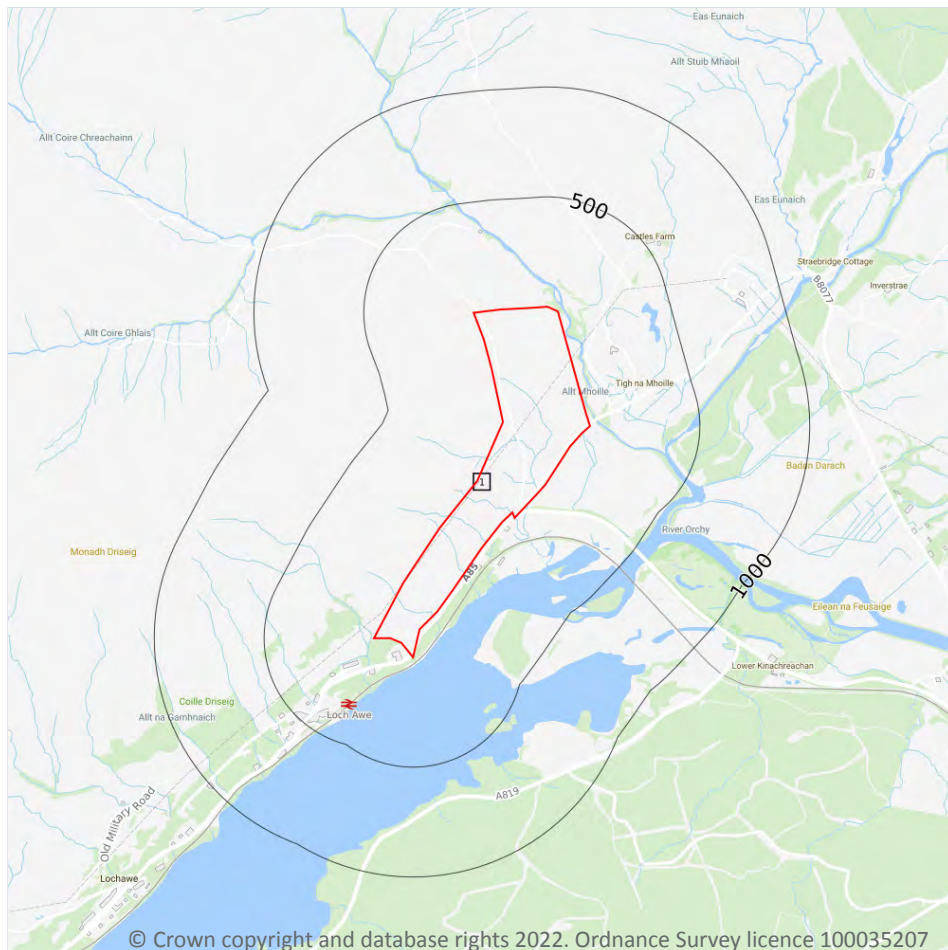


ID	Location	Classification	Description
5	107m NW	Grade 6.3	Land Suited only to Improved Grassland and Rough Grazings
6	135m SE	Grade 5.2	Land Suited only to Improved Grassland and Rough Grazings
7	225m SE	Grade 5.3	Land Suited only to Improved Grassland and Rough Grazings

*This data is sourced from the James Hutton Institute.*



## 14 Geology 1:10,000 scale - Availability



— Site Outline  
Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

### 14.1 10k Availability

#### Records within 500m

1

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 48**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	No coverage	No coverage	No coverage	NoCov

*This data is sourced from the British Geological Survey.*



## Geology 1:10,000 scale - Artificial and made ground

### 14.2 Artificial and made ground (10k)

Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

*This data is sourced from the British Geological Survey.*



## Geology 1:10,000 scale - Superficial

### 14.3 Superficial geology (10k)

Records within 500m

0

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

*This data is sourced from the British Geological Survey.*

### 14.4 Landslip (10k)

Records within 500m

0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

*This data is sourced from the British Geological Survey.*



## Geology 1:10,000 scale - Bedrock

### 14.5 Bedrock geology (10k)

Records within 500m

0

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

*This data is sourced from the British Geological Survey.*

### 14.6 Bedrock faults and other linear features (10k)

Records within 500m

0

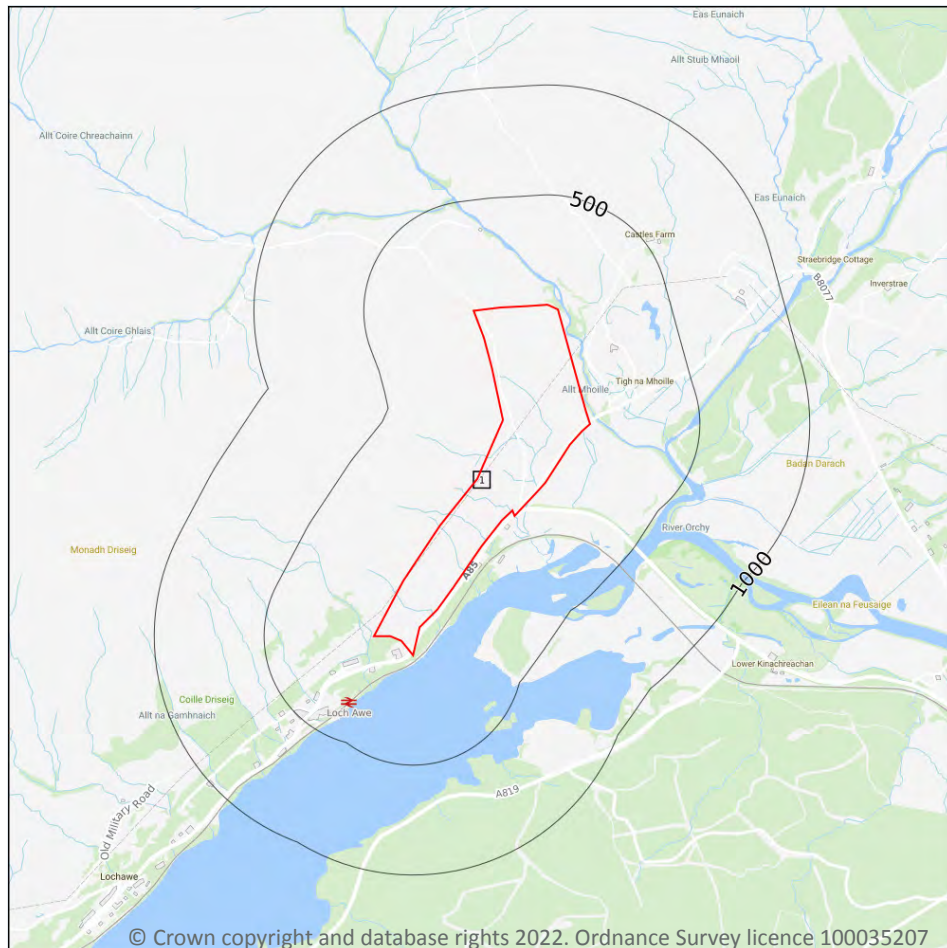
Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

*This data is sourced from the British Geological Survey.*





## 15 Geology 1:50,000 scale - Availability



— Site Outline

Search buffers in metres (m)

□ Geological map tile

### 15.1 50k Availability

#### Records within 500m

1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 52**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	Full	Full	No coverage	SC045e_Dalmally_v4

*This data is sourced from the British Geological Survey.*



## Geology 1:50,000 scale - Artificial and made ground

### 15.2 Artificial and made ground (50k)

Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

*This data is sourced from the British Geological Survey.*

### 15.3 Artificial ground permeability (50k)

Records within 50m

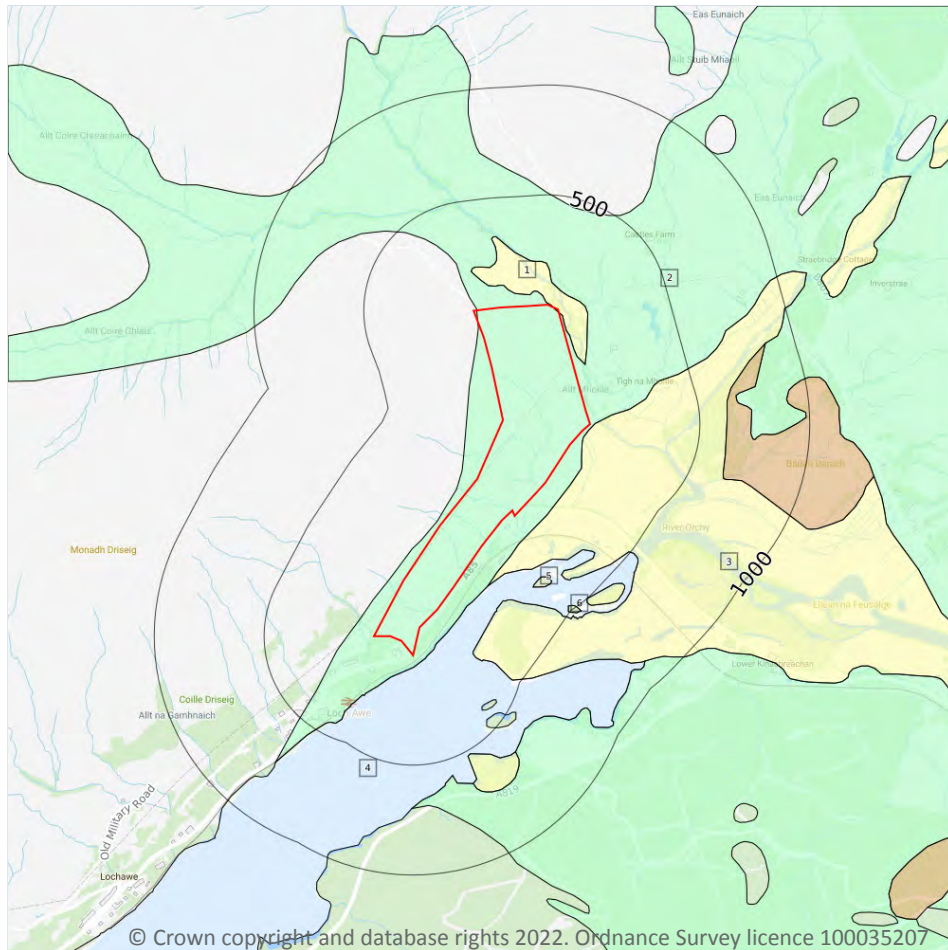
0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

*This data is sourced from the British Geological Survey.*



## Geology 1:50,000 scale - Superficial



**Site Outline**

Search buffers in metres (m)

**Landslip (50k)**

**Superficial geology (50k)**  
Please see table for more details.

### 15.4 Superficial geology (50k)

#### Records within 500m

6

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 54**

ID	Location	LEX Code	Description	Rock description
1	On site	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
2	On site	HMGD-XDSV	HUMMOCKY (MOUNDY) GLACIAL DEPOSITS	DIAMICTON, SAND AND GRAVEL
3	15m SE	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL



ID	Location	LEX Code	Description	Rock description
4	46m SE	SUPNM-WATR	SUPERFICIAL THEME NOT MAPPED [FOR DIGITAL MAP USE ONLY]	WATER, TYPE UNSPECIFIED
5	296m SE	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
6	477m SE	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

*This data is sourced from the British Geological Survey.*

## 15.5 Superficial permeability (50k)

### Records within 50m

**3**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Mixed	High	Low
On site	Intergranular	High	Very Low
15m SE	Intergranular	High	Very Low

*This data is sourced from the British Geological Survey.*

## 15.6 Landslip (50k)

### Records within 500m

**0**

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

*This data is sourced from the British Geological Survey.*

## 15.7 Landslip permeability (50k)

### Records within 50m

**0**

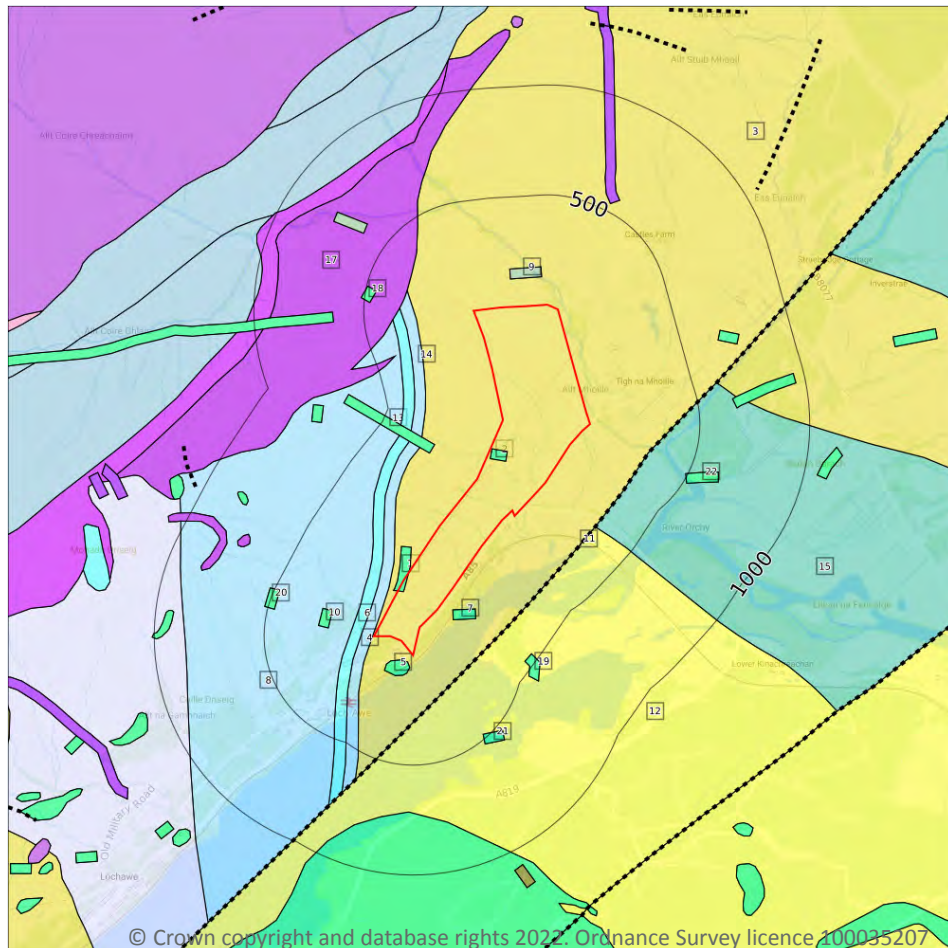
A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

*This data is sourced from the British Geological Survey.*





## Geology 1:50,000 scale - Bedrock



**— Site Outline**

**Search buffers in metres (m)**

**.... Bedrock faults and other linear features (50k)**

**Bedrock geology (50k)**  
Please see table for more details.

### 15.8 Bedrock geology (50k)

Records within 500m

21

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 56**

ID	Location	LEX Code	Description	Rock age
1	On site	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
2	On site	CSTD-MCQGB	CENTRAL SCOTLAND LATE CARBONIFEROUS THOLEIITIC DYKE SWARM - QUARTZ-MICROGABBRO	-



ID	Location	LEX Code	Description	Rock age
3	On site	DAGQ-QZITE	GLEN COE QUARTZITE MEMBER - QUARTZITE	-
4	6m W	DALS-PESP	LEVEN SCHIST FORMATION - PELITE AND SEMIPELITE	-
5	39m SW	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
6	57m W	DALS-MARBLE	LEVEN SCHIST FORMATION - MARBLE	-
7	58m SE	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
8	105m W	DALS-PESP	LEVEN SCHIST FORMATION - PELITE AND SEMIPELITE	-
9	127m N	CSTD-CAMO	CENTRAL SCOTLAND LATE CARBONIFEROUS THOLEIITIC DYKE SWARM - CAMPTONITE AND MONCHIQUE	-
10	211m W	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
12	216m SE	DBAP-QMPS	ARDRISHAIG PHYLLITE FORMATION - QUARTZITE, METALIMESTONE AND PHYLLITIC SEMIPELITE	-
13	240m NW	CSTD-MCQGB	CENTRAL SCOTLAND LATE CARBONIFEROUS THOLEIITIC DYKE SWARM - QUARTZ-MICROGABBRO	-
14	263m W	DALS-PESP	LEVEN SCHIST FORMATION - PELITE AND SEMIPELITE	-
15	294m SE	DBES-PELGP	EASDALE SLATE FORMATION - PELITE, GRAPHITIC	-
16	315m W	DALS-MARBLE	LEVEN SCHIST FORMATION - MARBLE	-
17	316m W	QARRY-QDI	QUARRY INTRUSION - QUARTZ-DIORITE	-
18	452m W	CSTD-MCQGB	CENTRAL SCOTLAND LATE CARBONIFEROUS THOLEIITIC DYKE SWARM - QUARTZ-MICROGABBRO	-
19	461m SE	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
20	469m W	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
21	481m SE	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
22	491m SE	CSTD-MCQGB	CENTRAL SCOTLAND LATE CARBONIFEROUS THOLEIITIC DYKE SWARM - QUARTZ-MICROGABBRO	-

*This data is sourced from the British Geological Survey.*



## 15.9 Bedrock permeability (50k)

### Records within 50m

**5**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Fracture	Low	Low
On site	Fracture	Low	Low
On site	Fracture	Low	Low
6m SW	Fracture	Low	Low
39m SW	Fracture	Low	Low

*This data is sourced from the British Geological Survey.*

## 15.10 Bedrock faults and other linear features (50k)

### Records within 500m

**1**

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 56**

ID	Location	Category	Description
11	216m SE	FAULT	Fault, inferred, displacement unknown

*This data is sourced from the British Geological Survey.*



## 16 Boreholes

### 16.1 BGS Boreholes

Records within 250m

0

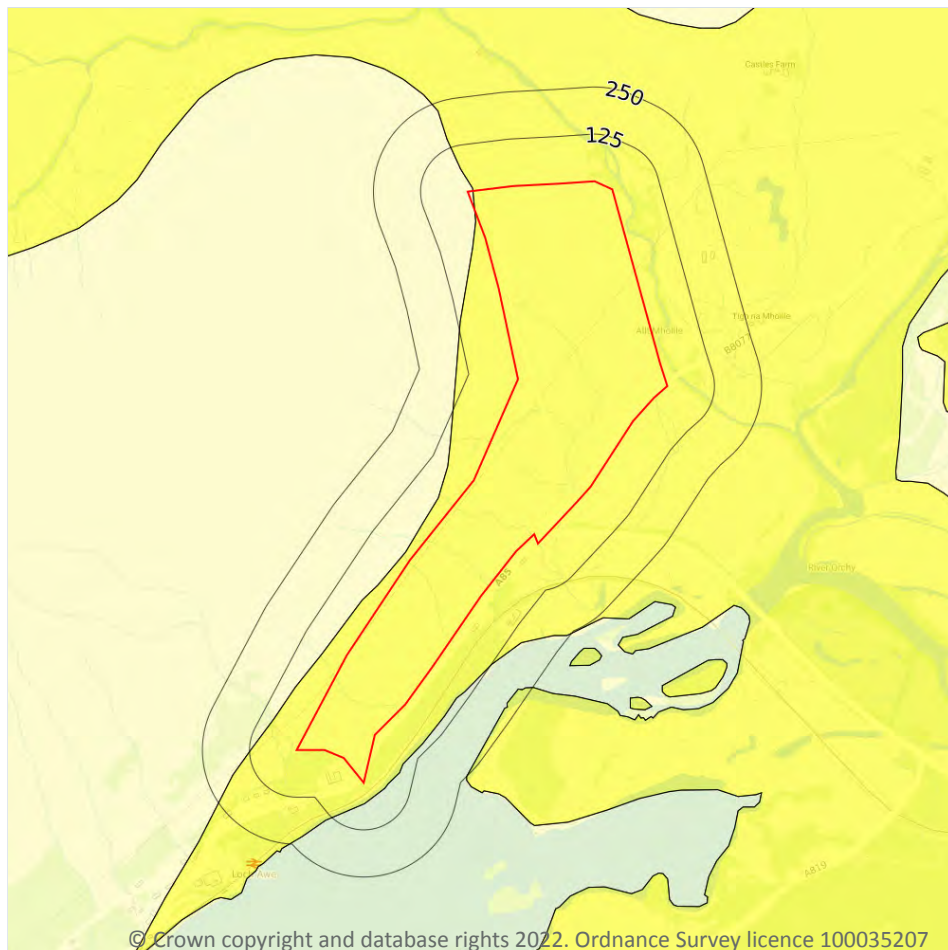
The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

*This data is sourced from the British Geological Survey.*





## 17 Natural ground subsidence - Shrink swell clays



- Site Outline
- Search buffers in metres (m)
- ☐ No data
  - ☐ Negligible
  - ☐ Very low
  - ☐ Low
  - ☐ Moderate
  - ☐ High

### 17.1 Shrink swell clays

#### Records within 50m

2

The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

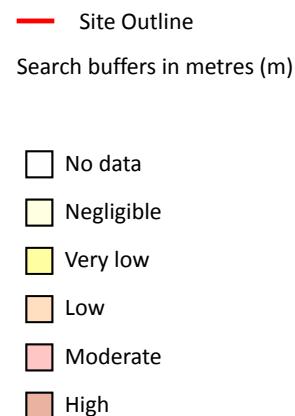
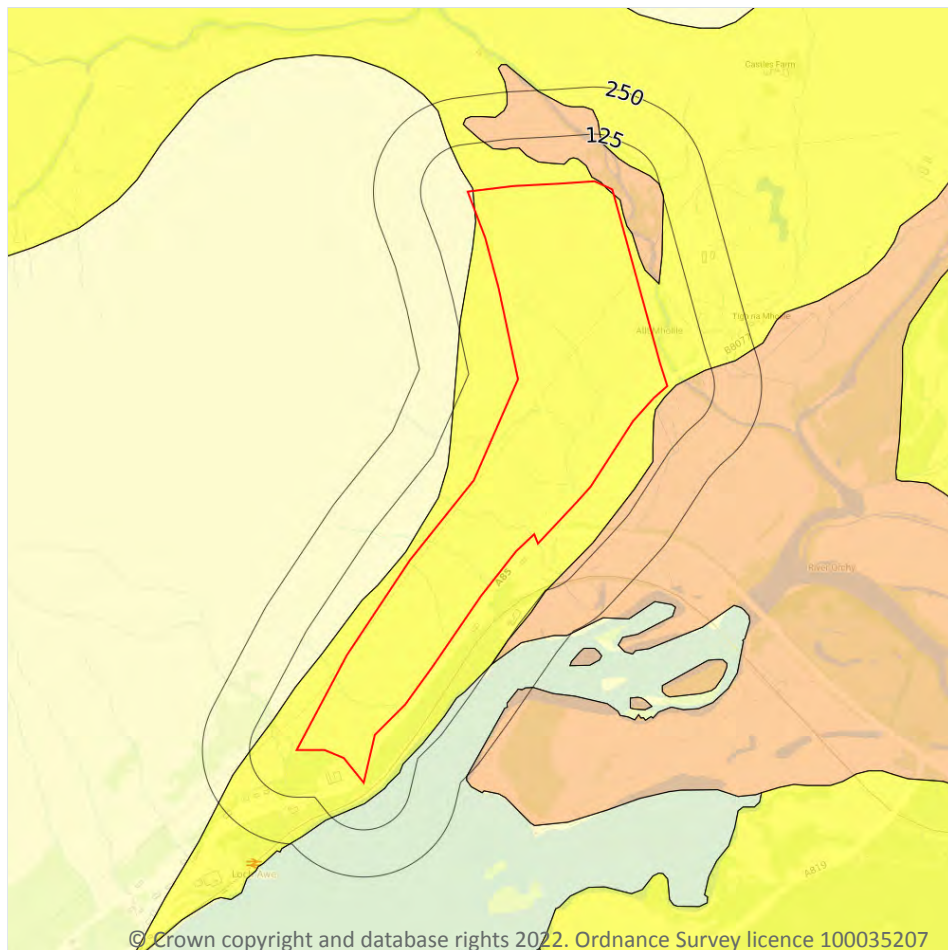
Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 60**

Location	Hazard rating	Details
On site	Negligible	Ground conditions predominantly non-plastic.
On site	Very low	Ground conditions predominantly low plasticity.

*This data is sourced from the British Geological Survey.*



## Natural ground subsidence - Running sands



### 17.2 Running sands

#### Records within 50m

4

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 61**

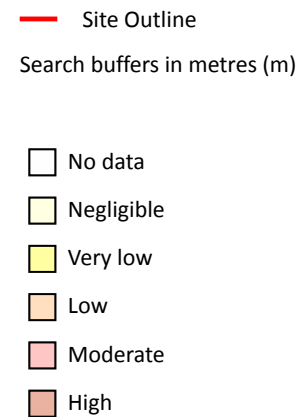
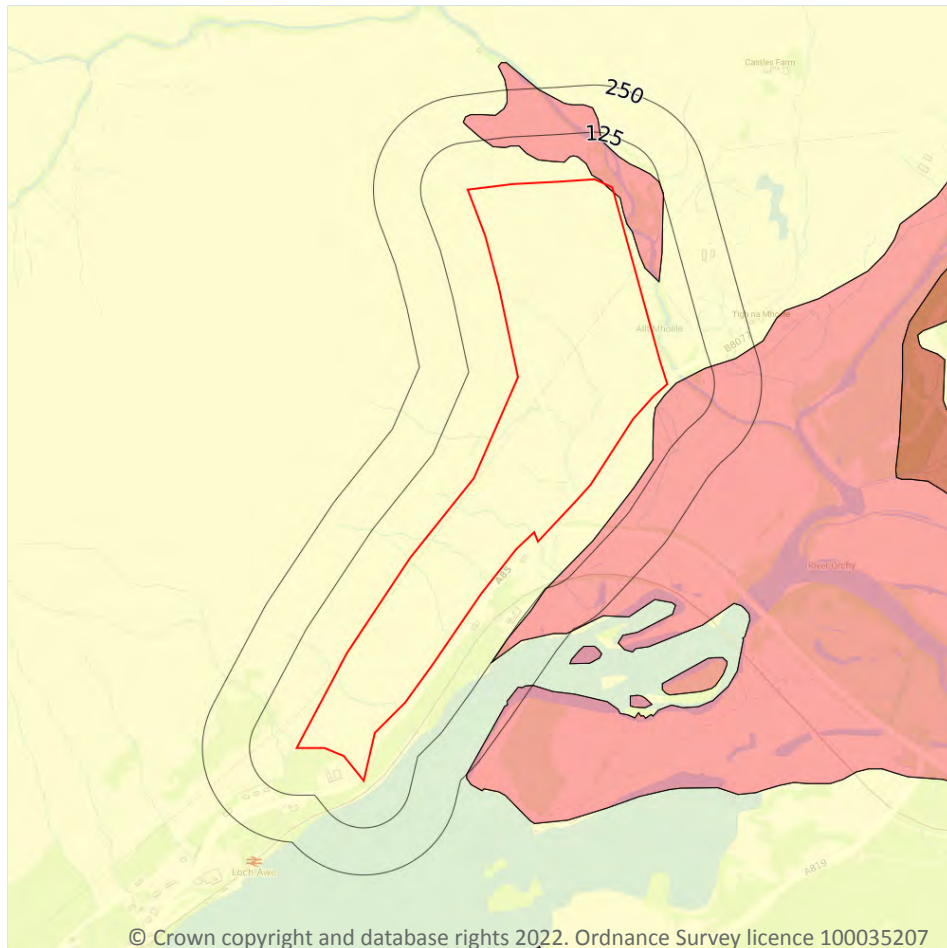
Location	Hazard rating	Details
On site	Negligible	Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.

Location	Hazard rating	Details
On site	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.
On site	Low	Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.
15m SE	Low	Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.

*This data is sourced from the British Geological Survey.*



## Natural ground subsidence - Compressible deposits



### 17.3 Compressible deposits

#### Records within 50m

3

The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 63**

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.
On site	Moderate	Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.

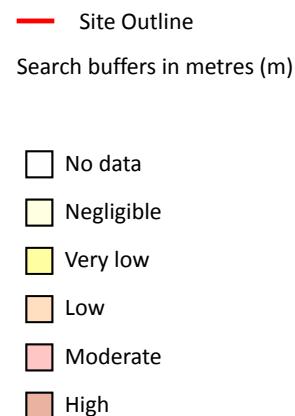
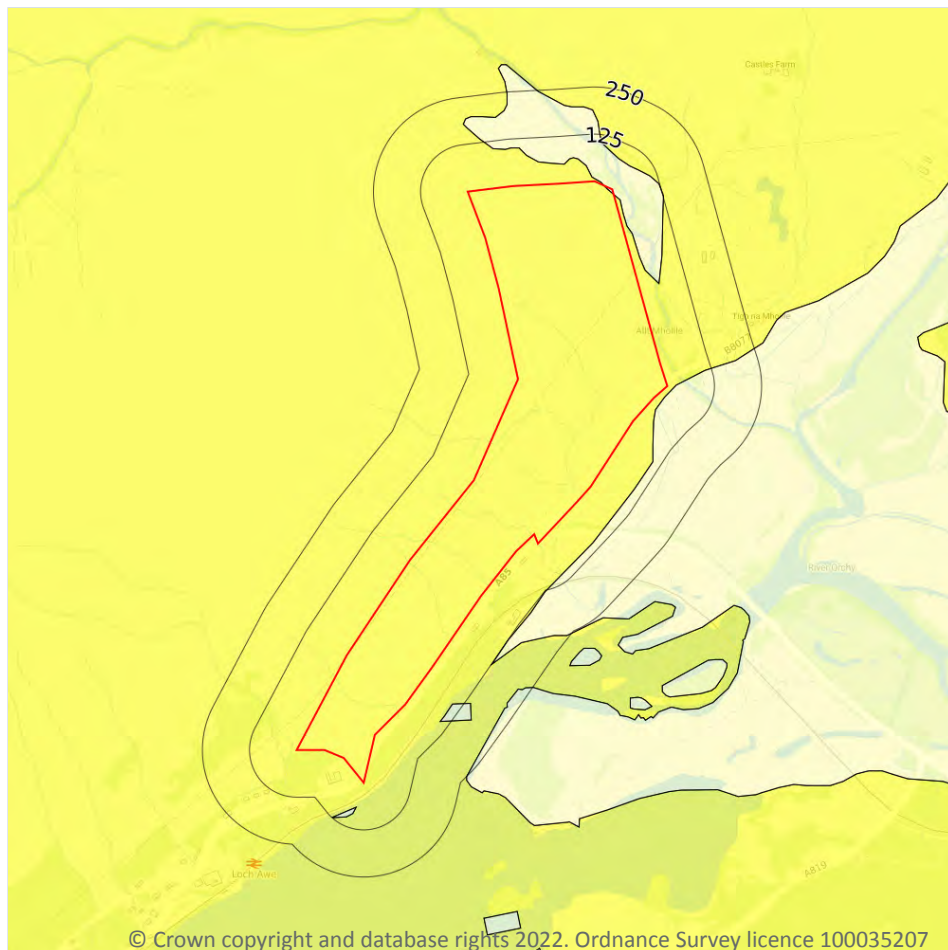


Location	Hazard rating	Details
15m SE	Moderate	Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.

*This data is sourced from the British Geological Survey.*



## Natural ground subsidence - Collapsible deposits



### 17.4 Collapsible deposits

#### Records within 50m

3

The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 65**

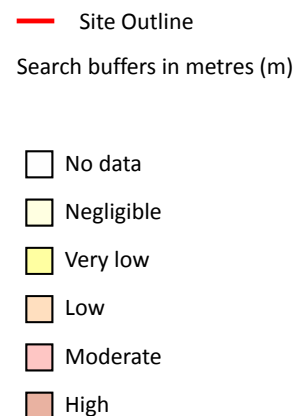
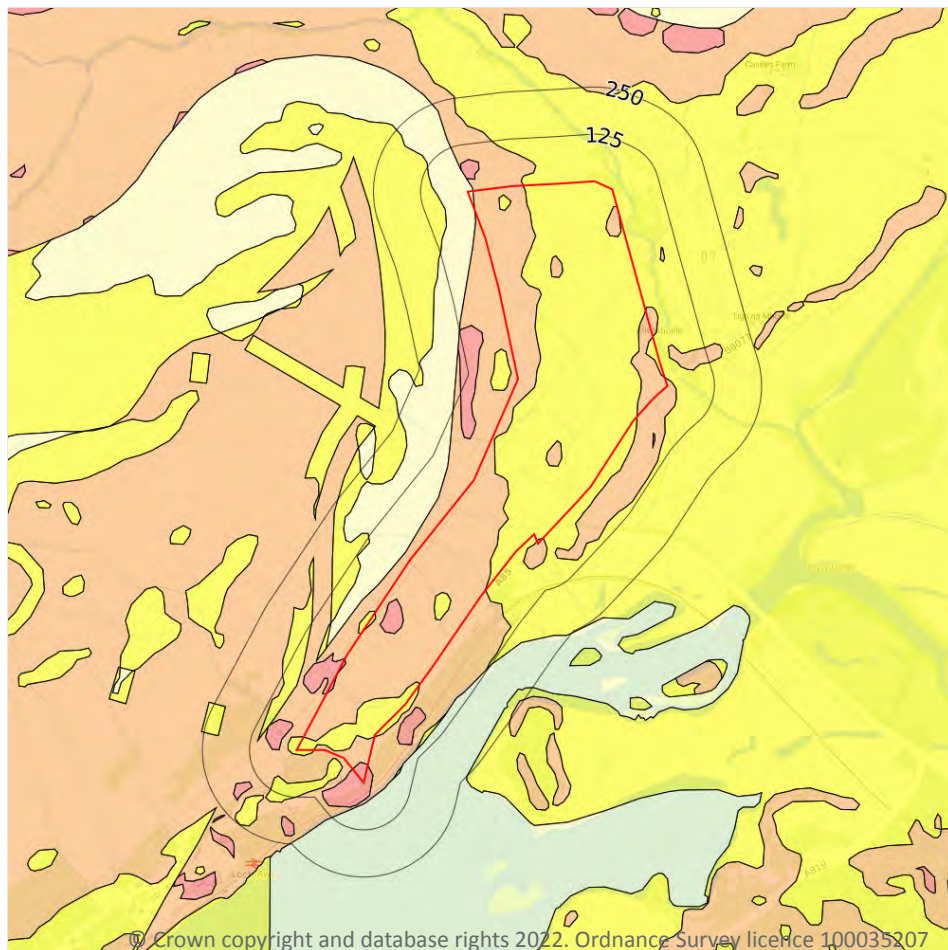
Location	Hazard rating	Details
On site	Negligible	Deposits with potential to collapse when loaded and saturated are believed not to be present.
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.
15m SE	Negligible	Deposits with potential to collapse when loaded and saturated are believed not to be present.



*This data is sourced from the British Geological Survey.*



## Natural ground subsidence - Landslides



### 17.5 Landslides

#### Records within 50m

11

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 67**

Location	Hazard rating	Details
On site	Negligible	Slope instability problems are not thought to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

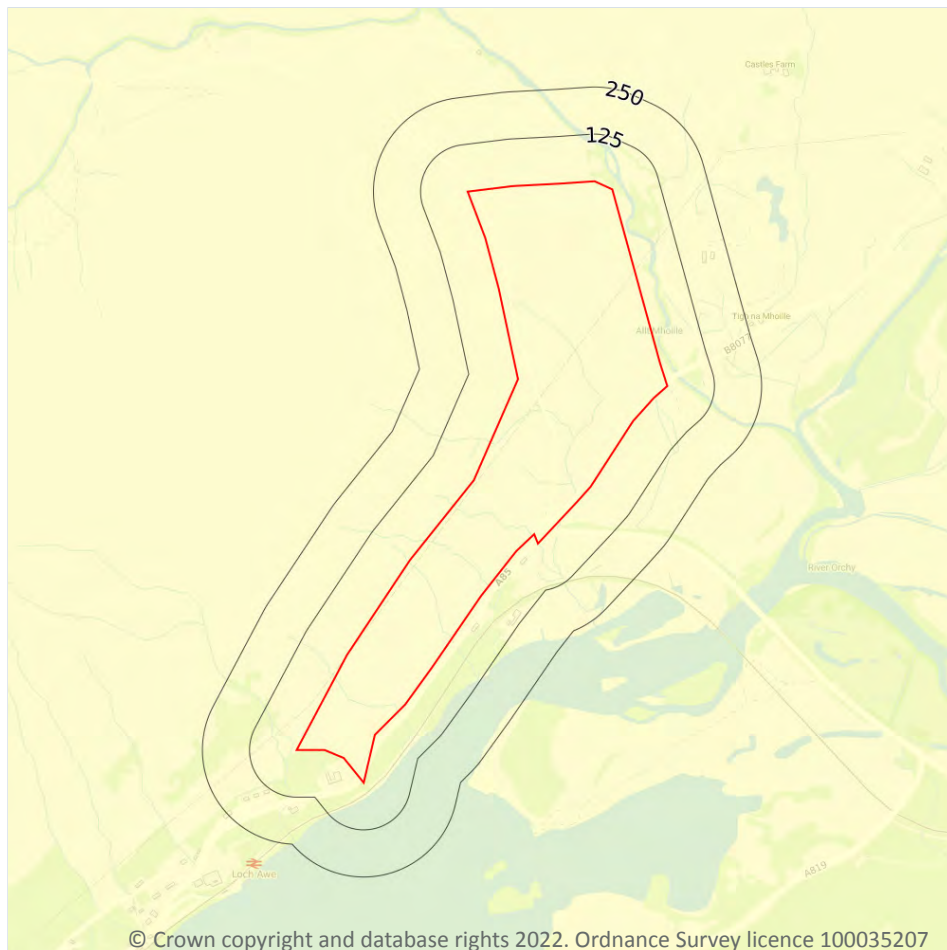


Location	Hazard rating	Details
On site	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
On site	Low	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.
On site	Moderate	Slope instability problems are probably present or have occurred in the past. Land use should consider specifically the stability of the site.
10m SW	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
14m W	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
25m SE	Moderate	Slope instability problems are probably present or have occurred in the past. Land use should consider specifically the stability of the site.
29m E	Low	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.
31m N	Moderate	Slope instability problems are probably present or have occurred in the past. Land use should consider specifically the stability of the site.
39m NW	Moderate	Slope instability problems are probably present or have occurred in the past. Land use should consider specifically the stability of the site.
46m SE	Negligible	Slope instability problems are not thought to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

*This data is sourced from the British Geological Survey.*



## Natural ground subsidence - Ground dissolution of soluble rocks



- Site Outline**
- Search buffers in metres (m)
- ☐ No data
  - ☐ Negligible
  - ☐ Very low
  - ☐ Low
  - ☐ Moderate
  - ☐ High

### 17.6 Ground dissolution of soluble rocks

#### Records within 50m

1

The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

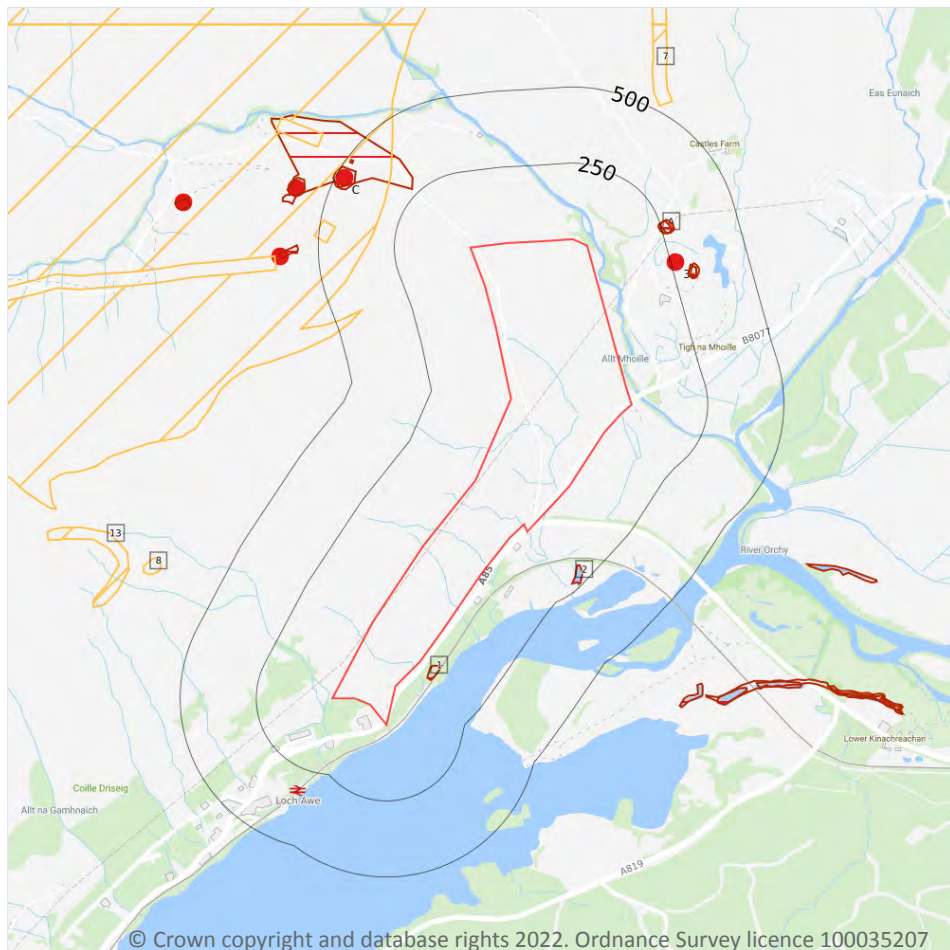
Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 69**

Location	Hazard rating	Details
On site	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.

*This data is sourced from the British Geological Survey.*



## 18 Mining, ground workings and natural cavities



- Site Outline
- Search buffers in metres (m)
- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities
- Non Coal Mining
- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

### 18.1 Natural cavities

Records within 500m

0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

*This data is sourced from Stantec UK Ltd.*

## 18.2 BritPits

### Records within 500m

2

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

Features are displayed on the Mining, ground workings and natural cavities map on **page 70**

ID	Location	Details	Description
3	266m E	Name: Barran an Tuirc Address: Stronmilchan, OBAN, Argyll and Bute Commodity: Igneous & Metamorphic Rock Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority
C	474m NW	Name: Ben Cruachan Quarry Address: Lochawe, DALMALLY, Argyllshire Commodity: Igneous & Metamorphic Rock Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

*This data is sourced from the British Geological Survey.*

## 18.3 Surface ground workings

### Records within 250m

4

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 70**

ID	Location	Land Use	Year of mapping	Mapping scale
1	39m SE	Cuttings	1900	1:10560
2	195m SE	Pond	1976	1:10000
A	243m E	Pond	1900	1:10560
A	243m E	Pond	1900	1:10560

*This data is sourced from Ordnance Survey/Groundsure.*





## 18.4 Underground workings

### Records within 1000m

**0**

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

*This data is sourced from Ordnance Survey/Groundsure.*

## 18.5 Historical Mineral Planning Areas

### Records within 500m

**0**

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

*This data is sourced from the British Geological Survey.*

## 18.6 Non-coal mining

### Records within 1000m

**6**

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

Features are displayed on the Mining, ground workings and natural cavities map on **page 70**

ID	Location	Name	Commodity	Class	Likelihood
5	316m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
7	518m NE	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
8	697m NW	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
10	753m N	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered



ID	Location	Name	Commodity	Class	Likelihood
11	754m N	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
13	789m NW	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered

*This data is sourced from the British Geological Survey.*

## 18.7 Mining cavities

**Records within 1000m** **0**

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

*This data is sourced from Stantec UK Ltd.*

## 18.8 JPB mining areas

**Records on site** **0**

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

*This data is sourced from Johnson Poole and Bloomer.*

## 18.9 Coal mining

**Records on site** **0**

Areas which could be affected by past, current or future coal mining.

*This data is sourced from the Coal Authority.*

## 18.10 Brine areas

**Records on site** **0**

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.



*This data is sourced from the Cheshire Brine Subsidence Compensation Board.*

### 18.11 Gypsum areas

Records on site	0
-----------------	---

Generalised areas that may be affected by gypsum extraction.

*This data is sourced from British Gypsum.*

### 18.12 Tin mining

Records on site	0
-----------------	---

Generalised areas that may be affected by historical tin mining.

*This data is sourced from Groundsure.*

### 18.13 Clay mining

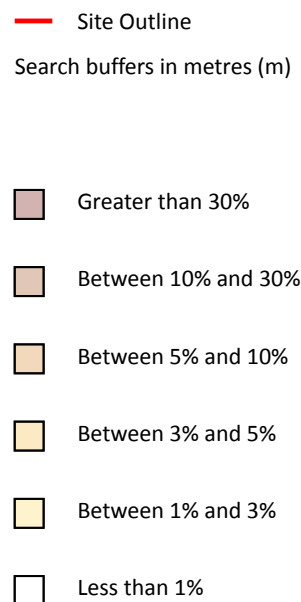
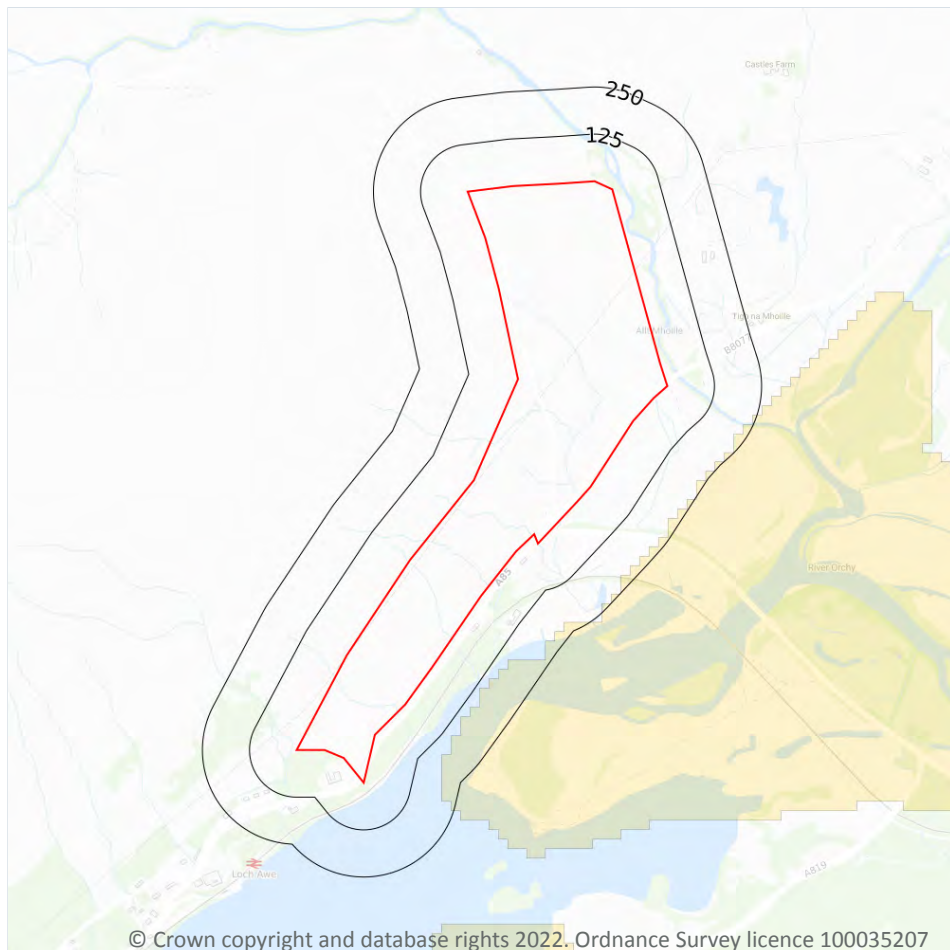
Records on site	0
-----------------	---

Generalised areas that may be affected by kaolin and ball clay extraction.

*This data is sourced from the Kaolin and Ball Clay Association (UK).*



## 19 Radon



### 19.1 Radon

#### Records on site

1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 75**

Location	Estimated properties affected	Radon Protection Measures required
On site	Less than 1%	None**

*This data is sourced from the British Geological Survey and Public Health England.*





## 20 Soil chemistry

### 20.1 BGS Estimated Background Soil Chemistry

Records within 50m

28

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km<sup>2</sup>. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km<sup>2</sup>; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
6m SW	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
15m E	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
18m SW	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
19m N	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
19m NW	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg



Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
22m SW	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
22m NE	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
22m NE	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
26m W	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
26m NW	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
35m NE	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
39m SW	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
42m SW	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
45m S	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
47m SW	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg

*This data is sourced from the British Geological Survey.*

## 20.2 BGS Estimated Urban Soil Chemistry

### Records within 50m

0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km<sup>2</sup>).

*This data is sourced from the British Geological Survey.*

## 20.3 BGS Measured Urban Soil Chemistry

### Records within 50m

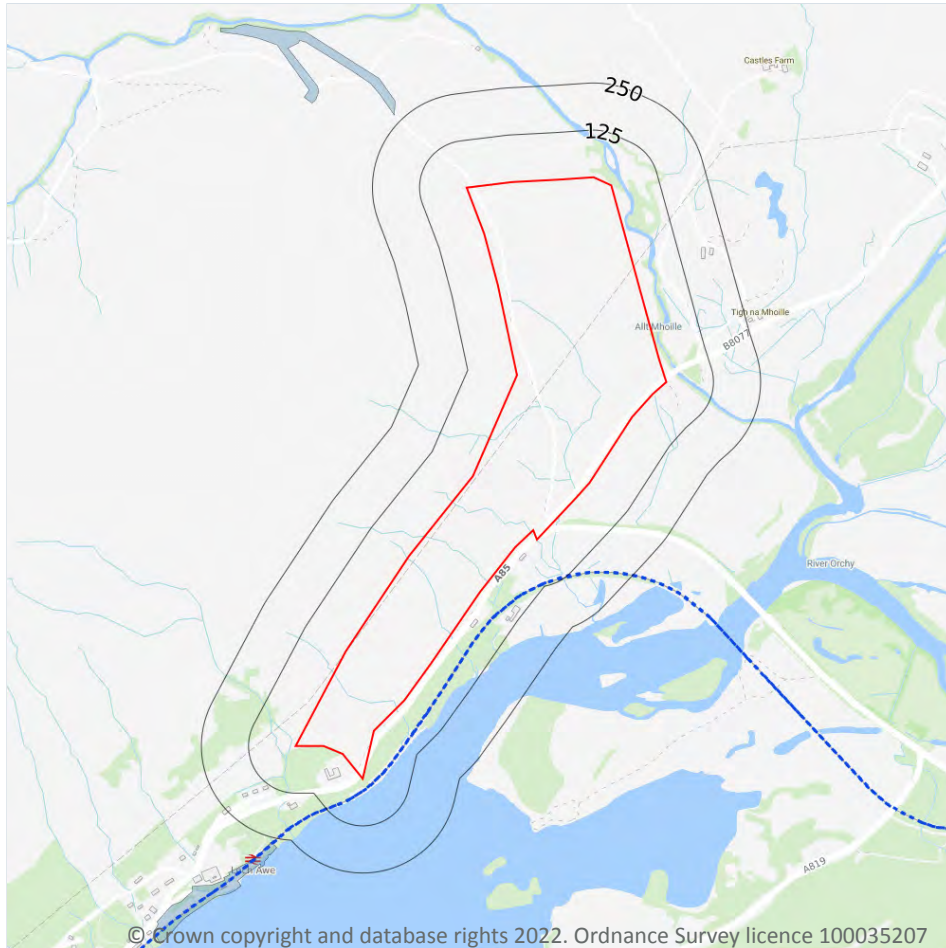
0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km<sup>2</sup>.

*This data is sourced from the British Geological Survey.*



## 21 Railway infrastructure and projects



- Site Outline
- Search buffers in metres (m)
- C1 Crossrail 1 Stations
- Crossrail 1 Route
- Crossrail 1 Worksites
- C2 Crossrail 2 Stations
- Crossrail 2 Route
- Crossrail 2 Worksites
- Crossrail 2 Safeguarding
- Crossrail 2 Headhouses
- Railway stations
- Active railways
- Active tunnels
- Abandoned railways
- Historic railways
- Historic tunnels
- Underground stations
- Underground Lines
- Royal Mail tunnels
- HS2 optimised route
- HS2 Stations
- HS2 Depots
- HS2 Surface Safeguarding
- HS2 Subsurface Safeguarding

### 21.1 Underground railways (London)

Records within 250m

0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

*This data is sourced from publicly available information by Groundsure.*

### 21.2 Underground railways (Non-London)

Records within 250m

0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.



*This data is sourced from publicly available information by Groundsure.*

### 21.3 Railway tunnels

Records within 250m

0

Railway tunnels taken from contemporary Ordnance Survey mapping.

*This data is sourced from the Ordnance Survey.*

### 21.4 Historical railway and tunnel features

Records within 250m

0

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

*This data is sourced from Ordnance Survey/Groundsure.*

### 21.5 Royal Mail tunnels

Records within 250m

0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

*This data is sourced from Groundsure/the Postal Museum.*

### 21.6 Historical railways

Records within 250m

0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

*This data is sourced from OpenStreetMap.*

### 21.7 Railways

Records within 250m

15

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways. Features are displayed on the Railway infrastructure and projects map on **page 78**



Location	Name	Type
26m SE	Not given	Single Track
28m SE	West Highland Line	rail
30m S	Not given	Single Track
53m E	Not given	Single Track
60m SE	Not given	Single Track
63m SW	Not given	Single Track
64m SE	Not given	Single Track
66m SE	Not given	Single Track
68m SE	Not given	Single Track
69m SE	Not given	Single Track
91m SE	Not given	Single Track
99m SW	Not given	Single Track
116m S	Not given	Single Track
116m S	Not given	Single Track
219m S	Not given	Single Track

*This data is sourced from Ordnance Survey and OpenStreetMap.*

## 21.8 Crossrail 1

**Records within 500m**

**0**

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

*This data is sourced from publicly available information by Groundsure.*

## 21.9 Crossrail 2

**Records within 500m**

**0**

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

*This data is sourced from publicly available information by Groundsure.*



## 21.10 HS2

### Records within 500m

**0**

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

*This data is sourced from HS2 Ltd.*



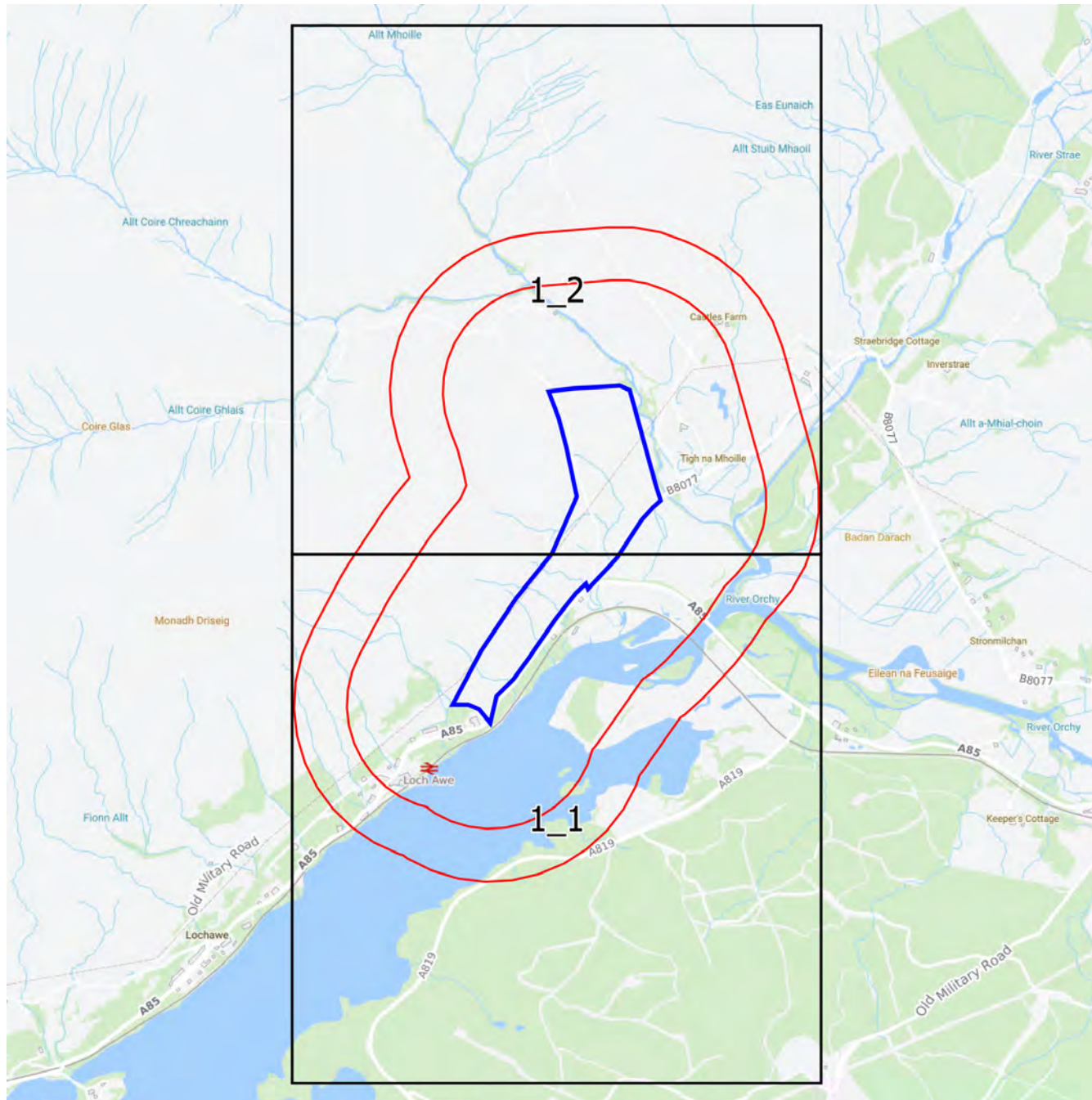
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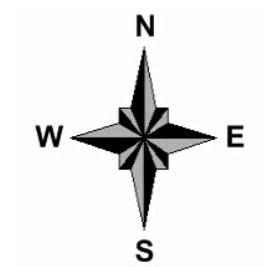
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## Small Scale Grid Index





#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_SS\_1\_1  
**Grid Ref:** 213056, 727247

**Map Name:** County Series

**Map date:** 1870

**Scale:** 1:10,560

**Printed at:** 1:10,560



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 Edition N/A  
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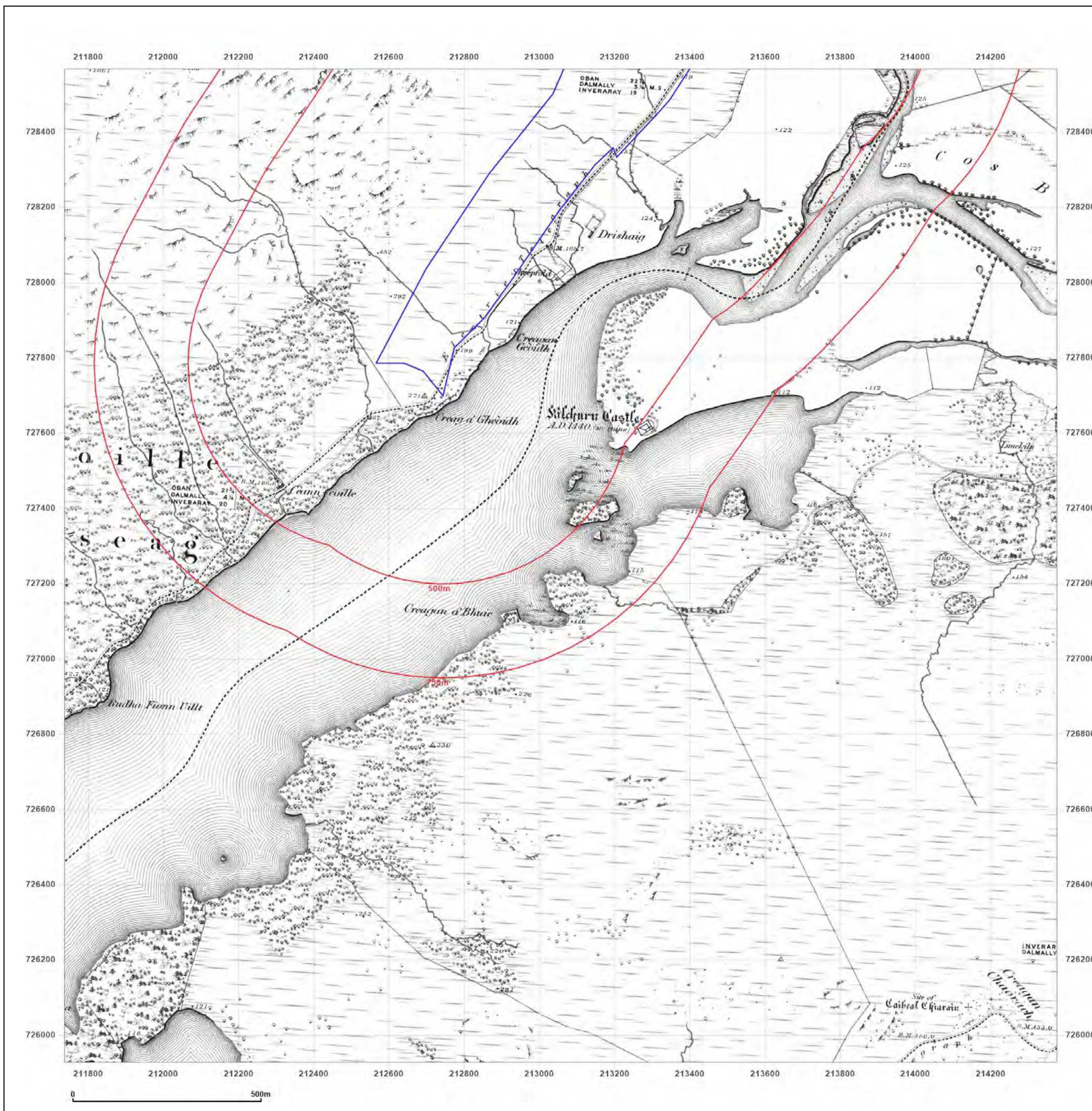


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**Report Ref:** GSIP-2022-12632-9900\_SS\_1\_1  
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**Map Name:** National Grid

**Map date:** 1976

**Scale:** 1:10,000

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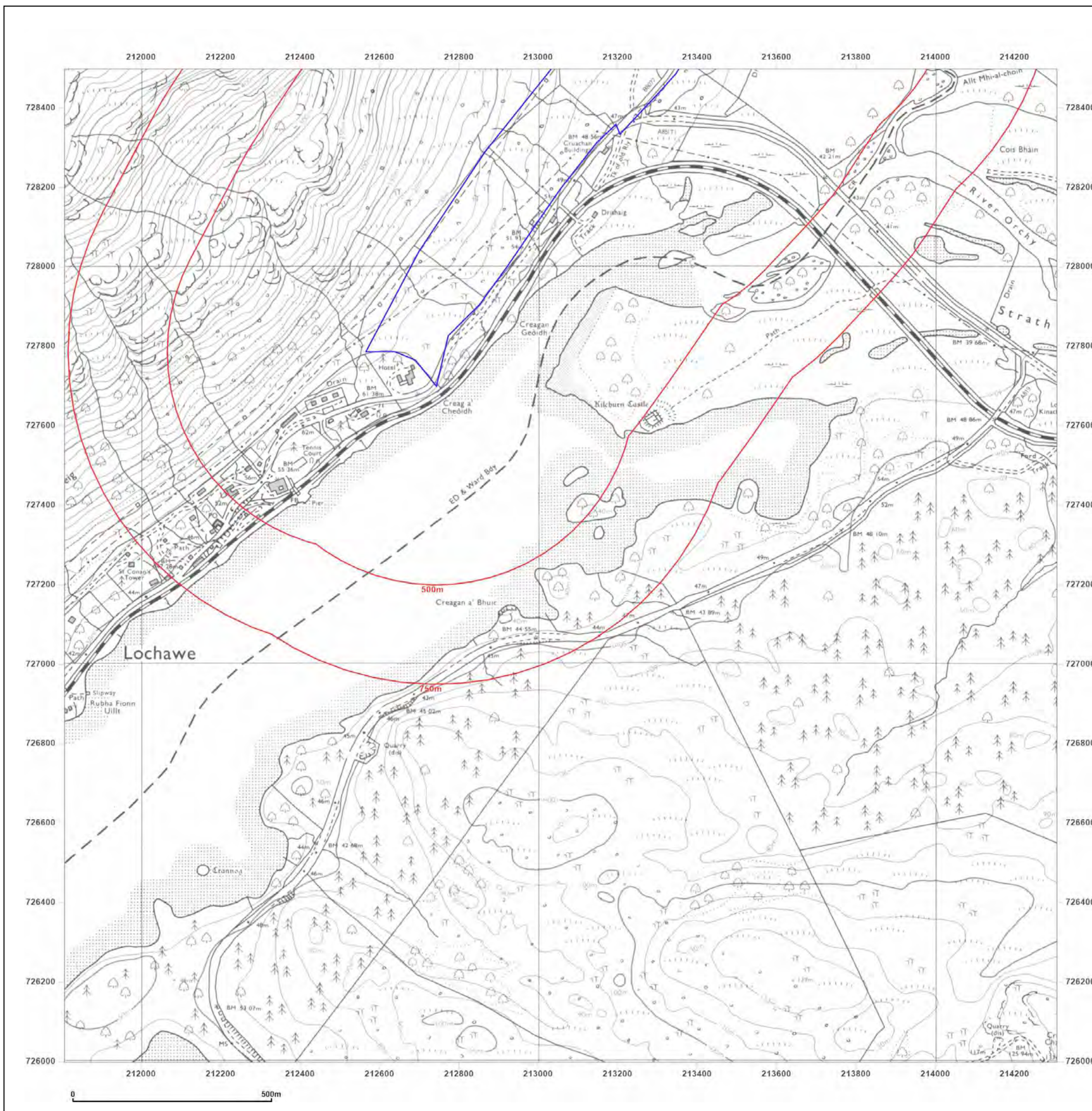


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**Report Ref:** GSIP-2022-12632-9900\_SS\_1\_1  
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**Report Ref:** GSIP-2022-12632-9900\_SS\_1\_1  
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**Map date:** 2010

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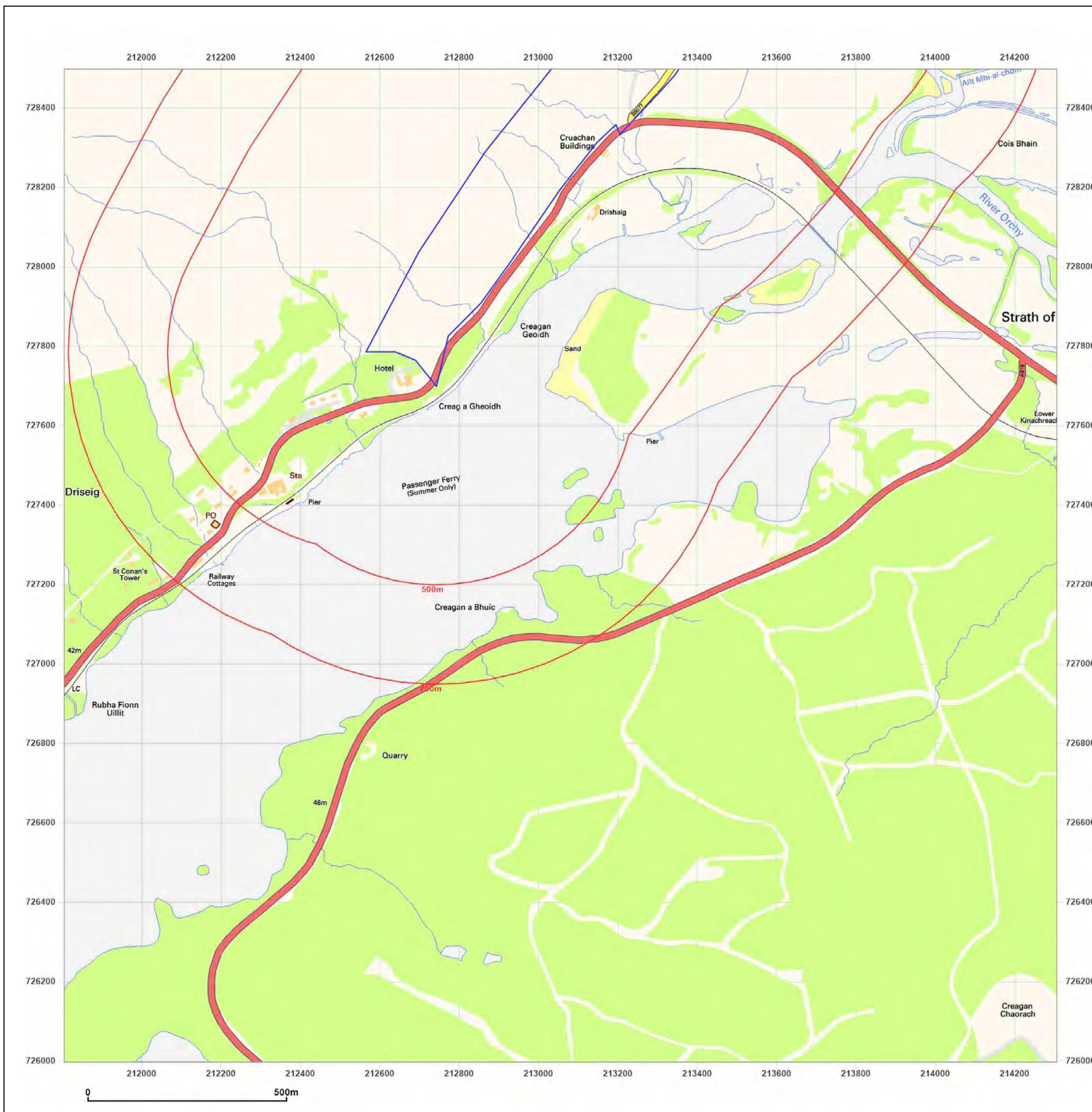


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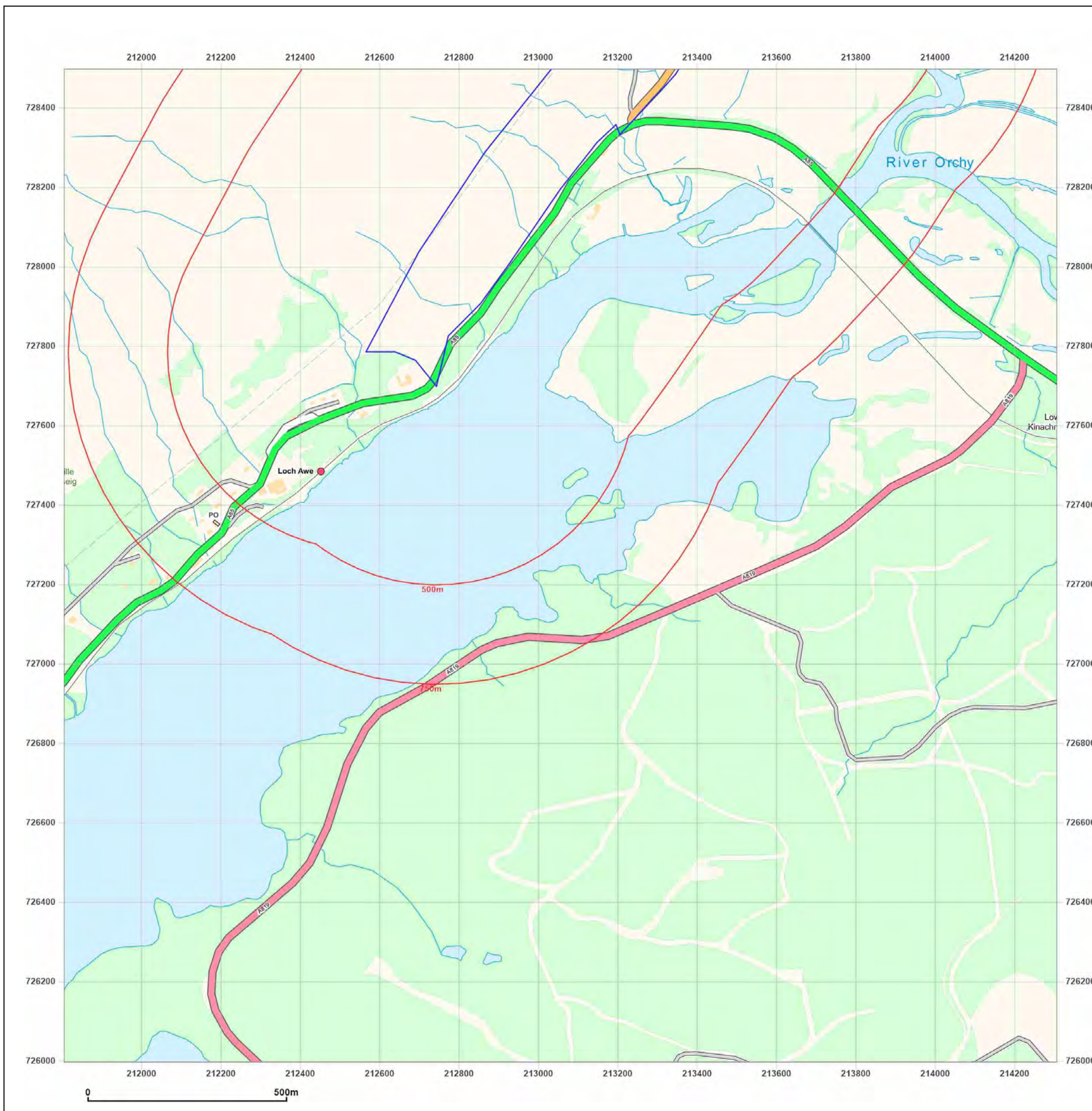


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**Grid Ref:** 213056, 729747

**Map Name:** County Series

**Map date:** 1870

**Scale:** 1:10,560

**Printed at:** 1:10,560



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 Edition N/A  
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 Edition N/A  
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 Levelled N/A

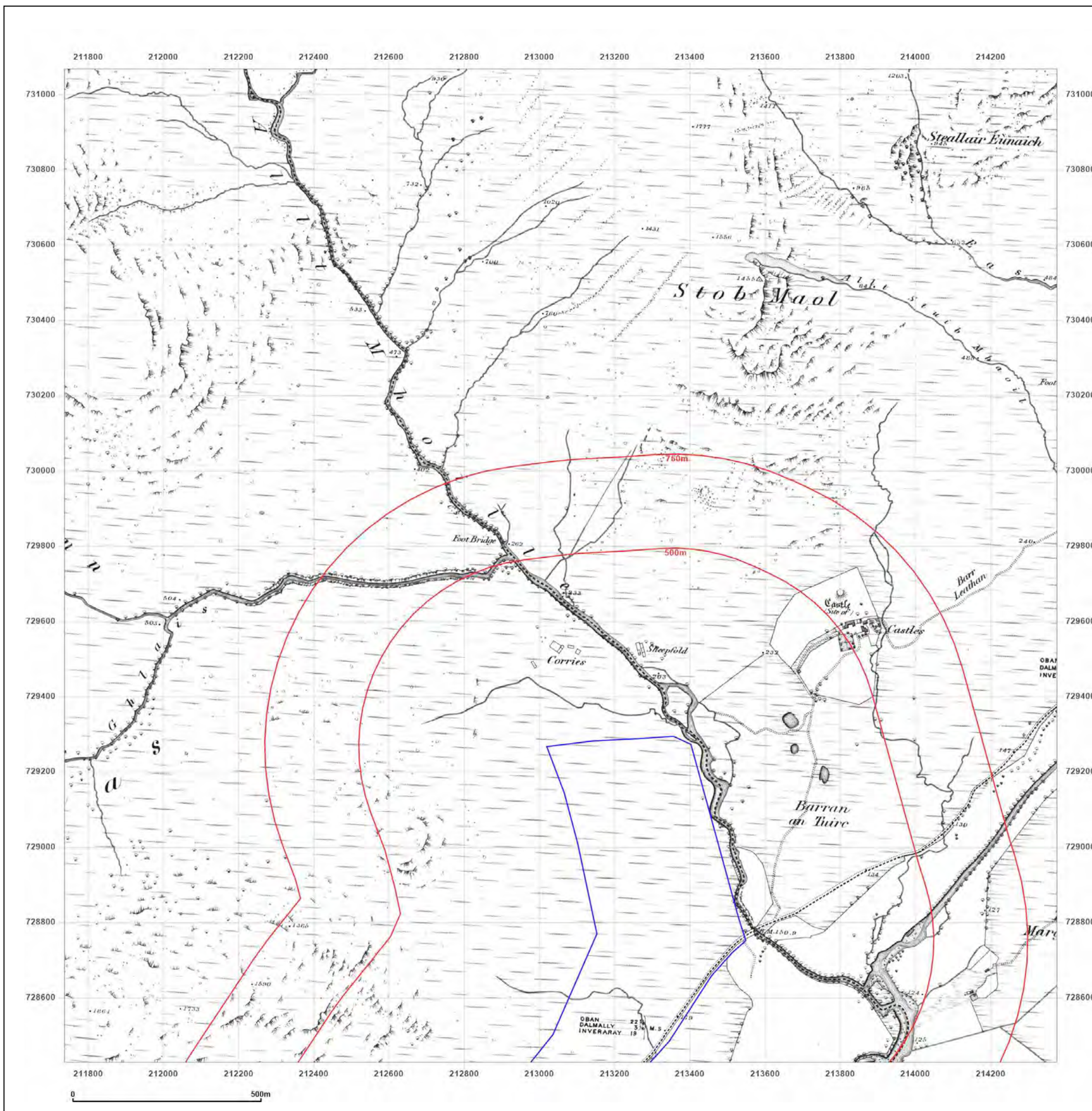


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**Map Name:** County Series

**Map date:** 1900

**Scale:** 1:10,560

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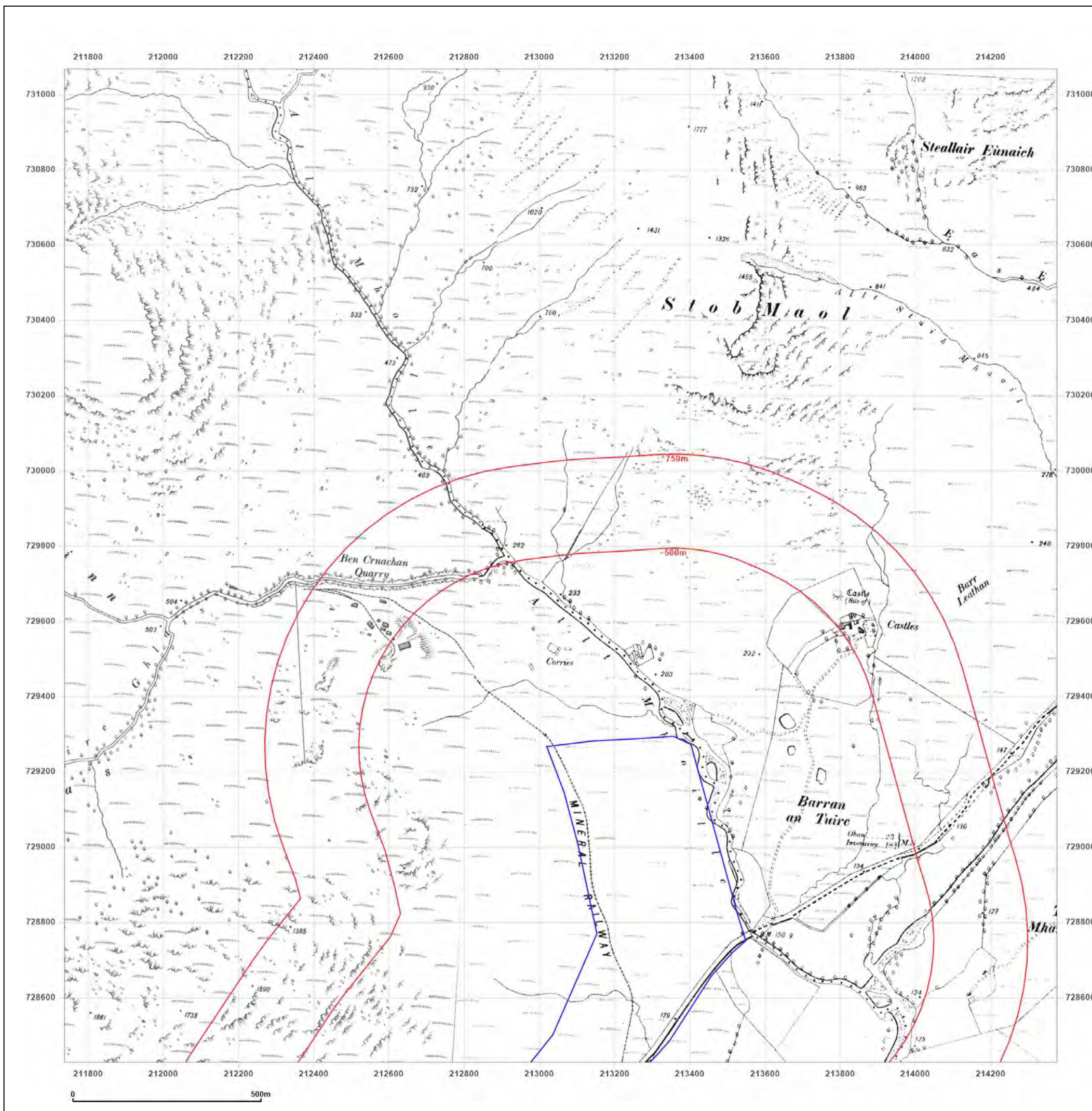


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**Grid Ref:** 213056, 729747

**Map Name:** National Grid

**Map date:** 1973-1976

**Scale:** 1:10,000

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 Revised 1976  
 Edition N/A  
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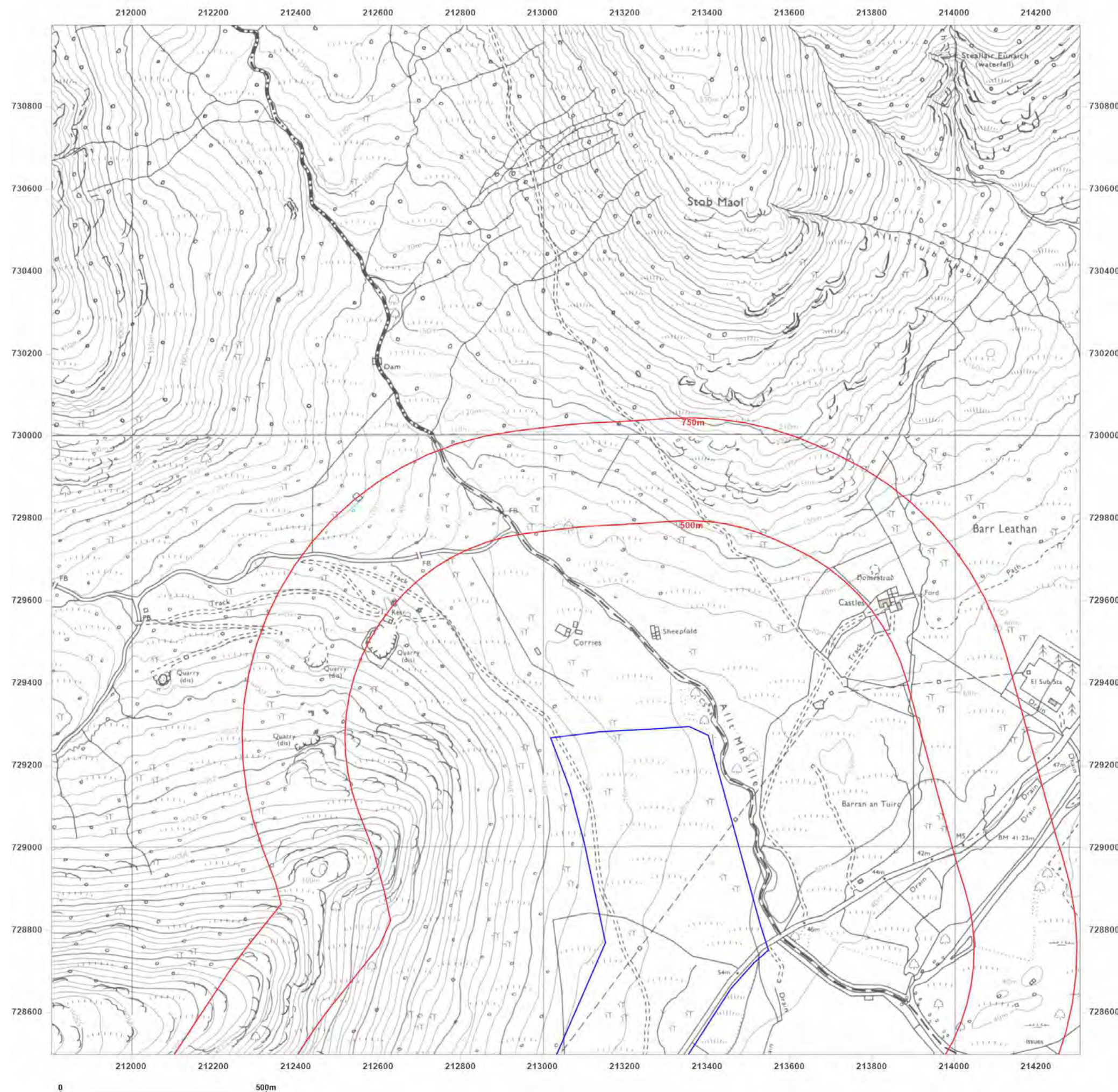


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**Grid Ref:** 213056, 729747

**Map Name:** National Grid

**Map date:** 2022

**Scale:** 1:10,000

**Printed at:** 1:10,000

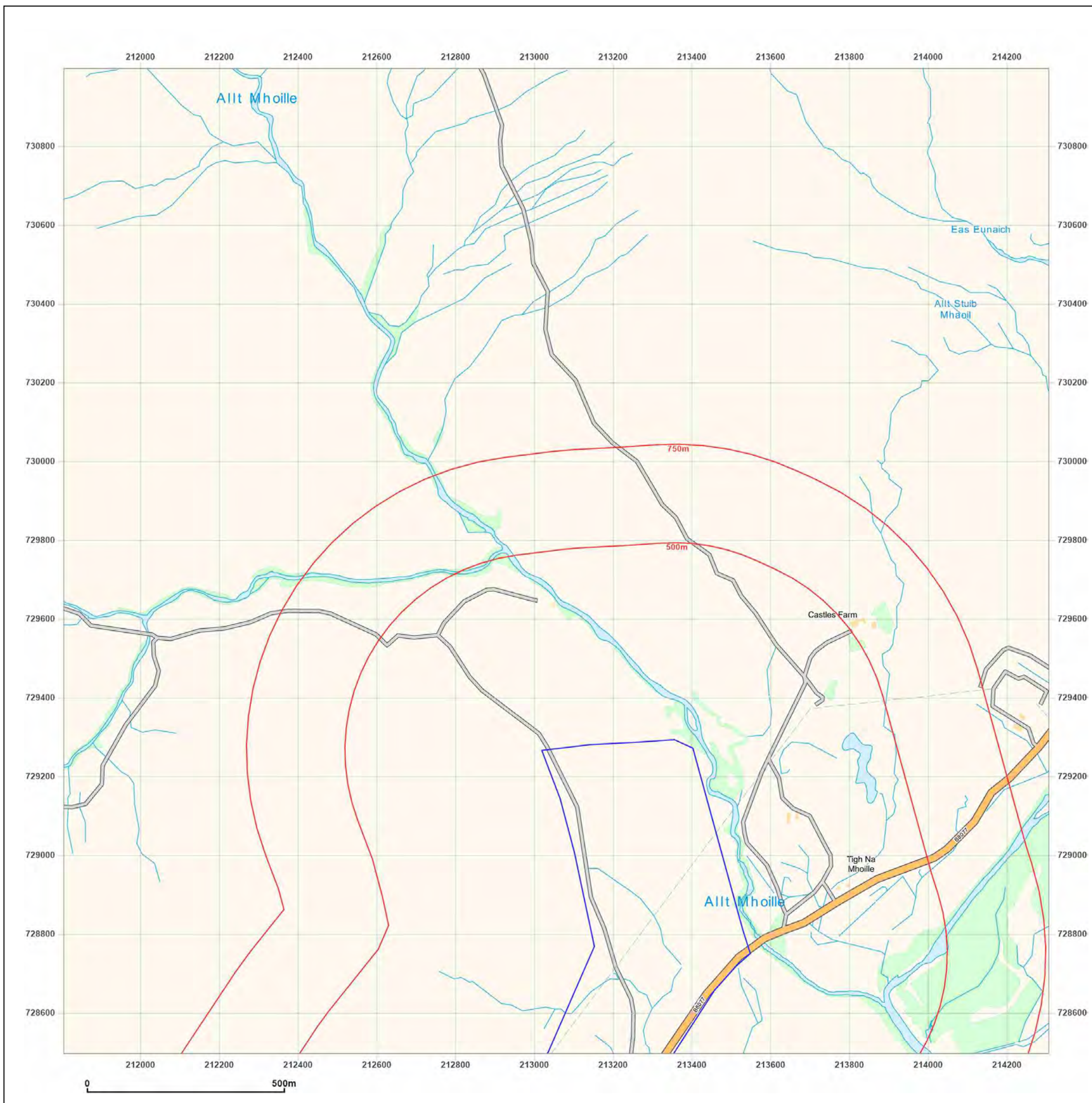


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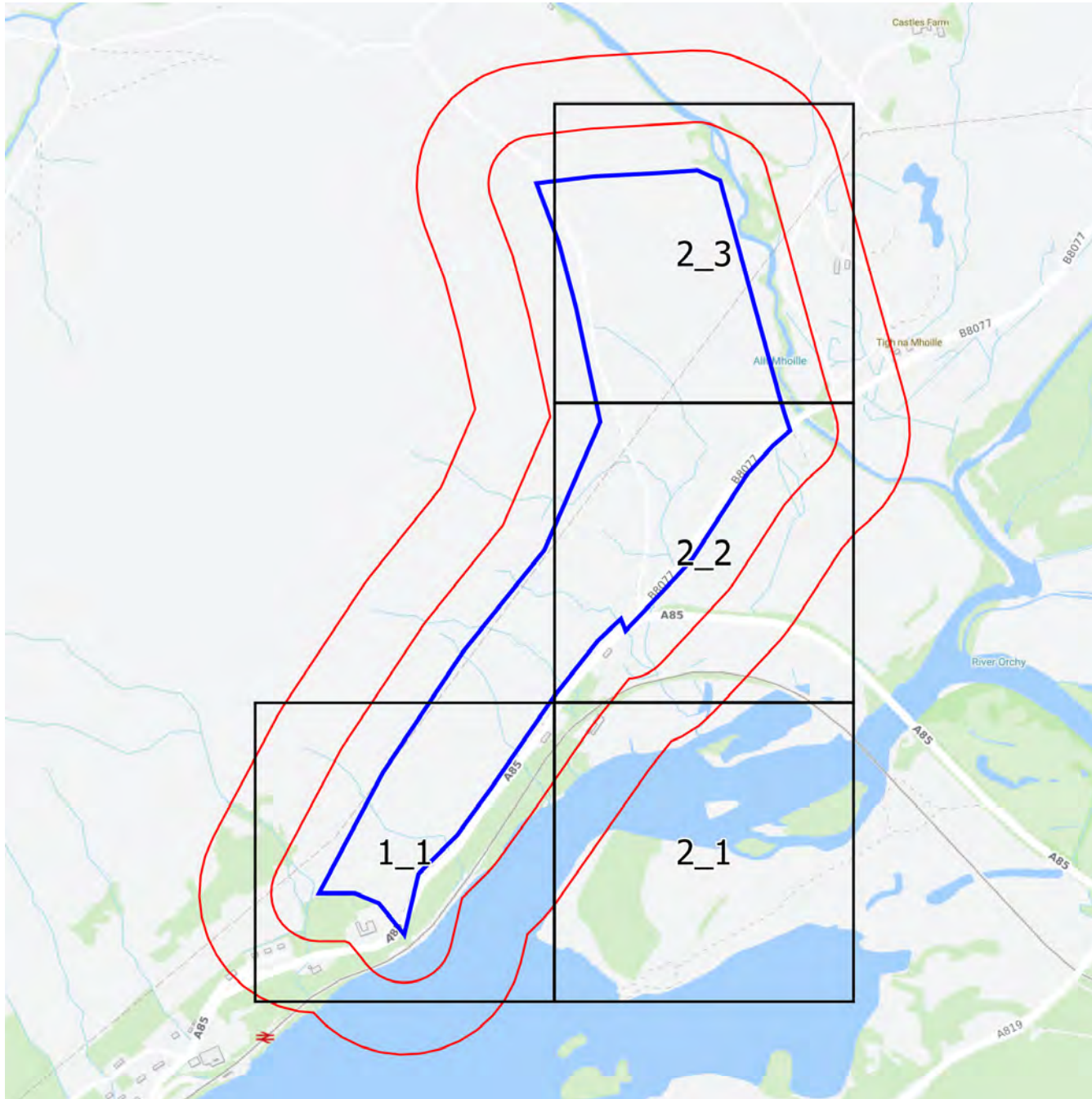
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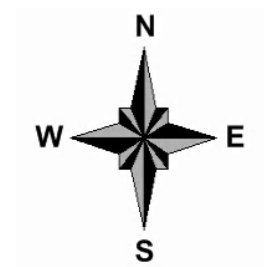






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1:2,500 Scale Grid Index





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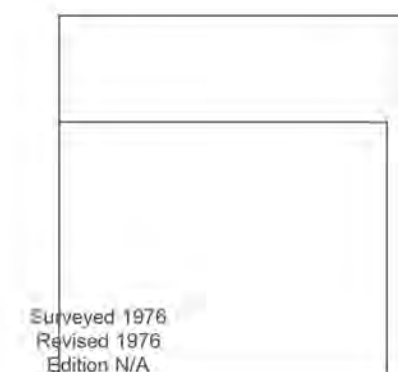
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**Map Name:** National Grid

**Map date:** 1977

**Scale:** 1:2,500

**Printed at:** 1:2,500



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 Edition N/A  
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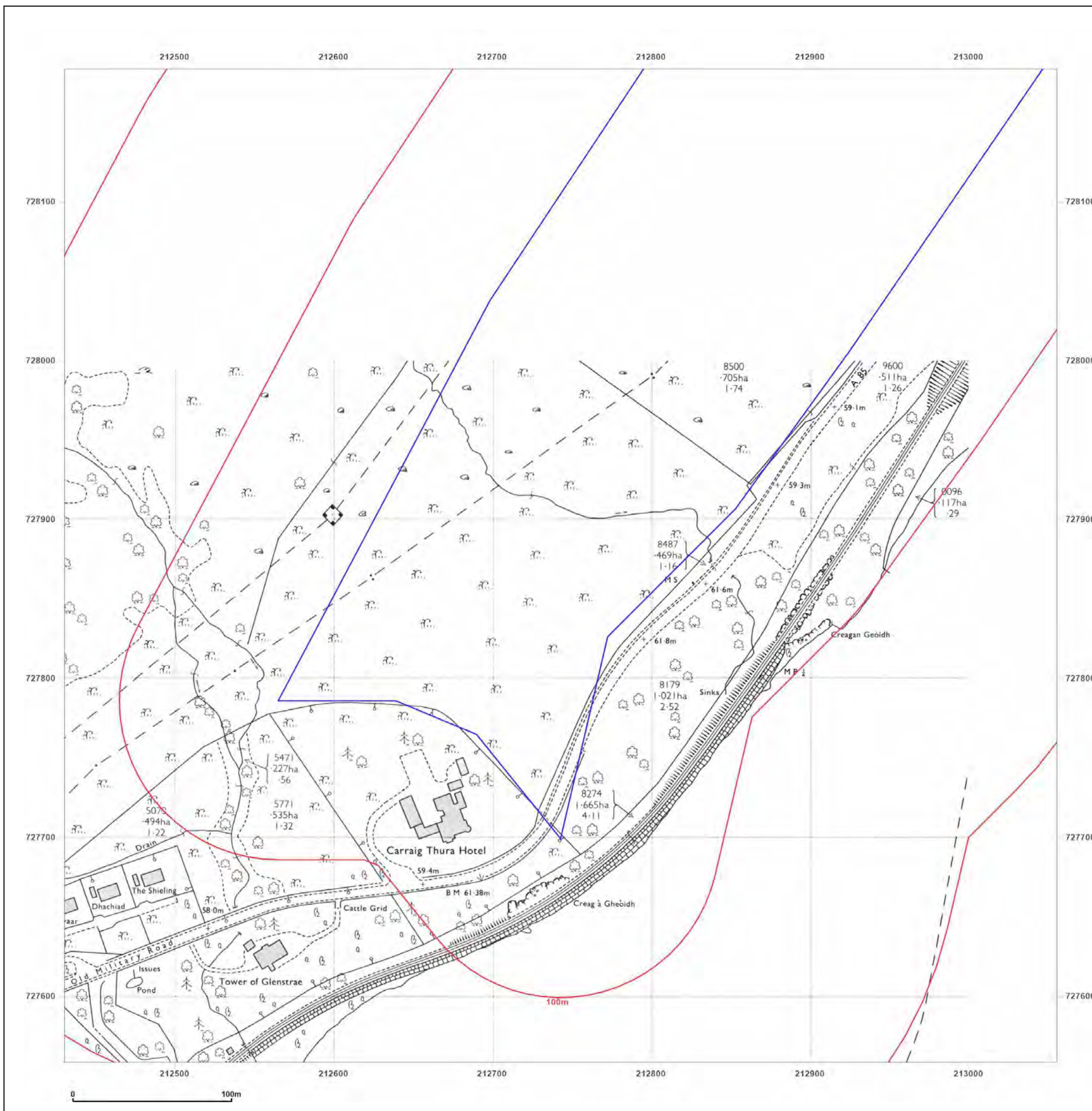


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**Map Name:** National Grid

**Map date:** 1995

**Scale:** 1:2,500

**Printed at:** 1:2,500



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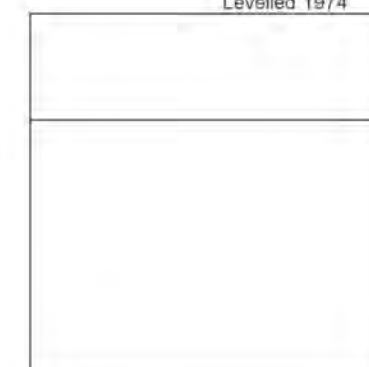
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 Edition N/A  
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 Levelled 1974

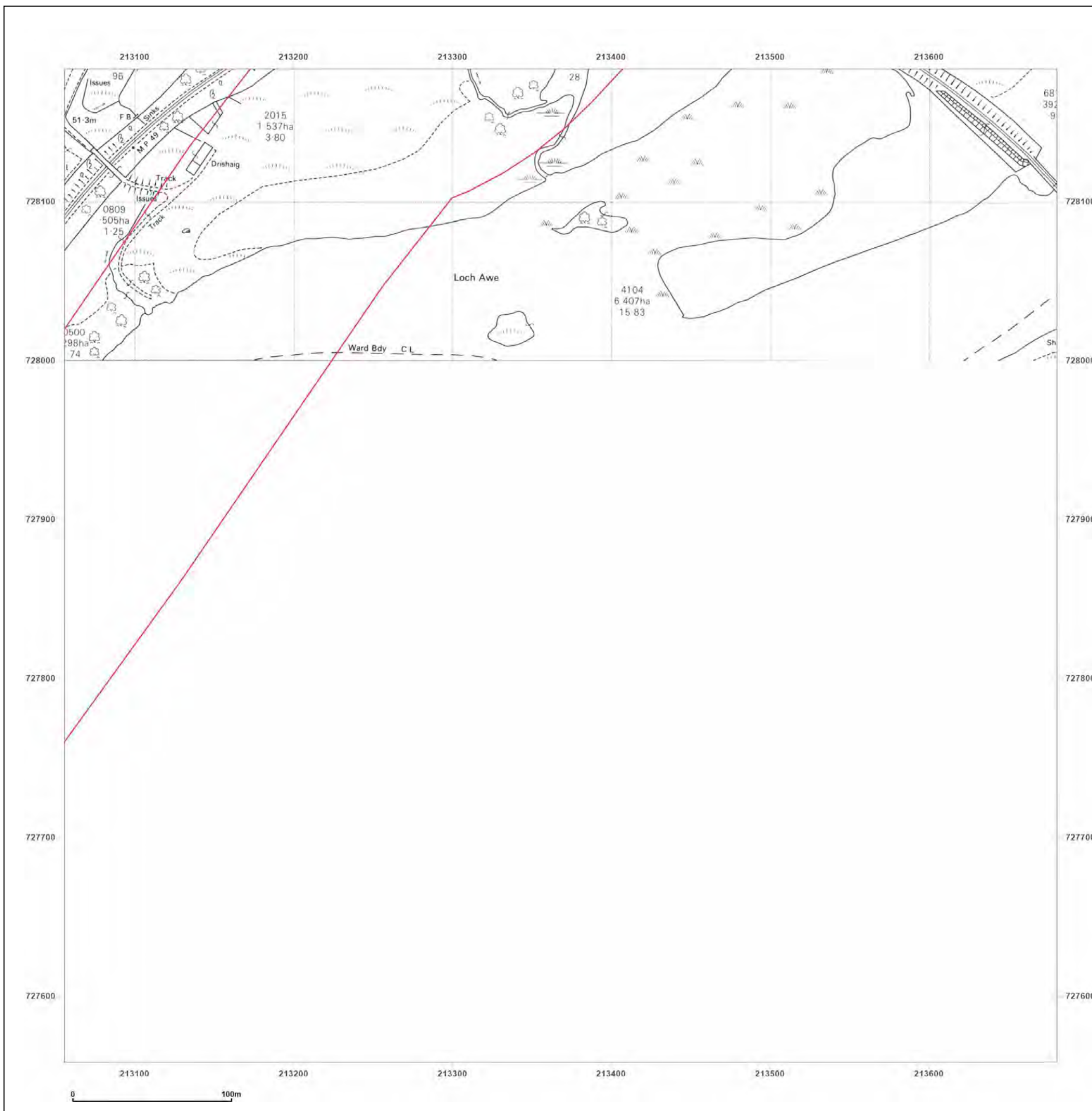


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_LS\_2\_1  
**Grid Ref:** 213368, 727871

**Map Name:** National Grid

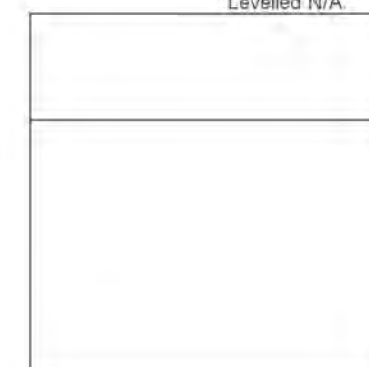
**Map date:** 1995

**Scale:** 1:2,500

**Printed at:** 1:2,500



Surveyed N/A  
 Revised N/A  
 Edition N/A  
 Copyright 1995  
 Levelled N/A

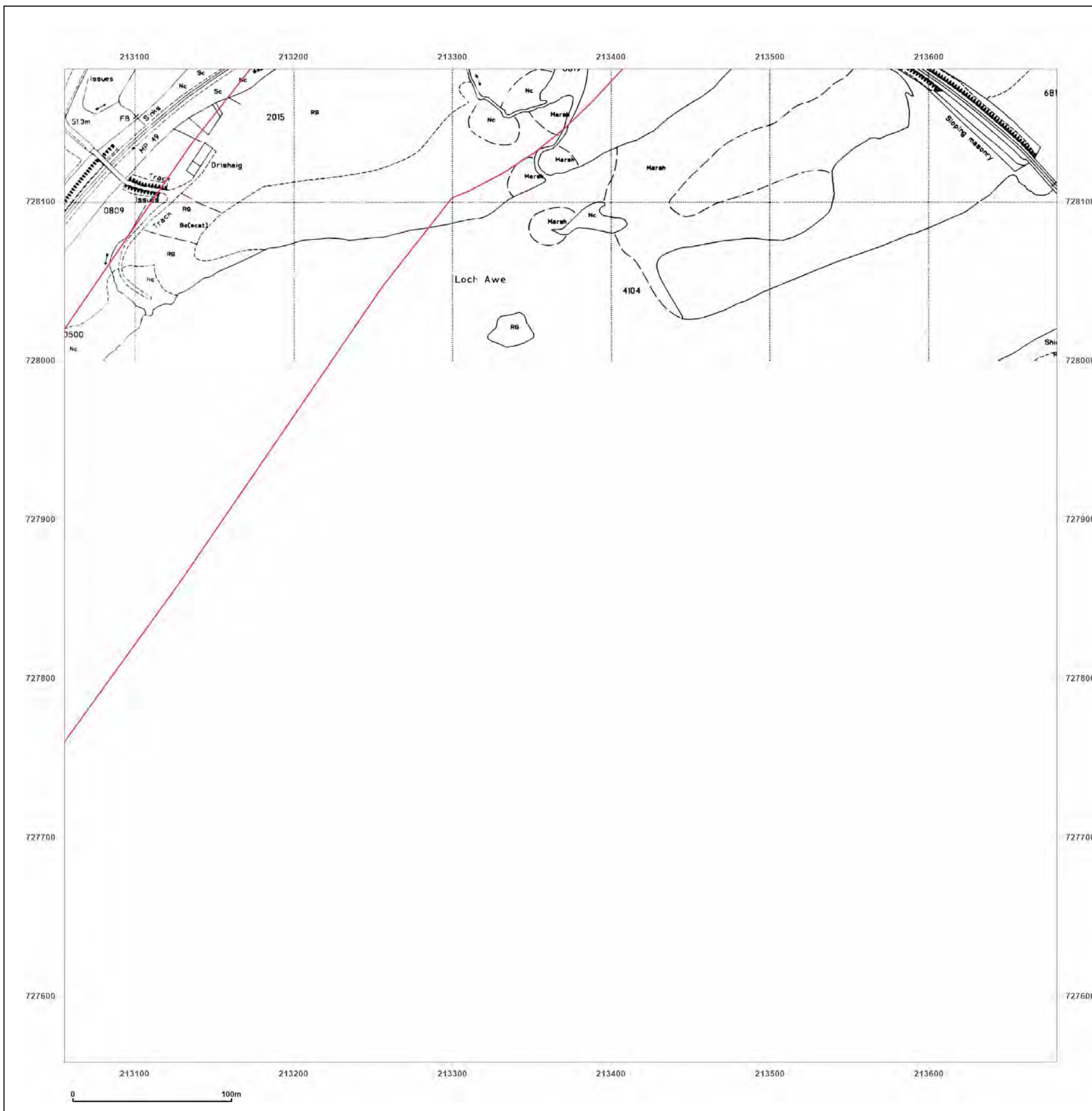


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_LS\_2\_2  
**Grid Ref:** 213368, 728496

**Map Name:** National Grid

**Map date:** 1984

**Scale:** 1:2,500

**Printed at:** 1:2,500



Surveyed 1982  
 Revised 1982  
 Edition N/A  
 Copyright 1984  
 Levelled 1974

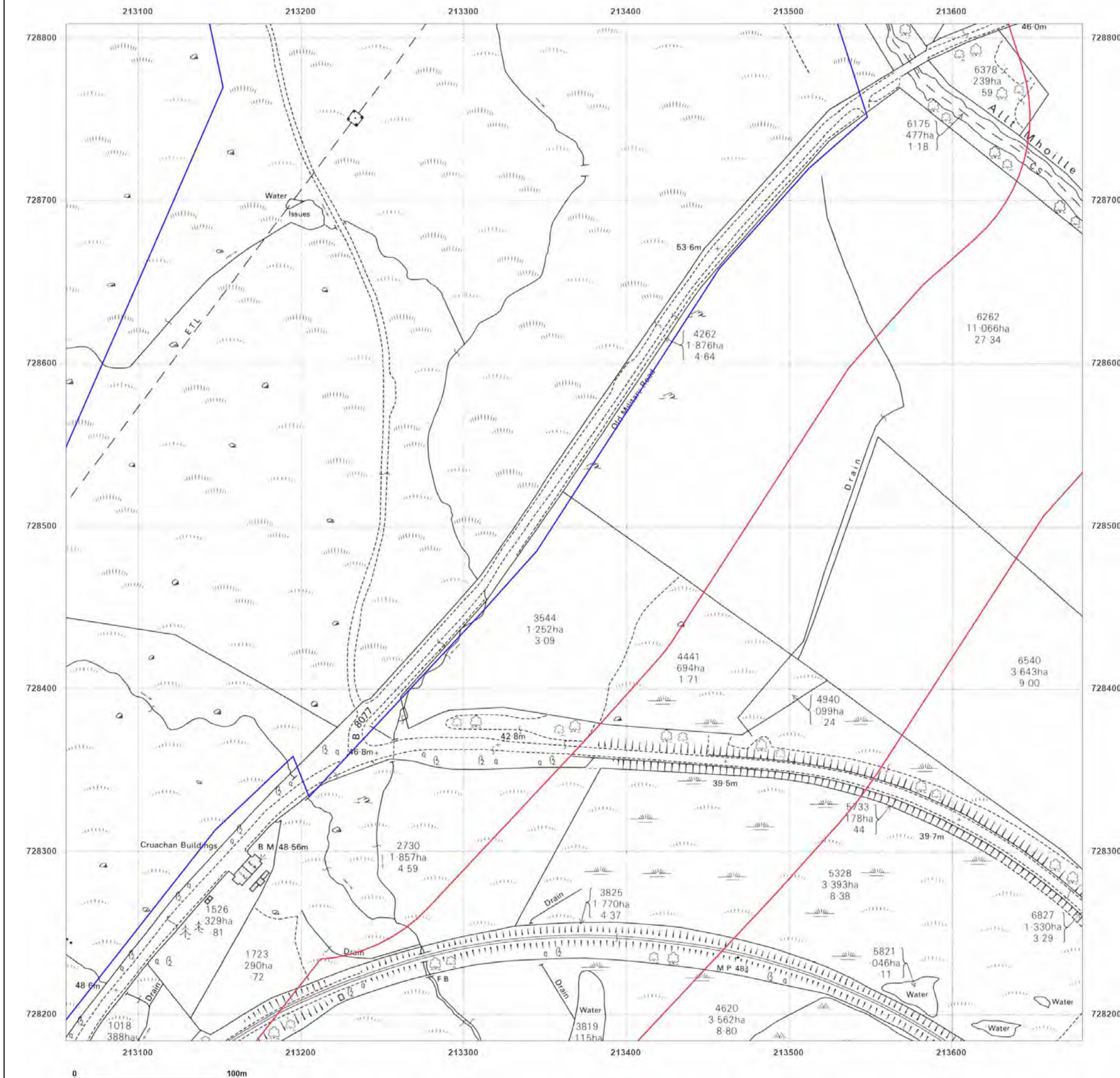


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_LS\_2\_2  
**Grid Ref:** 213368, 728496

**Map Name:** National Grid

**Map date:** 1995

**Scale:** 1:2,500

**Printed at:** 1:2,500



Surveyed N/A  
 Revised N/A  
 Edition N/A  
 Copyright 1995  
 Levelled N/A

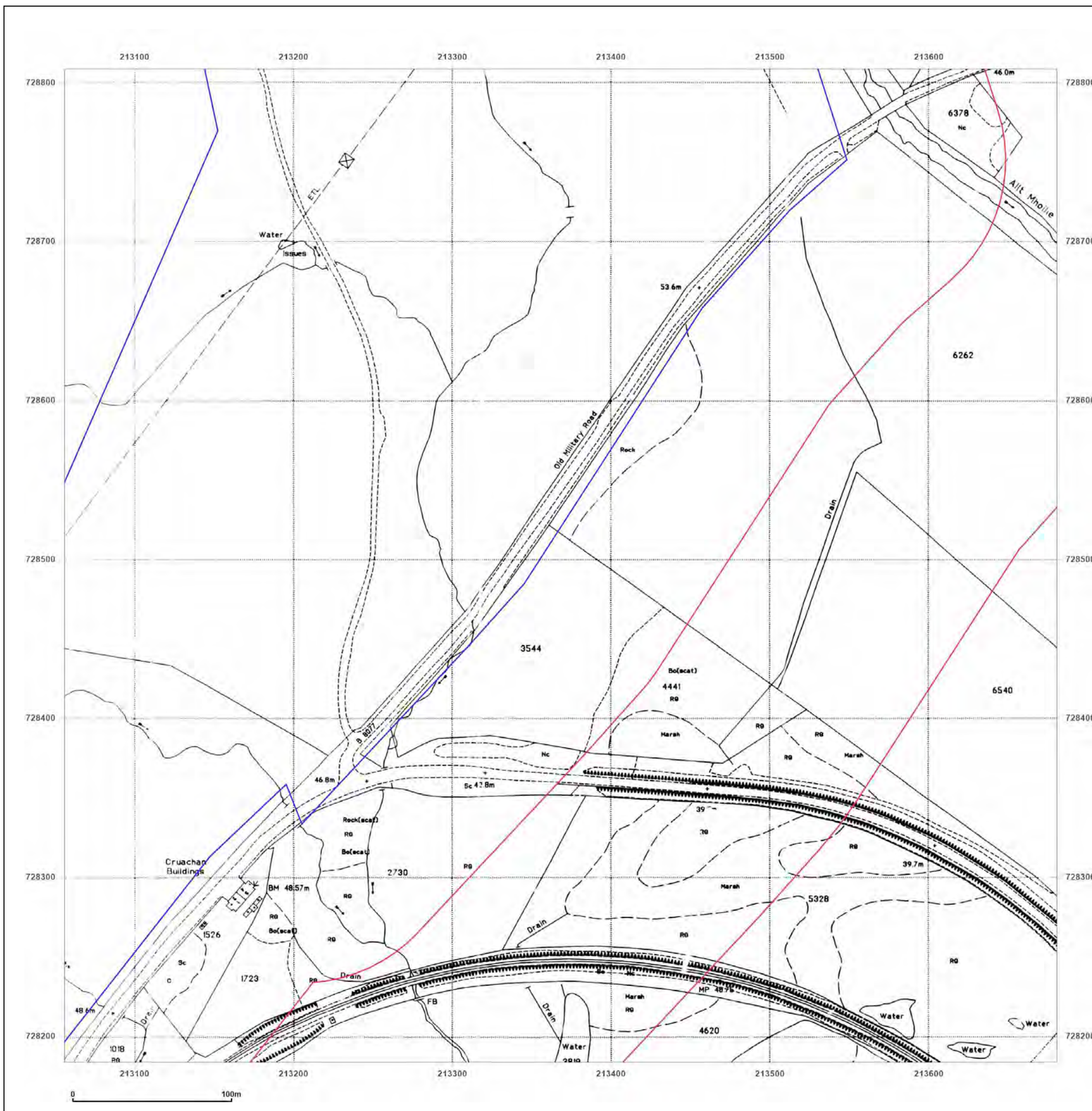


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#### Site Details:

Cruachan 2 East

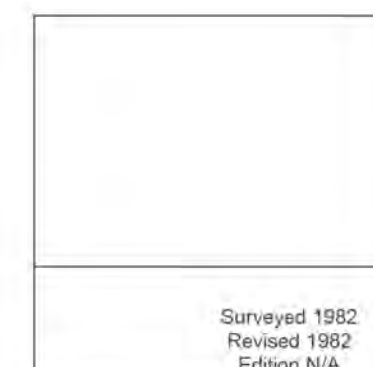
**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_LS\_2\_3  
**Grid Ref:** 213368, 729121

**Map Name:** National Grid

**Map date:** 1984

**Scale:** 1:2,500

**Printed at:** 1:2,500



Surveyed 1982  
 Revised 1982  
 Edition N/A  
 Copyright 1984  
 Levelled 1974

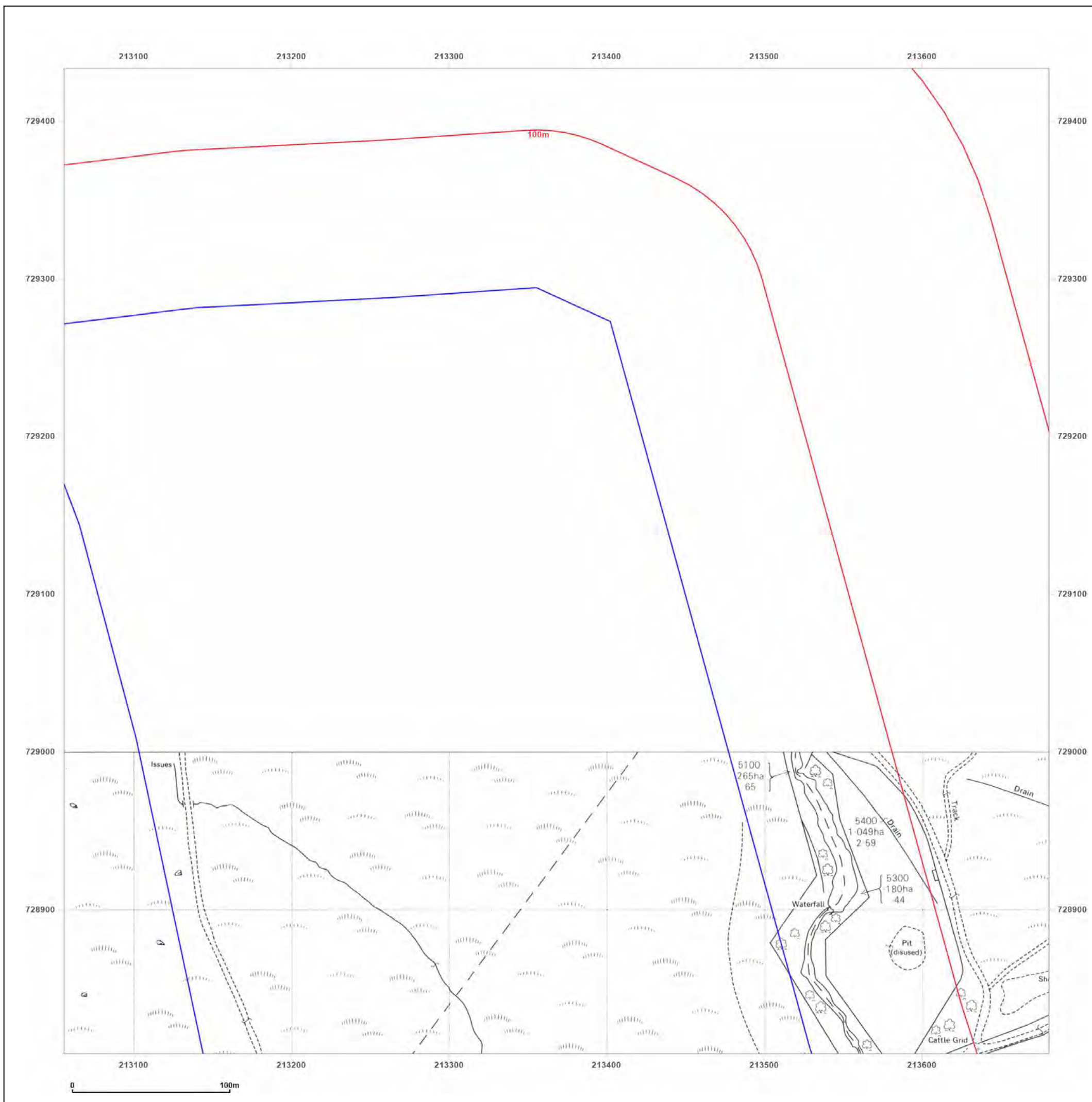


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_LS\_2\_3  
**Grid Ref:** 213368, 729121

**Map Name:** National Grid

**Map date:** 1995

**Scale:** 1:2,500

**Printed at:** 1:2,500



Surveyed N/A  
 Revised N/A  
 Edition N/A  
 Copyright 1995  
 Levelled N/A

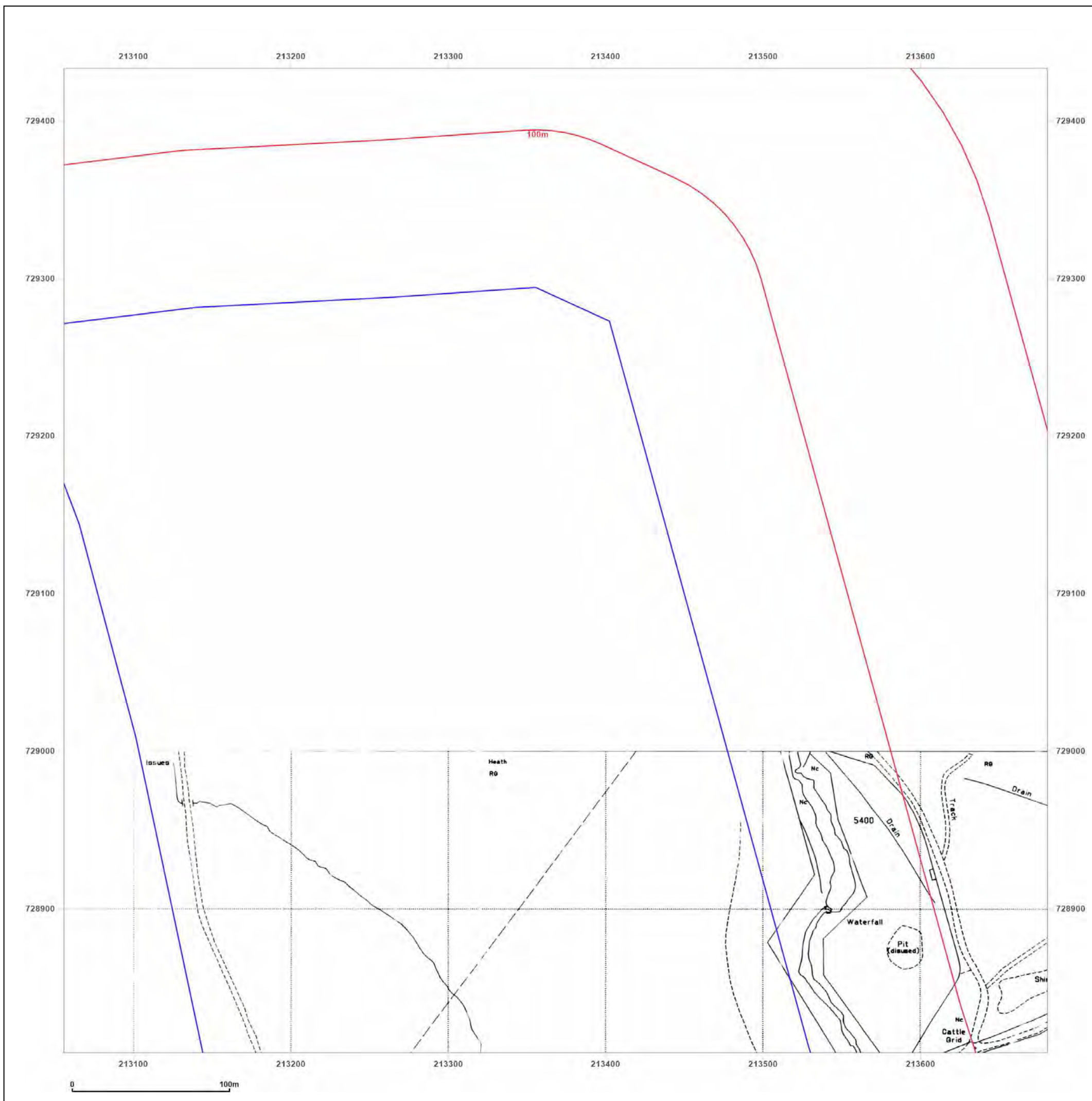


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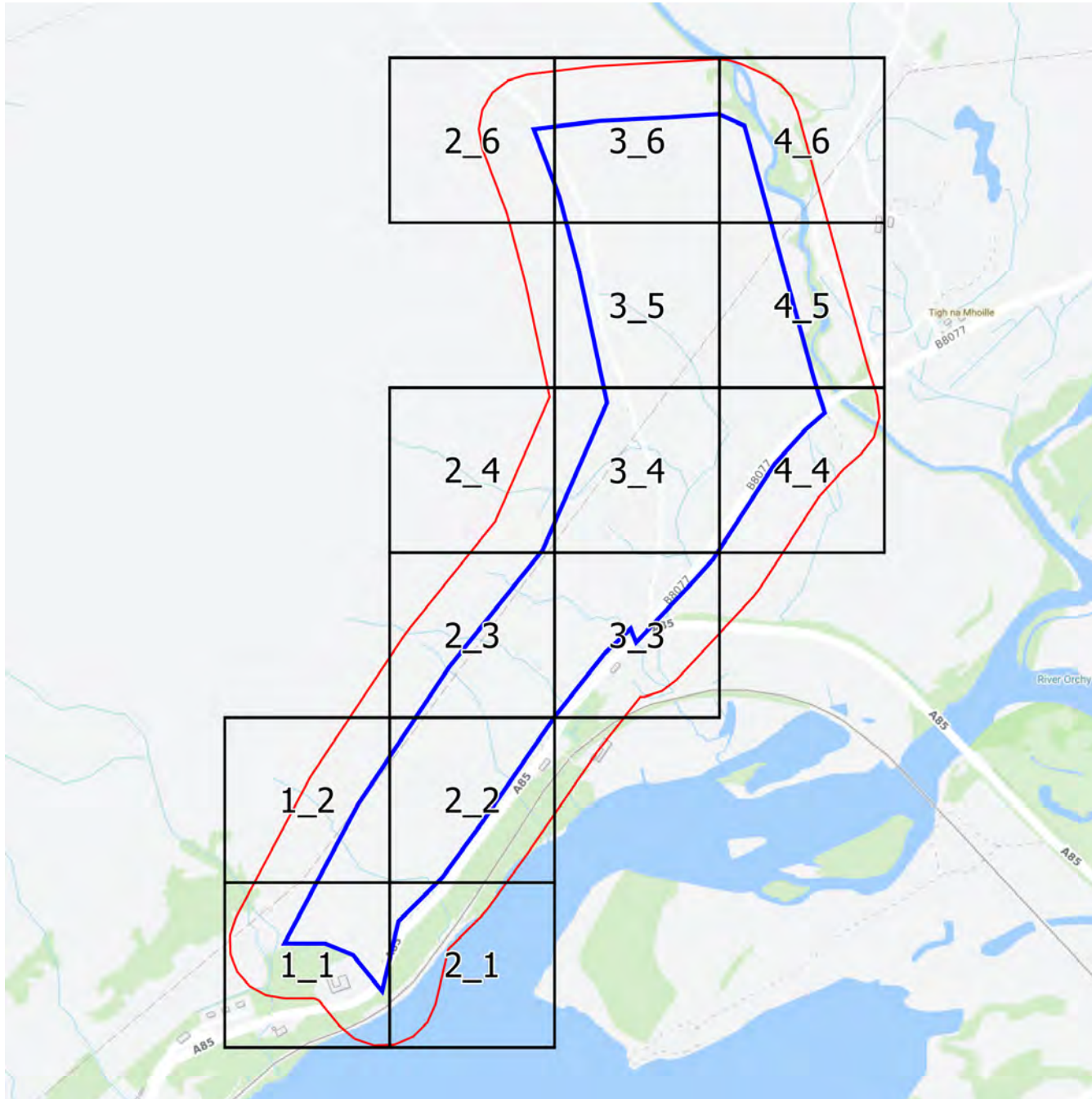
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Production date: 07 April 2022

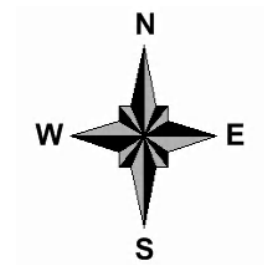
Map legend available at:  
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## Landline Scale Grid Index



#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_Landline\_1\_1  
**Grid Ref:** 212606, 727747

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

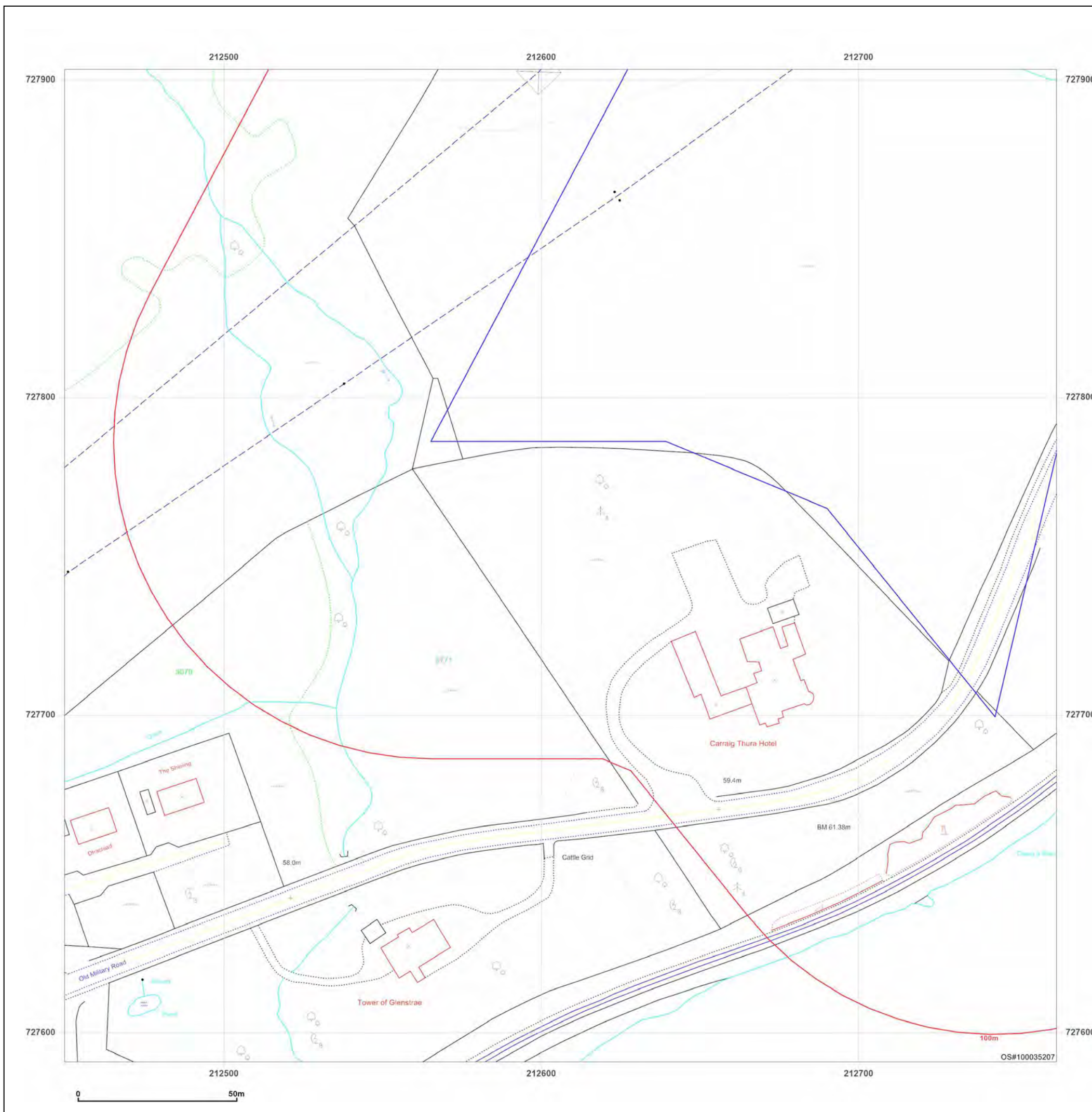


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_Landline\_1\_2  
**Grid Ref:** 212606, 728047

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

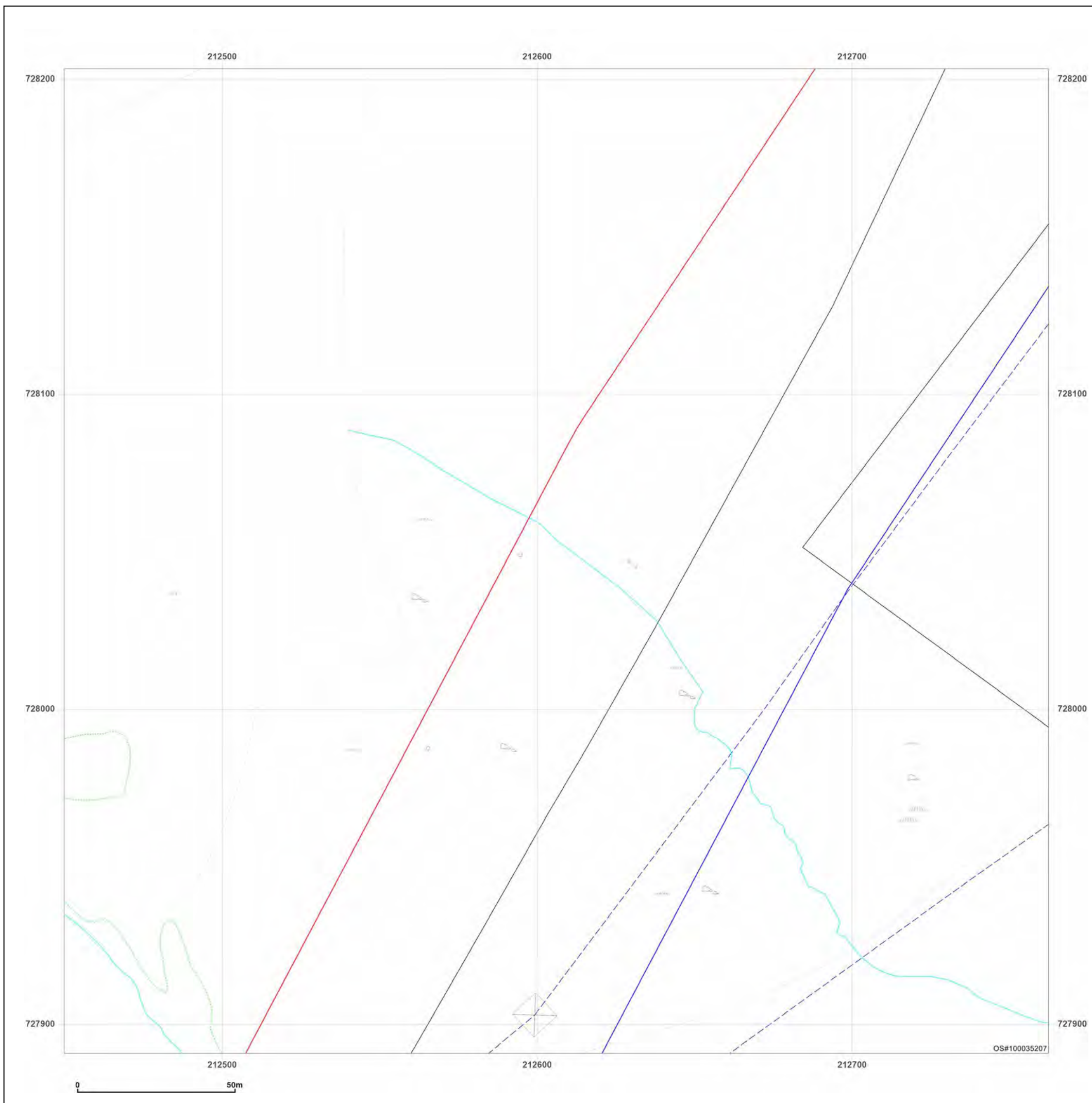


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_Landline\_2\_1  
**Grid Ref:** 212906, 727747

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

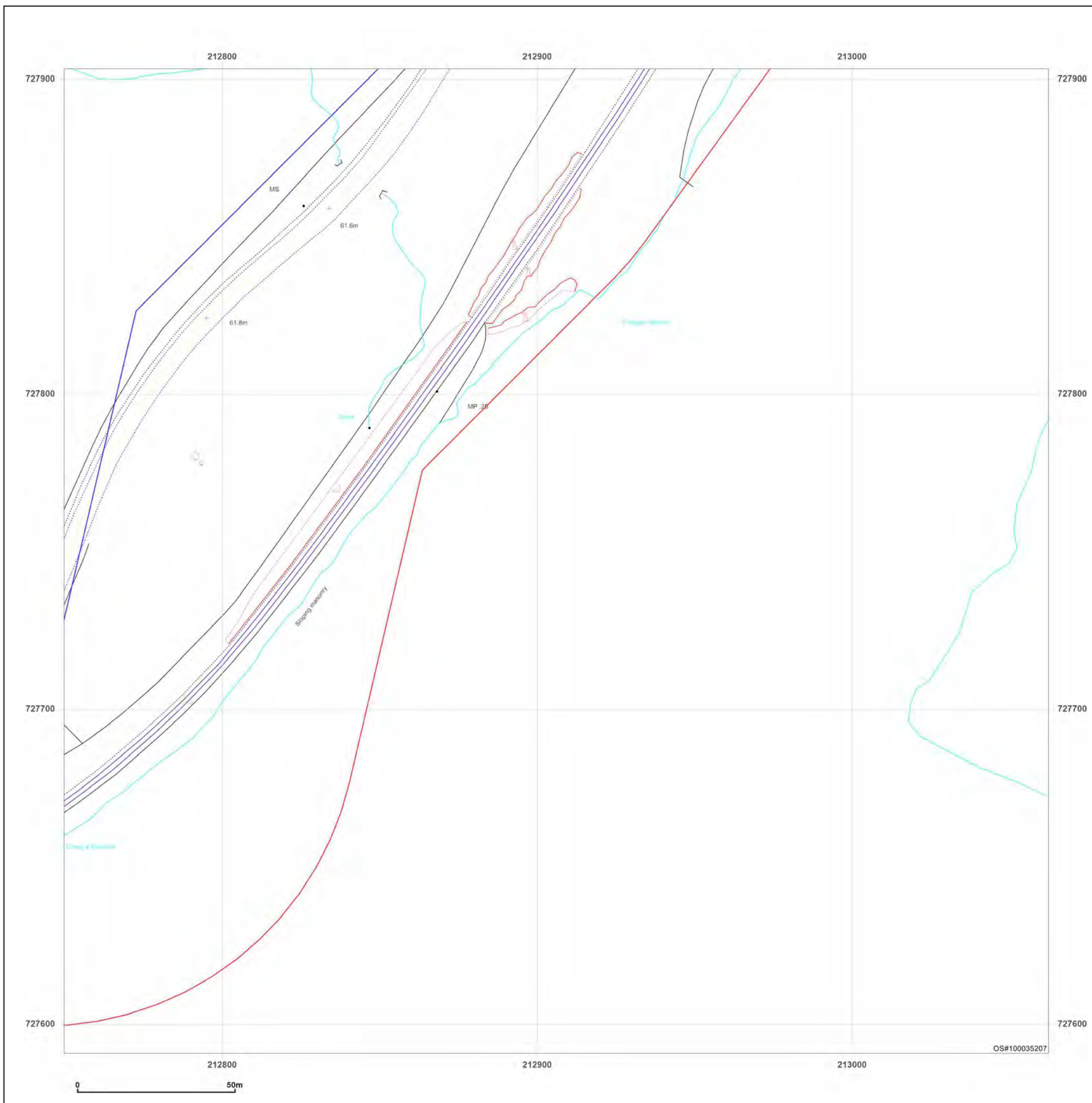


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_Landline\_2\_3  
**Grid Ref:** 212906, 728347

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

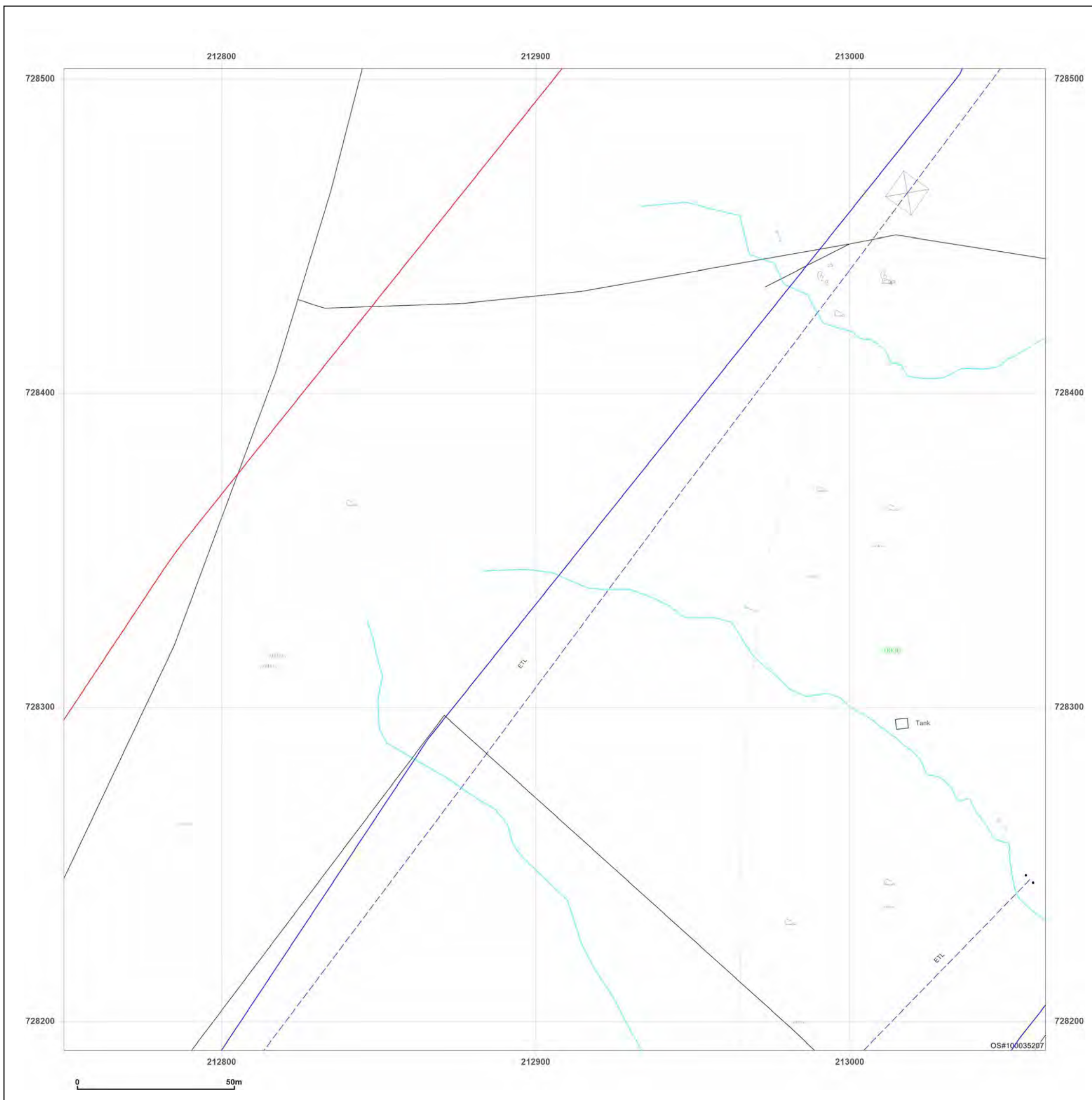


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_Landline\_2\_4  
**Grid Ref:** 212906, 728647

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

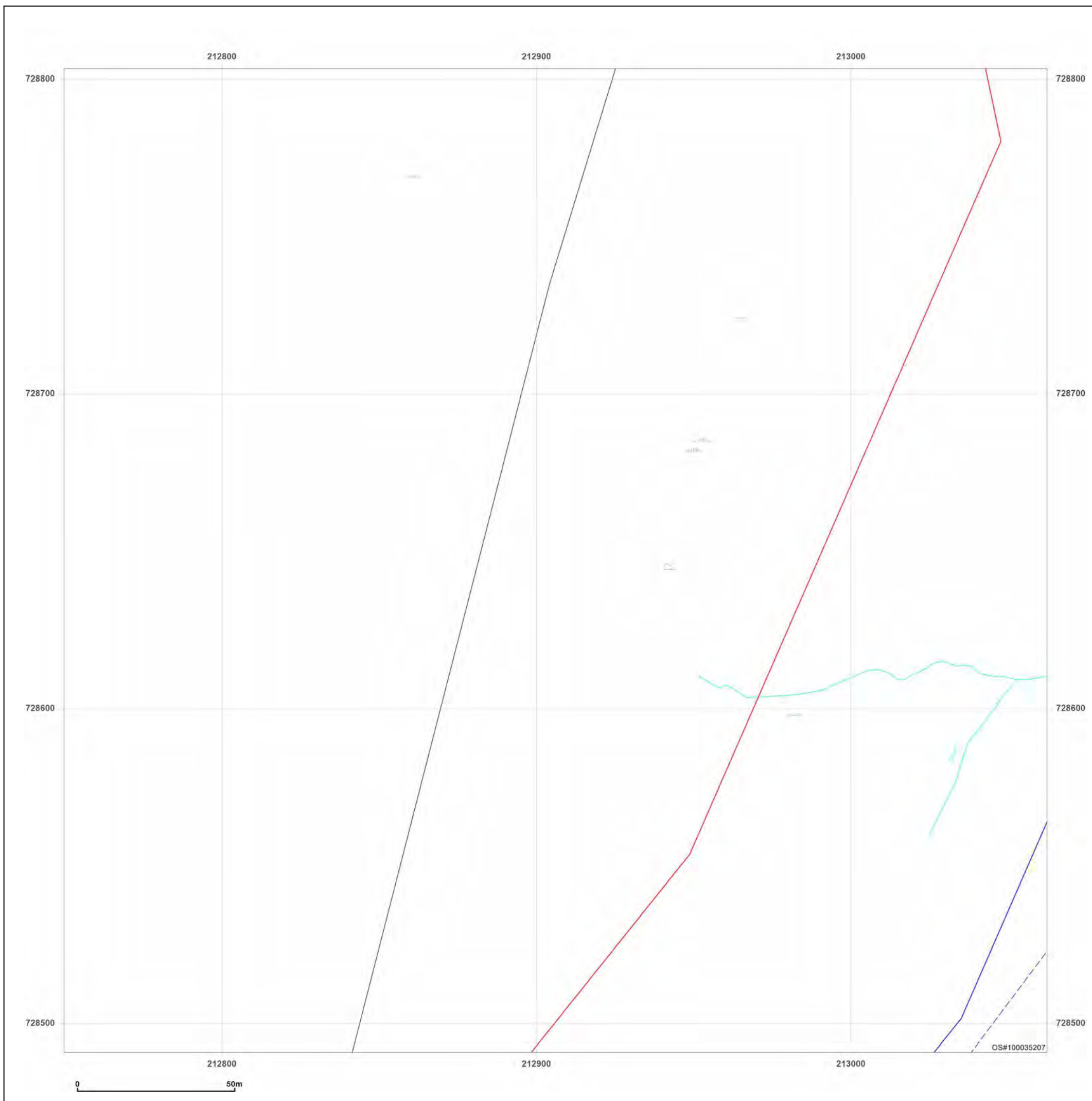


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_Landline\_2\_6  
**Grid Ref:** 212906, 729247

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

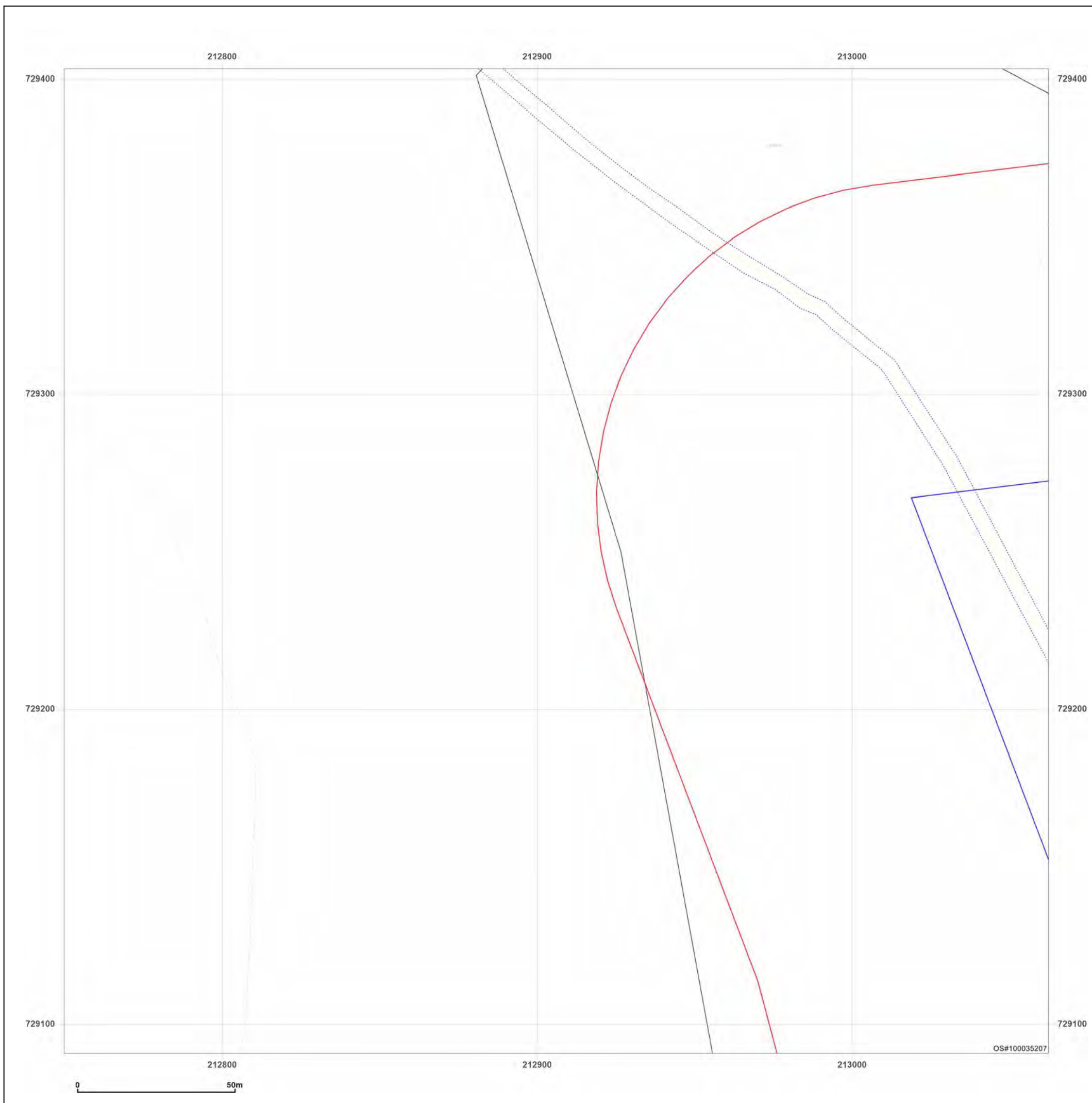


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_Landline\_3\_3  
**Grid Ref:** 213206, 728347

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

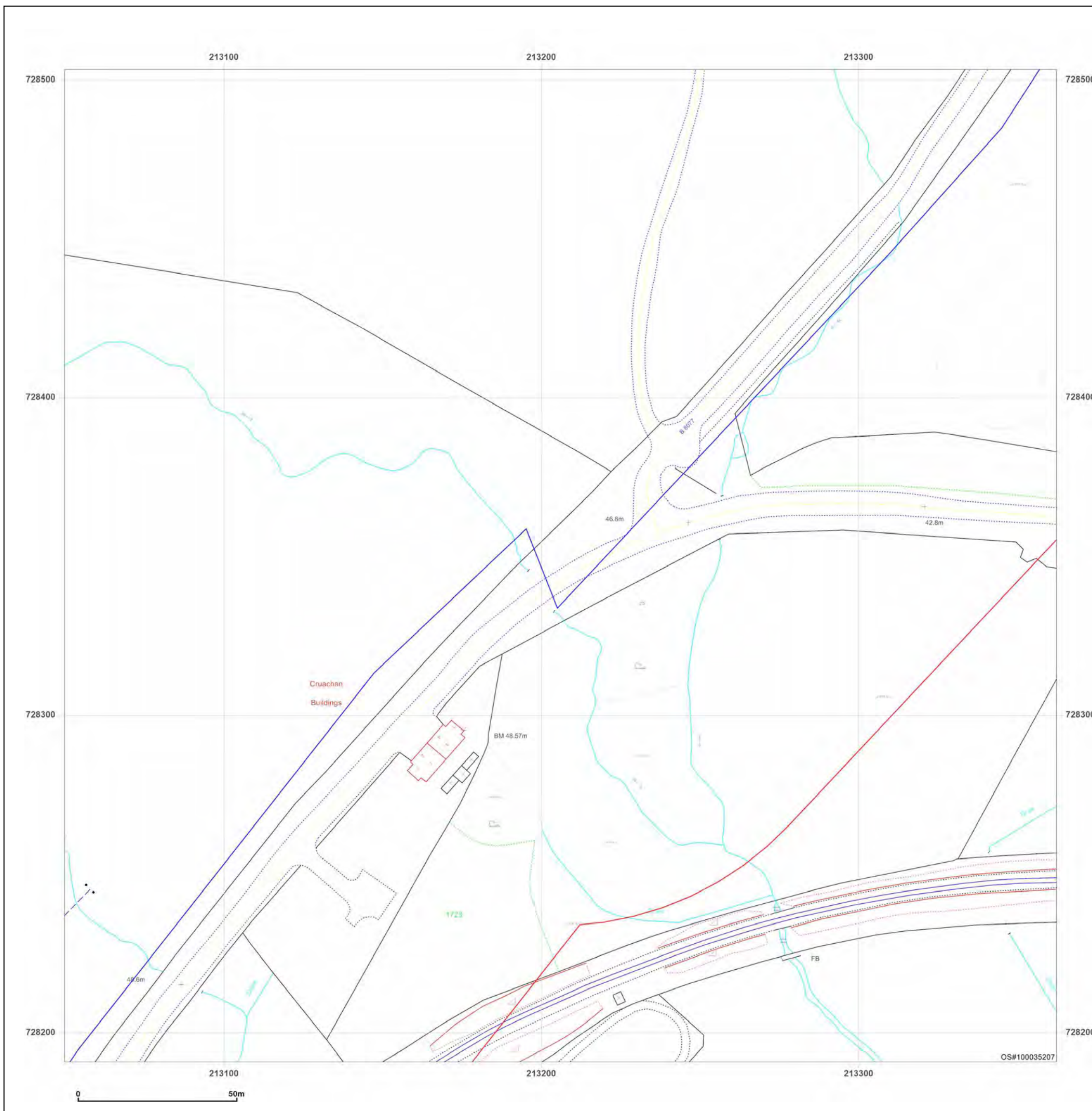


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_Landline\_3\_4  
**Grid Ref:** 213206, 728647

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

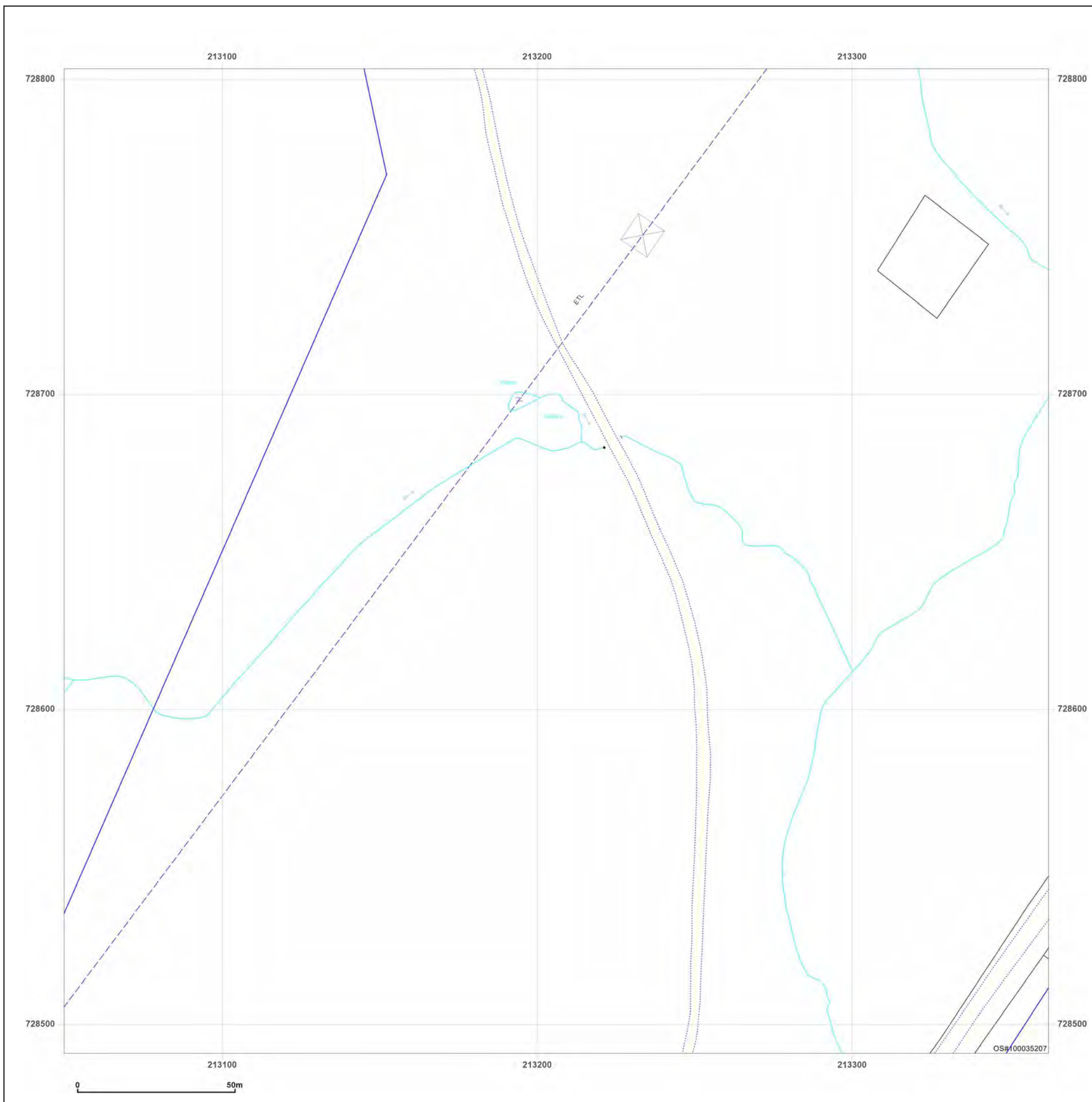


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_Landline\_3\_5  
**Grid Ref:** 213206, 728947

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

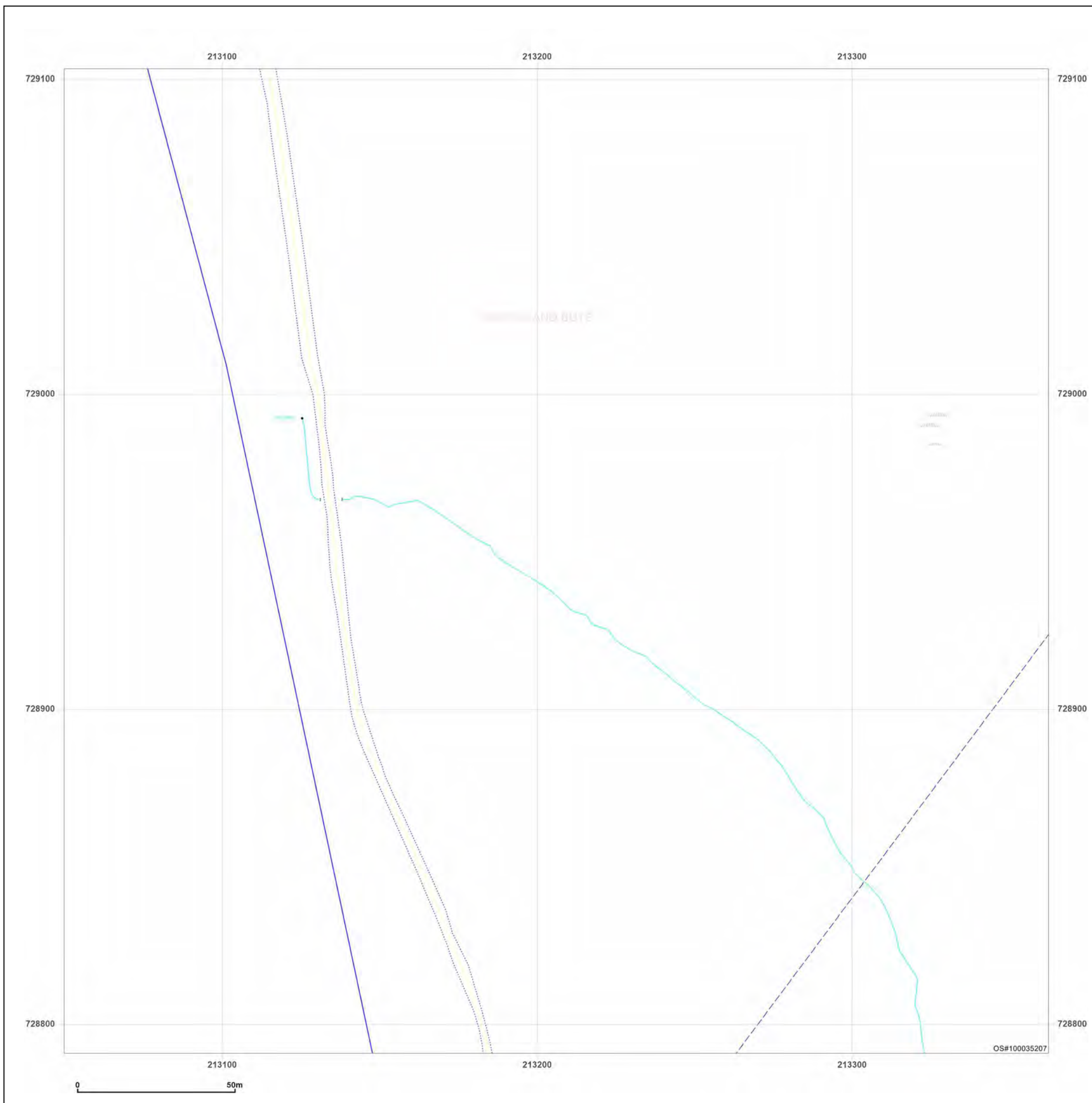


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_Landline\_3\_6  
**Grid Ref:** 213206, 729247

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

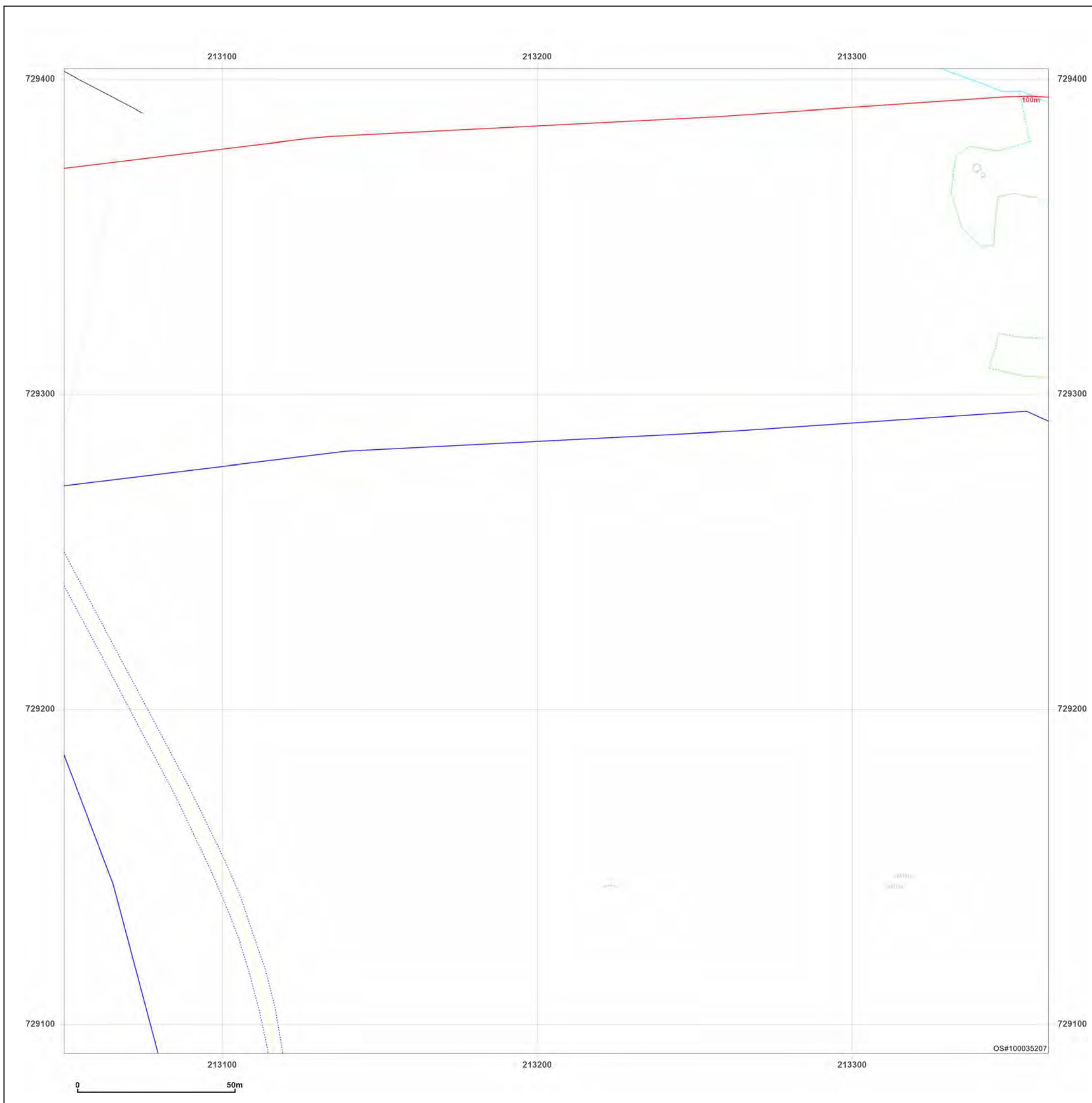


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_Landline\_4\_4  
**Grid Ref:** 213506, 728647

**Map Name:** LandLine

**Map date:** 2003

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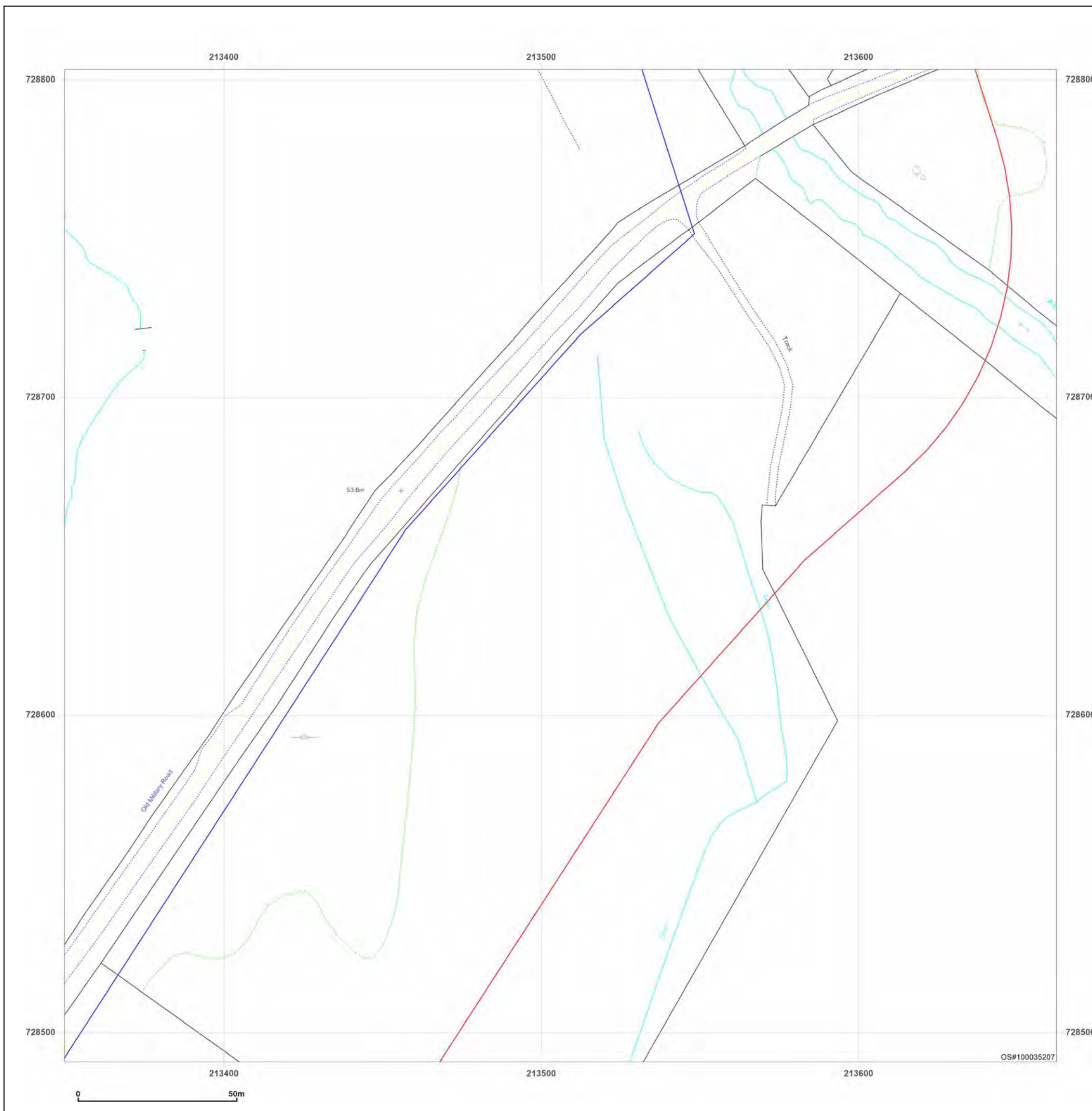


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_Landline\_4\_5  
**Grid Ref:** 213506, 728947

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

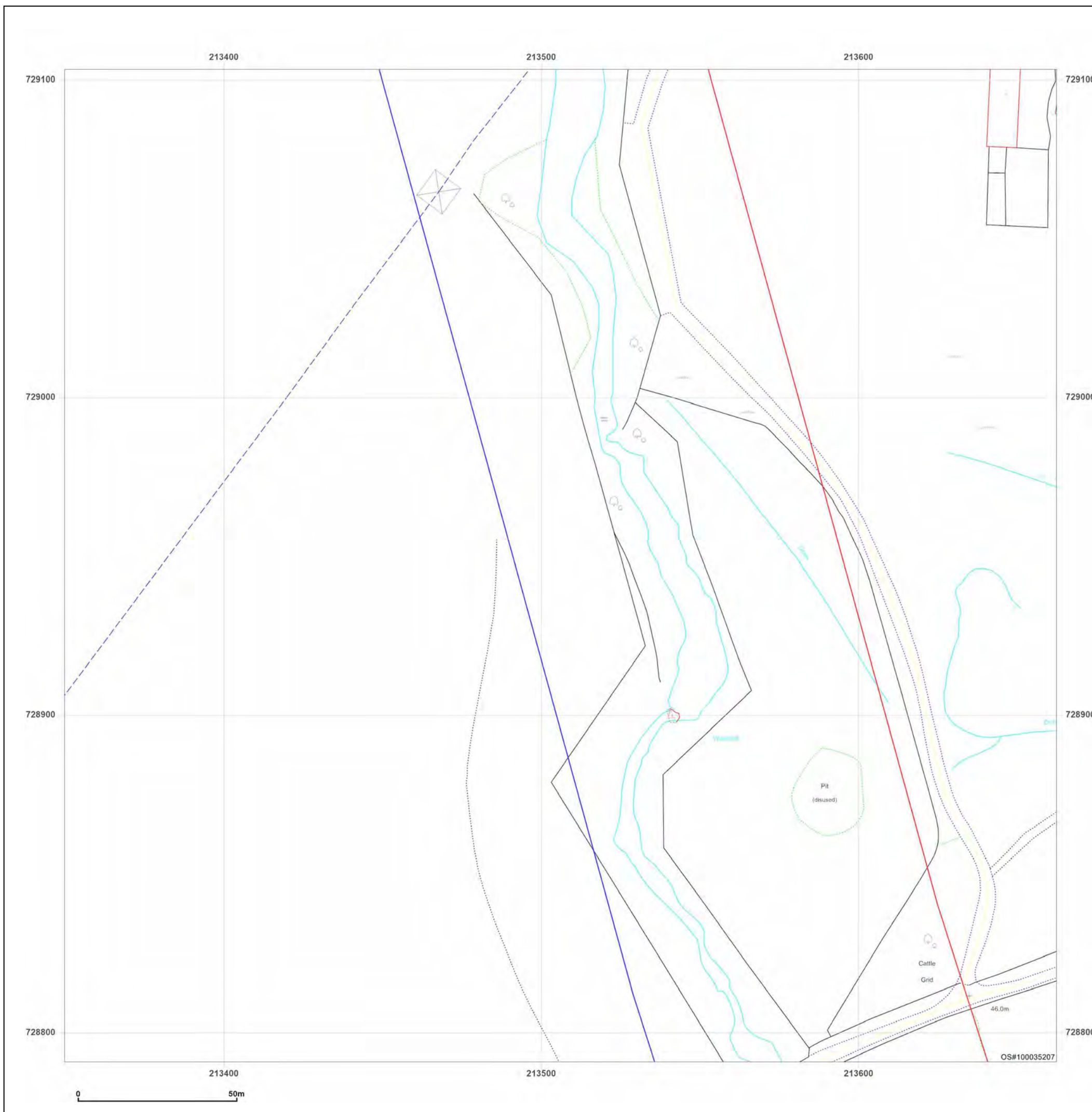


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#### Site Details:

Cruachan 2 East

**Client Ref:** Cruachan 2 East  
**Report Ref:** GSIP-2022-12632-9900\_Landline\_4\_6  
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**Map Name:** LandLine

**Map date:** 2003

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**Printed at:** 1:1,250

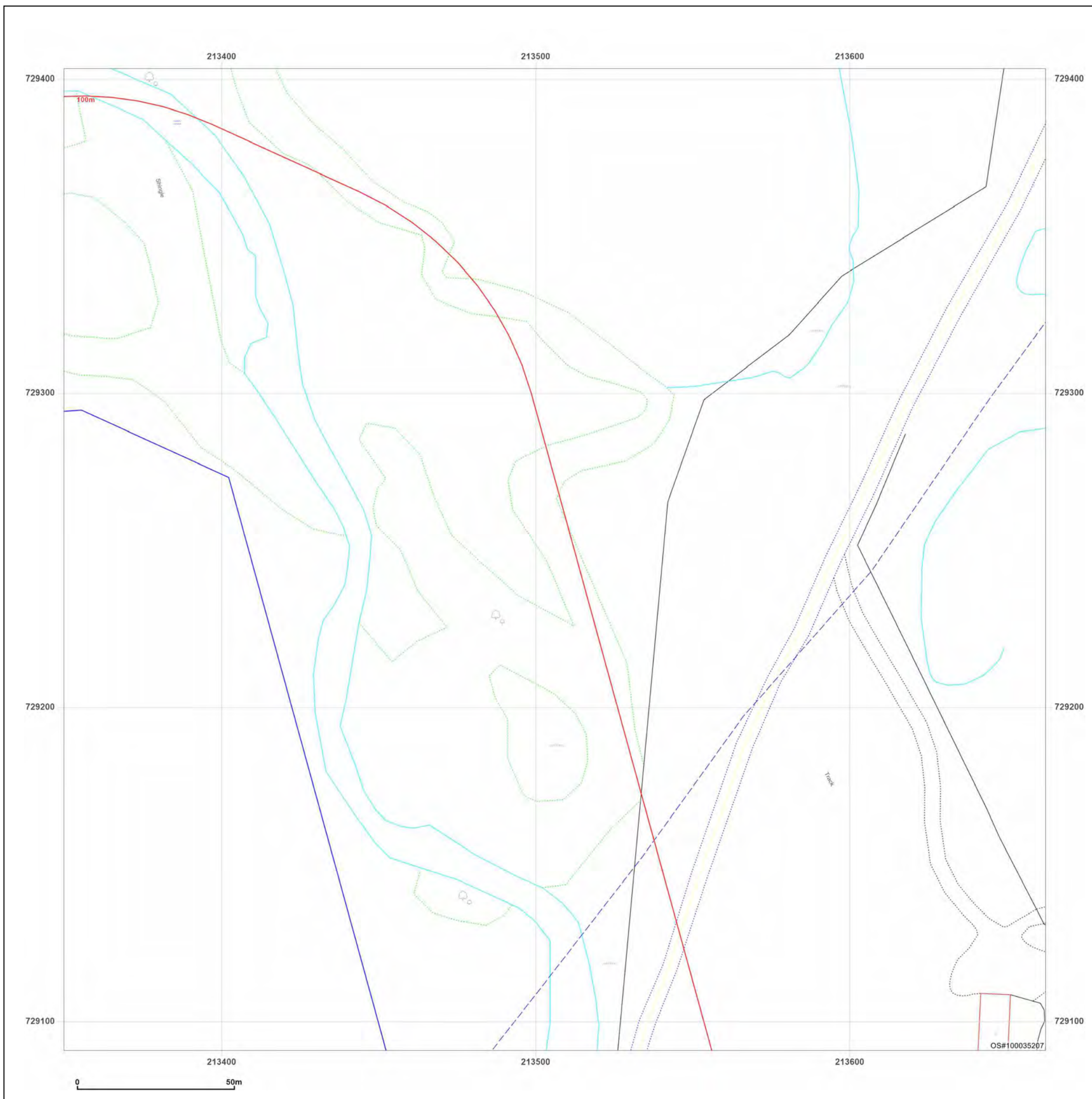


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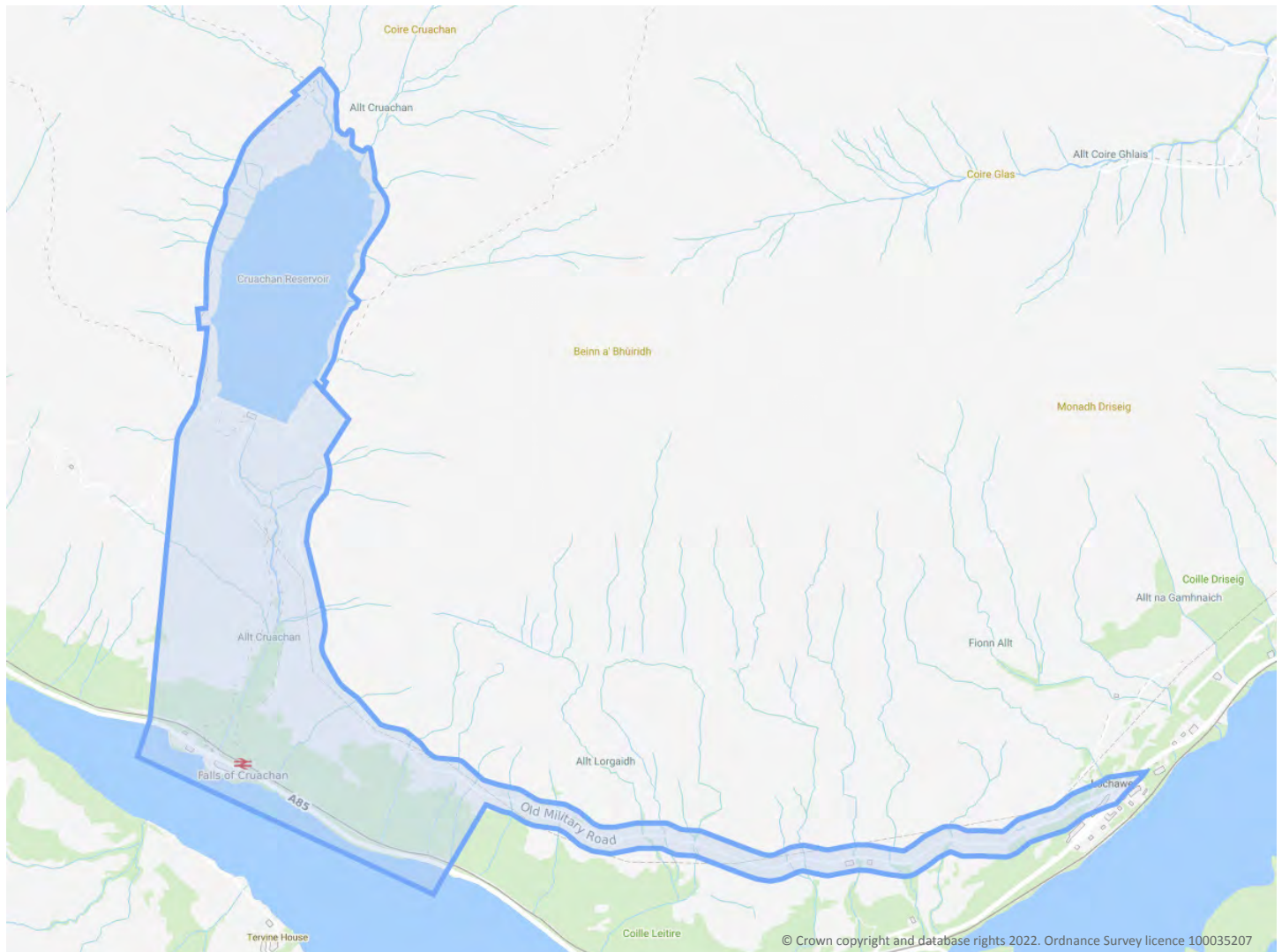
## Cruachan 2 West

### Order Details

**Date:** 07/04/2022  
**Your ref:** Cruachan 2 West  
**Our Ref:** GISP-2022-12632-9903  
**Client:** Stantec UK Ltd

### Site Details

**Location:** 209293 727271  
**Area:** 225.54 ha  
**Authority:** [Argyll and Bute Council](#)



**Summary of findings**

p. 2

**Aerial image**

p. 7

**OS MasterMap site plan**

N/A: >10ha

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08444 159 000

## Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
<b><u>11</u></b>	<b><u>1.1</u></b>	<b><u>Historical industrial land uses</u></b>	4	1	2	3	-
12	1.2	Historical tanks	0	0	0	0	-
<b><u>12</u></b>	<b><u>1.3</u></b>	<b><u>Historical energy features</u></b>	1	0	0	0	-
<b><u>13</u></b>	<b><u>1.4</u></b>	<b><u>Historical petrol stations</u></b>	0	0	1	0	-
13	1.5	Historical garages	0	0	0	0	-
13	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
<b><u>14</u></b>	<b><u>2.1</u></b>	<b><u>Historical industrial land uses</u></b>	4	1	2	3	-
15	2.2	Historical tanks	0	0	0	0	-
<b><u>15</u></b>	<b><u>2.3</u></b>	<b><u>Historical energy features</u></b>	1	0	0	0	-
<b><u>16</u></b>	<b><u>2.4</u></b>	<b><u>Historical petrol stations</u></b>	0	0	1	0	-
16	2.5	Historical garages	0	0	0	0	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
17	3.1	Active or recent landfill	0	0	0	0	-
17	3.2	Historical landfill (BGS records)	0	0	0	0	-
17	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
17	3.4	Licensed waste sites	0	0	0	0	-
17	3.5	Historical waste sites	0	0	0	0	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
<b><u>18</u></b>	<b><u>4.1</u></b>	<b><u>Recent industrial land uses</u></b>	12	6	5	-	-
<b><u>20</u></b>	<b><u>4.2</u></b>	<b><u>Current or recent petrol stations</u></b>	0	0	1	0	-
20	4.3	Electricity cables	0	0	0	0	-
20	4.4	Gas pipelines	0	0	0	0	-
21	4.5	Sites determined as Contaminated Land	0	0	0	0	-
21	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
21	4.7	Regulated explosive sites	0	0	0	0	-



21	4.8	Hazardous substance storage/usage	0	0	0	0	-
21	4.9	Part A(1), IPPC and Historic IPC Authorisations	0	0	0	0	-
22	4.10	Part B Authorisations	0	0	0	0	-
22	4.11	Pollution inventory substances	0	0	0	0	-
22	4.12	Pollution inventory waste transfers	0	0	0	0	-
22	4.13	Pollution inventory radioactive waste	0	0	0	0	-
Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
23	5.1	Superficial aquifer	None (within 500m)				
<b>24</b>	<b>5.2</b>	<b><u>Bedrock aquifer</u></b>	Identified (within 500m)				
Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
<b>26</b>	<b>6.1</b>	<b><u>Water Network (OS MasterMap)</u></b>	120	10	56	-	-
<b>41</b>	<b>6.2</b>	<b><u>Surface water features</u></b>	1	5	29	-	-
Page	Section	River flooding					
<b>42</b>	<b>7.1</b>	<b><u>River flooding</u></b>	1 in 30 year, Greater than 1.0m (within 50m)				
Page	Section	Coastal flooding					
44	8.1	Coastal flooding	Negligible (within 50m)				
Page	Section	Surface water flooding					
<b>45</b>	<b>9.1</b>	<b><u>Surface water flooding</u></b>	1 in 30 year, Greater than 1.0m (within 50m)				
Page	Section	Groundwater flooding					
<b>47</b>	<b>10.1</b>	<b><u>Groundwater flooding</u></b>	Low (within 50m)				
Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
<b>48</b>	<b>11.1</b>	<b><u>Sites of Special Scientific Interest (SSSI)</u></b>	1	0	0	0	0
49	11.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
<b>49</b>	<b>11.3</b>	<b><u>Special Areas of Conservation (SAC)</u></b>	1	0	0	0	0
<b>49</b>	<b>11.4</b>	<b><u>Special Protection Areas (SPA)</u></b>	1	0	0	0	0
50	11.5	National Nature Reserves (NNR)	0	0	0	0	0
50	11.6	Local Nature Reserves (LNR)	0	0	0	0	0
<b>50</b>	<b>11.7</b>	<b><u>Designated Ancient Woodland</u></b>	5	0	1	5	24
52	11.8	Biosphere Reserves	0	0	0	0	0





52	11.9	Forest Parks	0	0	0	0	0
52	11.10	Marine Conservation Zones	0	0	0	0	0
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
53	12.1	World Heritage Sites	0	0	0	-	-
54	12.2	Area of Outstanding Natural Beauty	0	0	0	-	-
54	12.3	National Parks	0	0	0	-	-
<b>54</b>	<b>12.4</b>	<b>Listed Buildings</b>	<b>3</b>	<b>0</b>	<b>1</b>	-	-
55	12.5	Conservation Areas	0	0	0	-	-
55	12.6	Scheduled Ancient Monuments	0	0	0	-	-
55	12.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
<b>56</b>	<b>13.1</b>	<b>Agricultural Land Classification</b>	Grade 5.1 (within 250m)				
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
<b>58</b>	<b>14.1</b>	<b>10k Availability</b>	Identified (within 500m)				
59	14.2	Artificial and made ground (10k)	0	0	0	0	-
60	14.3	Superficial geology (10k)	0	0	0	0	-
60	14.4	Landslip (10k)	0	0	0	0	-
61	14.5	Bedrock geology (10k)	0	0	0	0	-
61	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
<b>62</b>	<b>15.1</b>	<b>50k Availability</b>	Identified (within 500m)				
63	15.2	Artificial and made ground (50k)	0	0	0	0	-
63	15.3	Artificial ground permeability (50k)	0	0	-	-	-
<b>64</b>	<b>15.4</b>	<b>Superficial geology (50k)</b>	<b>3</b>	<b>0</b>	<b>3</b>	<b>0</b>	-
<b>65</b>	<b>15.5</b>	<b>Superficial permeability (50k)</b>	Identified (within 50m)				
65	15.6	Landslip (50k)	0	0	0	0	-
65	15.7	Landslip permeability (50k)	None (within 50m)				
<b>66</b>	<b>15.8</b>	<b>Bedrock geology (50k)</b>	<b>30</b>	<b>4</b>	<b>23</b>	<b>35</b>	-
<b>71</b>	<b>15.9</b>	<b>Bedrock permeability (50k)</b>	Identified (within 50m)				



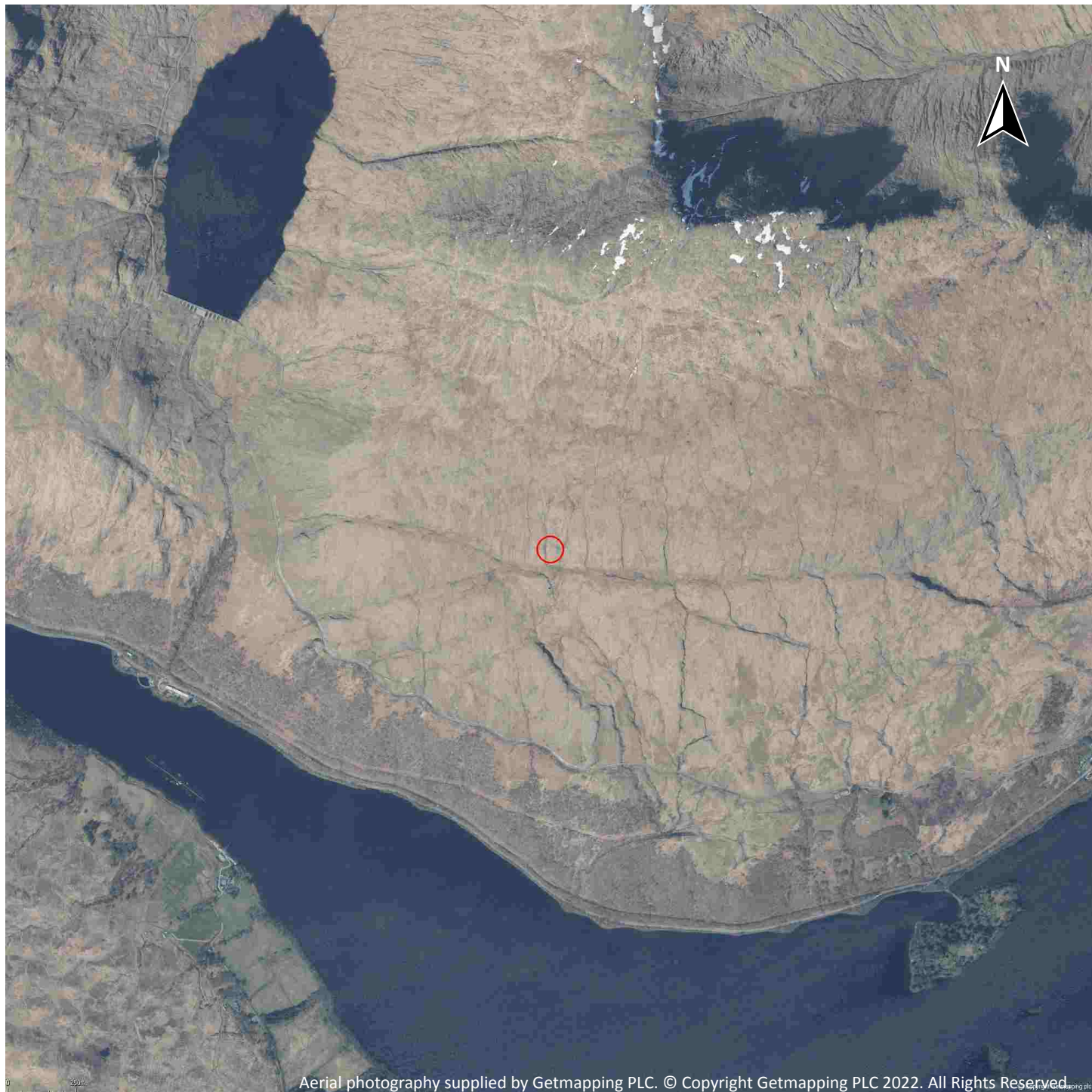
<b>73</b>	<b>15.10</b>	<b><u>Bedrock faults and other linear features (50k)</u></b>	1	0	2	4	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
<b>74</b>	<b>16.1</b>	<b><u>BGS Boreholes</u></b>	1	0	0	-	-
Page	Section	Natural ground subsidence					
<b>75</b>	<b>17.1</b>	<b><u>Shrink swell clays</u></b>	Very low (within 50m)				
<b>76</b>	<b>17.2</b>	<b><u>Running sands</u></b>	Very low (within 50m)				
<b>78</b>	<b>17.3</b>	<b><u>Compressible deposits</u></b>	Negligible (within 50m)				
<b>79</b>	<b>17.4</b>	<b><u>Collapsible deposits</u></b>	Very low (within 50m)				
<b>80</b>	<b>17.5</b>	<b><u>Landslides</u></b>	Moderate (within 50m)				
<b>82</b>	<b>17.6</b>	<b><u>Ground dissolution of soluble rocks</u></b>	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
83	18.1	Natural cavities	0	0	0	0	-
<b>84</b>	<b>18.2</b>	<b><u>BritPits</u></b>	0	0	1	0	-
<b>84</b>	<b>18.3</b>	<b><u>Surface ground workings</u></b>	2	0	2	-	-
84	18.4	Underground workings	0	0	0	0	0
85	18.5	Historical Mineral Planning Areas	0	0	0	0	-
<b>85</b>	<b>18.6</b>	<b><u>Non-coal mining</u></b>	11	2	8	10	20
90	18.7	Mining cavities	0	0	0	0	0
90	18.8	JPB mining areas	None (within 0m)				
91	18.9	Coal mining	None (within 0m)				
91	18.10	Brine areas	None (within 0m)				
91	18.11	Gypsum areas	None (within 0m)				
91	18.12	Tin mining	None (within 0m)				
91	18.13	Clay mining	None (within 0m)				
Page	Section	Radon					
<b>92</b>	<b>19.1</b>	<b><u>Radon</u></b>	Less than 1% (within 0m)				
Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
<b>93</b>	<b>20.1</b>	<b><u>BGS Estimated Background Soil Chemistry</u></b>	131	10	-	-	-
101	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-



101	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-
Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
102	21.1	Underground railways (London)	0	0	0	-	-
102	21.2	Underground railways (Non-London)	0	0	0	-	-
103	21.3	Railway tunnels	0	0	0	-	-
103	21.4	Historical railway and tunnel features	0	0	0	-	-
103	21.5	Royal Mail tunnels	0	0	0	-	-
103	21.6	Historical railways	0	0	0	-	-
<b>103</b>	<b>21.7</b>	<b><u>Railways</u></b>	<b>13</b>	<b>2</b>	<b>15</b>	-	-
105	21.8	Crossrail 1	0	0	0	0	-
105	21.9	Crossrail 2	0	0	0	0	-
105	21.10	HS2	0	0	0	0	-



## Recent aerial photograph



Capture Date: 21/04/2020

Site Area: 225.54ha



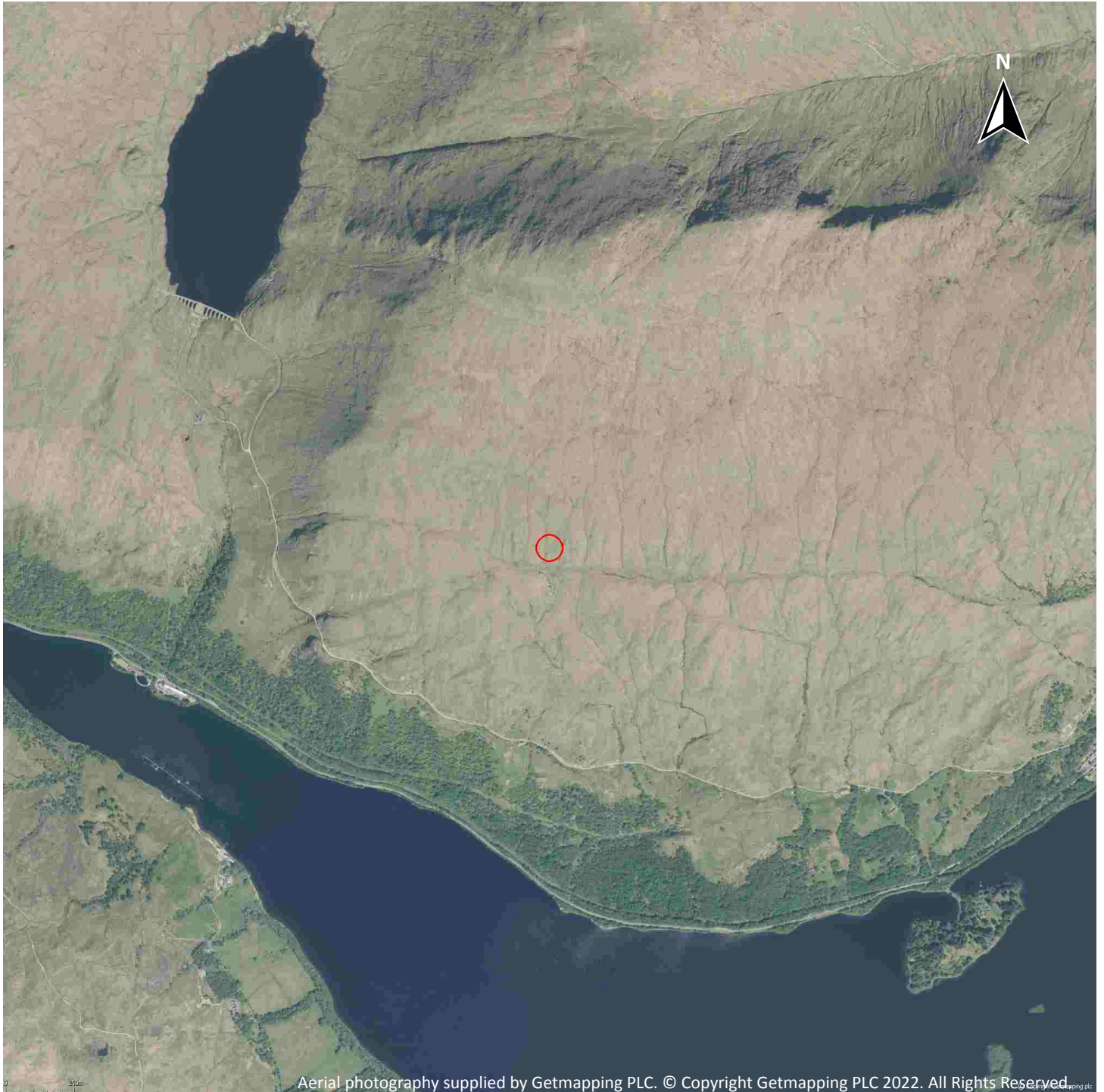
Contact us with any questions at:

[info@groundsure.com](mailto:info@groundsure.com)

08444 159 000

Date: 7 April 2022

## Recent site history - 2016 aerial photograph



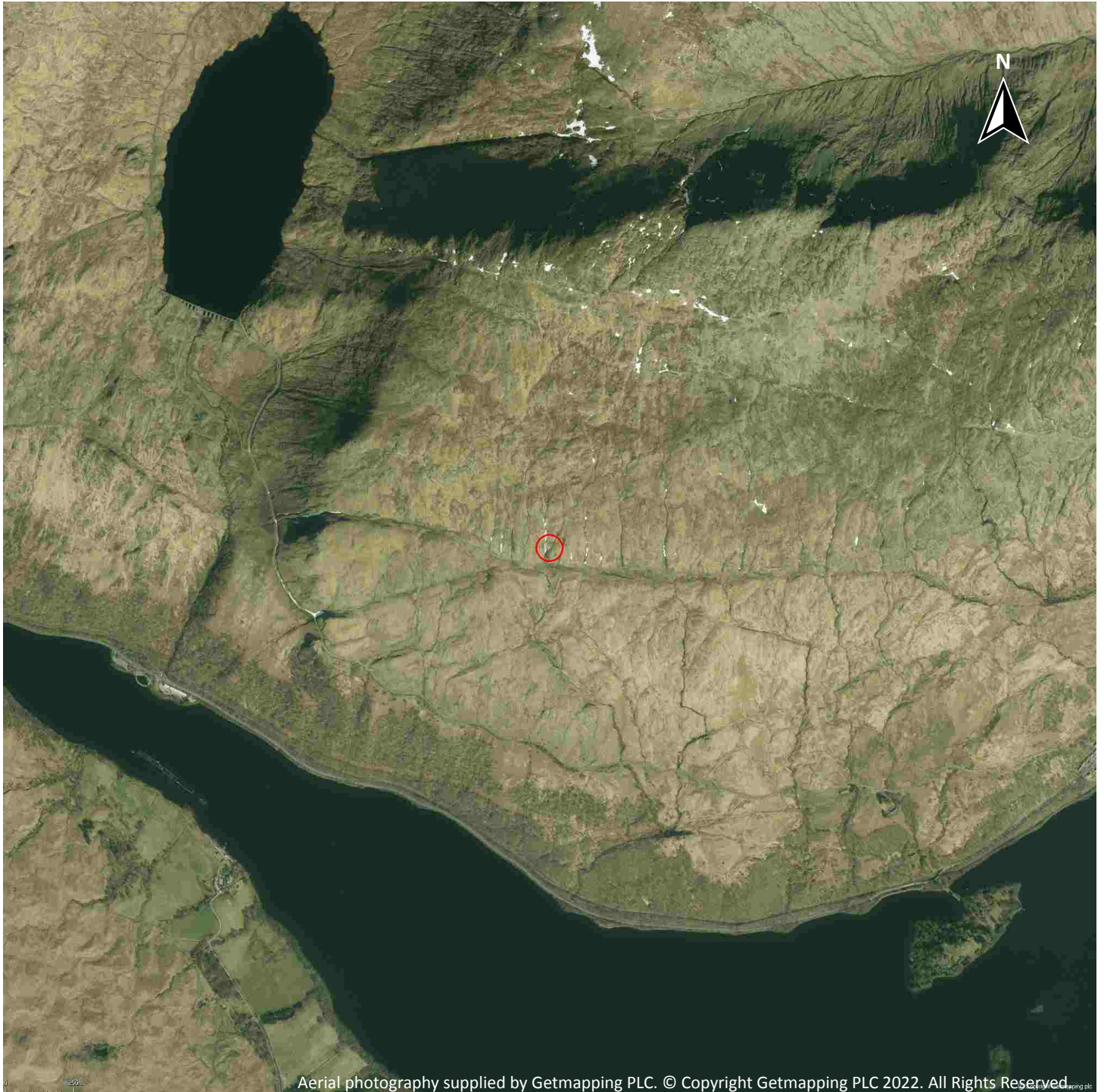
Capture Date: 02/06/2016

Site Area: 225.54ha





## Recent site history - 2010 aerial photograph



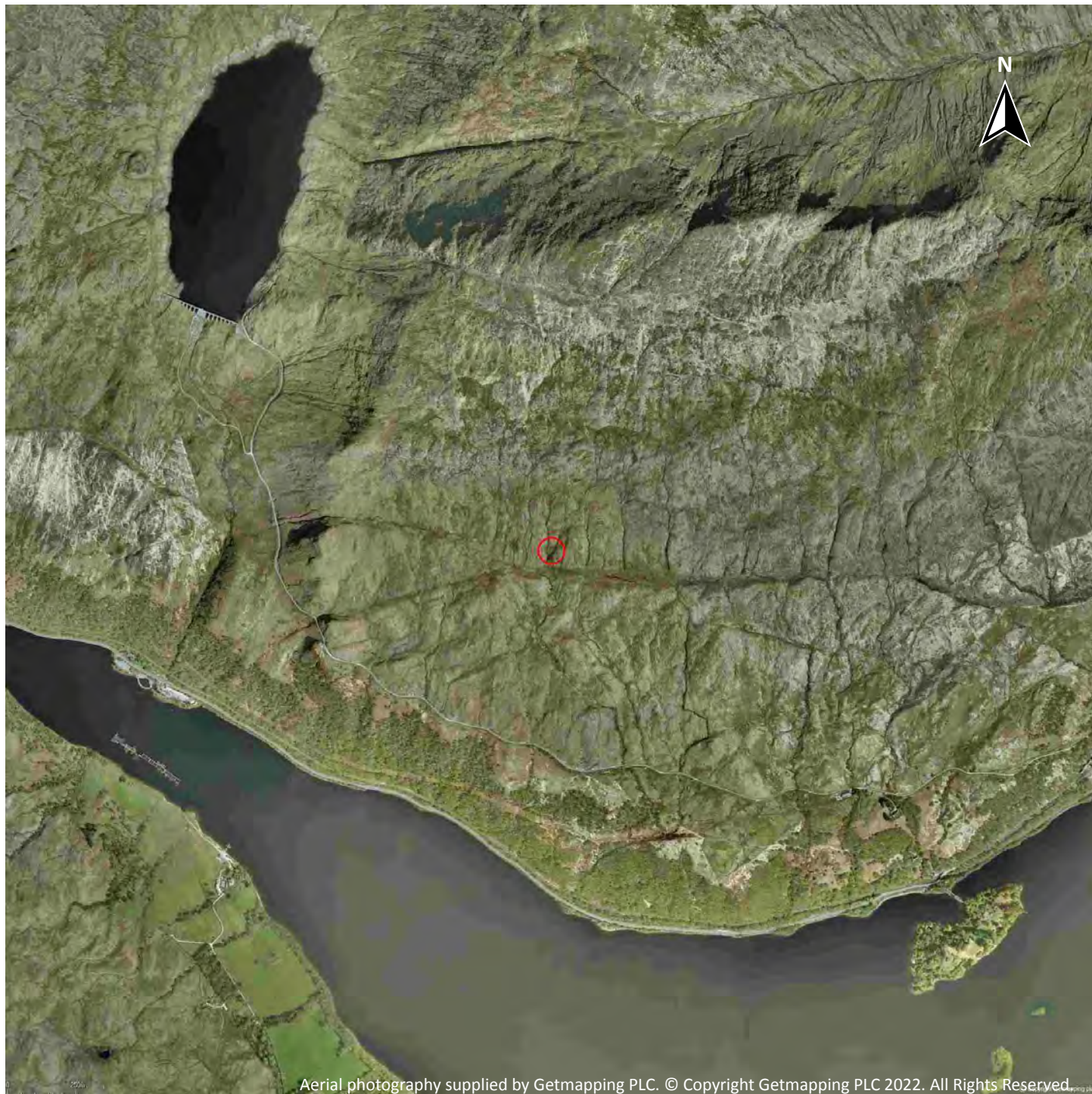
Capture Date: 11/04/2010

Site Area: 225.54ha





## Recent site history - 2006 aerial photograph



Capture Date: 10/05/2006

Site Area: 225.54ha



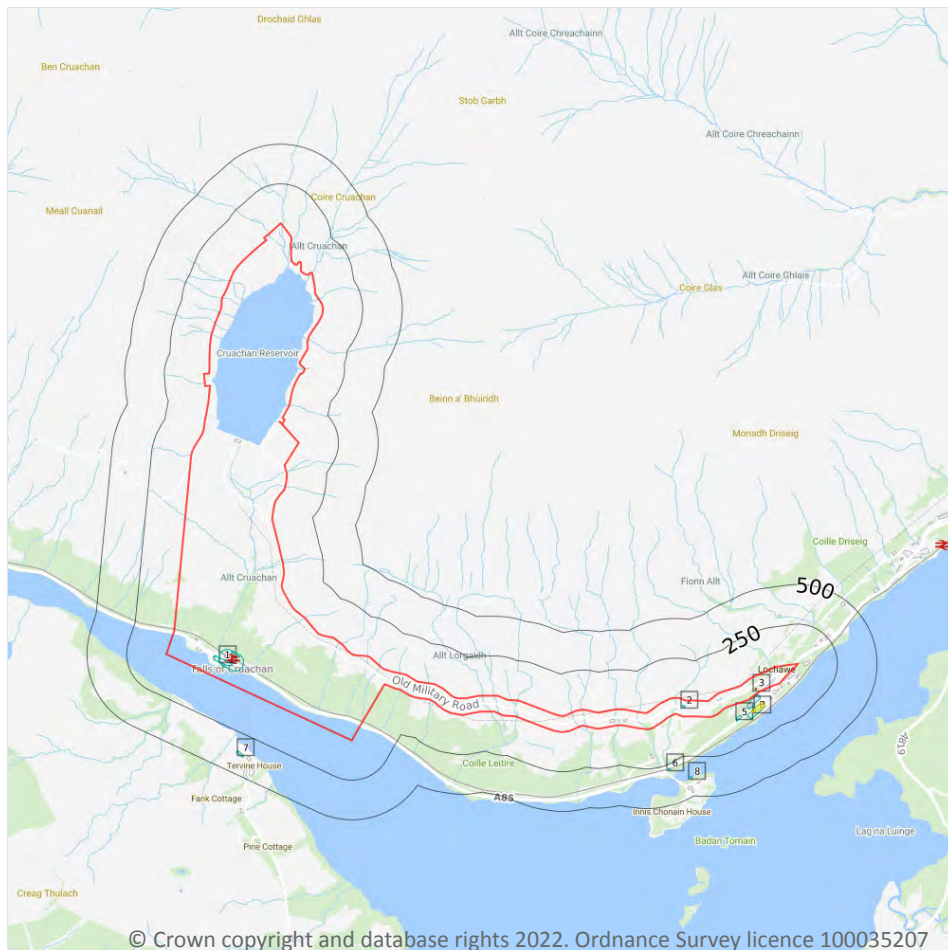
Contact us with any questions at:

[info@groundsure.com](mailto:info@groundsure.com)

08444 159 000

Date: 7 April 2022

## 1 Past land use



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical energy features
- Historical petrol stations

### 1.1 Historical industrial land uses

Records within 500m

10

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 11**

ID	Location	Land use	Dates present	Group ID
1	On site	Power Station	1973	75341





ID	Location	Land use	Dates present	Group ID
2	On site	Unspecified Disused Pit	1976	75361
A	On site	Railway Buildings	1900	73948
A	On site	Electric Substation	1973	74601
4	2m SE	Electric Substation	1976	74600
B	62m SE	Sewage Works	1976	73660
5	76m S	Unspecified Disused Quarry	1976	72105
6	274m S	Railway Building	1900	74043
7	361m SW	Corn Dryer	1973	73935
8	378m S	Boat House	1976	75784

*This data is sourced from Ordnance Survey / Groundsure.*

## 1.2 Historical tanks

**Records within 500m**

**0**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

*This data is sourced from Ordnance Survey / Groundsure.*

## 1.3 Historical energy features

**Records within 500m**

**1**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 11**

ID	Location	Land use	Dates present	Group ID
3	On site	Electricity Substation	1982	3844

*This data is sourced from Ordnance Survey / Groundsure.*





## 1.4 Historical petrol stations

### Records within 500m

**1**

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 11**

ID	Location	Land use	Dates present	Group ID
B	59m SE	Filling Station	1982	252

*This data is sourced from Ordnance Survey / Groundsure.*

## 1.5 Historical garages

### Records within 500m

**0**

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original ungrouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

*This data is sourced from Ordnance Survey / Groundsure.*

## 1.6 Historical military land

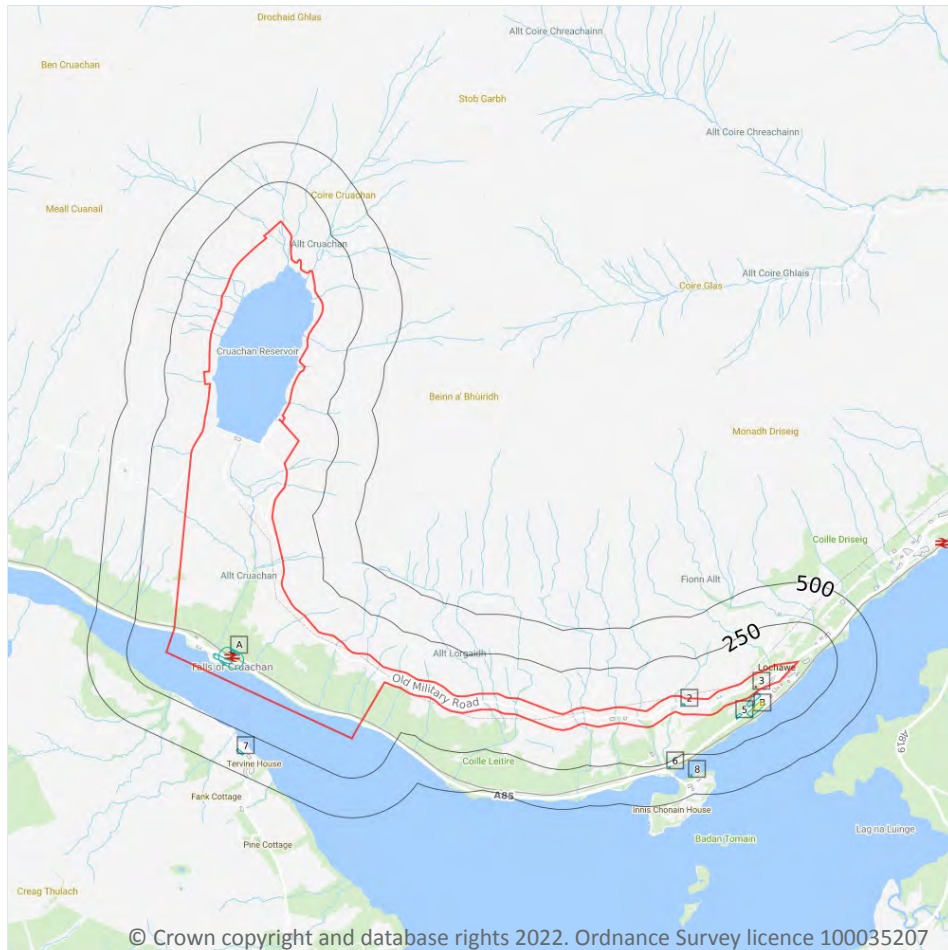
### Records within 500m

**0**

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

*This data is sourced from Ordnance Survey / Groundsure / other sources.*

## 2 Past land use - un-grouped



- Site Outline
- Search buffers in metres (m)
- Historical industrial land uses
- Historical energy features
- Historical petrol stations

### 2.1 Historical industrial land uses

Records within 500m

10

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 14**

ID	Location	Land Use	Date	Group ID
1	On site	Power Station	1973	75341
2	On site	Unspecified Disused Pit	1976	75361
A	On site	Railway Buildings	1900	73948



ID	Location	Land Use	Date	Group ID
<b>A</b>	<b>On site</b>	<b>Electric Substation</b>	<b>1973</b>	<b>74601</b>
4	2m SE	Electric Substation	1976	74600
B	62m SE	Sewage Works	1976	73660
5	76m S	Unspecified Disused Quarry	1976	72105
6	274m S	Railway Building	1900	74043
7	361m SW	Corn Dryer	1973	73935
8	378m S	Boat House	1976	75784

*This data is sourced from Ordnance Survey / Groundsure.*

## 2.2 Historical tanks

**Records within 500m**

**0**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

*This data is sourced from Ordnance Survey / Groundsure.*

## 2.3 Historical energy features

**Records within 500m**

**1**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 14**

ID	Location	Land Use	Date	Group ID
<b>3</b>	<b>On site</b>	<b>Electricity Substation</b>	<b>1982</b>	<b>3844</b>

*This data is sourced from Ordnance Survey / Groundsure.*





## 2.4 Historical petrol stations

### Records within 500m

**1**

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 14**

ID	Location	Land Use	Date	Group ID
B	59m SE	Filling Station	1982	252

*This data is sourced from Ordnance Survey / Groundsure.*

## 2.5 Historical garages

### Records within 500m

**0**

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

*This data is sourced from Ordnance Survey / Groundsure.*



## 3 Waste and landfill

### 3.1 Active or recent landfill

Records within 500m

0

Active or recently closed landfill sites under Scottish Environment Protection (SEPA) regulation.

*This data is sourced from the Scottish Environment Protection Agency.*

### 3.2 Historical landfill (BGS records)

Records within 500m

0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

*This data is sourced from the British Geological Survey.*

### 3.3 Historical landfill (LA/mapping records)

Records within 500m

0

Landfill sites identified from Local Authority records and high detail historical mapping.

*This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.*

### 3.4 Licensed waste sites

Records within 500m

0

Active or recently closed waste sites under Scottish Environment Protection Agency (SEPA) regulation.

*This data is sourced from the Scottish Environment Protection Agency.*

### 3.5 Historical waste sites

Records within 500m

0

Waste site records derived from Local Authority planning records and high detail historical mapping.

*This data is sourced from Ordnance Survey/Groundsure and Local Authority records.*





ID	Location	Company	Address	Activity	Category
3	On site	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
4	On site	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
5	On site	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
6	On site	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
7	On site	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
8	On site	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
9	On site	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
10	On site	Outfall	Argyll and Bute, PA33	Waste Storage, Processing and Disposal	Infrastructure and Facilities
11	On site	Cruachan Power Station	Argyll and Bute, PA33	Energy Production	Industrial Features
12	On site	Electricity Sub Station	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
13	3m W	Outfall	Argyll and Bute, PA33	Waste Storage, Processing and Disposal	Infrastructure and Facilities
14	3m S	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
15	3m N	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
16	4m NE	Outfall	Argyll and Bute, PA33	Waste Storage, Processing and Disposal	Infrastructure and Facilities
17	37m N	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
18	44m S	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities
19	52m N	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities



ID	Location	Company	Address	Activity	Category
21	72m S	Quarry (Disused)	Argyll and Bute, PA33	Unspecified Quarries Or Mines	Extractive Industries
A	106m SE	Sewage Works	Argyll and Bute, PA33	Waste Storage, Processing and Disposal	Infrastructure and Facilities
A	111m SE	Works	Argyll and Bute, PA33	Unspecified Works Or Factories	Industrial Features
22	163m N	Pylon	Argyll and Bute, PA33	Electrical Features	Infrastructure and Facilities

*This data is sourced from Ordnance Survey.*

## 4.2 Current or recent petrol stations

**Records within 500m**

**1**

Open, closed, under development and obsolete petrol stations.

Features are displayed on the Current industrial land use map on **page 18**

ID	Location	Company	Address	LPG	Status
20	57m SE	UNBRANDED	A85, Lochawe, Dalmally, Argyll & Bute, PA33 1AW	Not Applicable	Obsolete

*This data is sourced from Experian.*

## 4.3 Electricity cables

**Records within 500m**

**0**

High voltage underground electricity transmission cables.

*This data is sourced from National Grid.*

## 4.4 Gas pipelines

**Records within 500m**

**0**

High pressure underground gas transmission pipelines.

*This data is sourced from National Grid.*



## 4.5 Sites determined as Contaminated Land

**Records within 500m****0**

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

*This data is sourced from Local Authority records.*

## 4.6 Control of Major Accident Hazards (COMAH)

**Records within 500m****0**

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

*This data is sourced from the Health and Safety Executive.*

## 4.7 Regulated explosive sites

**Records within 500m****0**

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

*This data is sourced from the Health and Safety Executive.*

## 4.8 Hazardous substance storage/usage

**Records within 500m****0**

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

*This data is sourced from Local Authority records.*

## 4.9 Part A(1), IPPC and Historic IPC Authorisations

**Records within 500m****0**

Records of Part A installations regulated for the release of substances to the environment.

*This data is sourced from the Scottish Environment Protection Agency.*





## 4.10 Part B Authorisations

Records within 500m

0

Records of Part B installations regulated for the release of substances to the environment.

*This data is sourced from the Scottish Environment Protection Agency.*

## 4.11 Pollution inventory substances

Records within 500m

0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

*This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.*

## 4.12 Pollution inventory waste transfers

Records within 500m

0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

*This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.*

## 4.13 Pollution inventory radioactive waste

Records within 500m

0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

*This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.*

## 5 Hydrogeology - Superficial aquifer

### 5.1 Superficial aquifer

Records within 500m

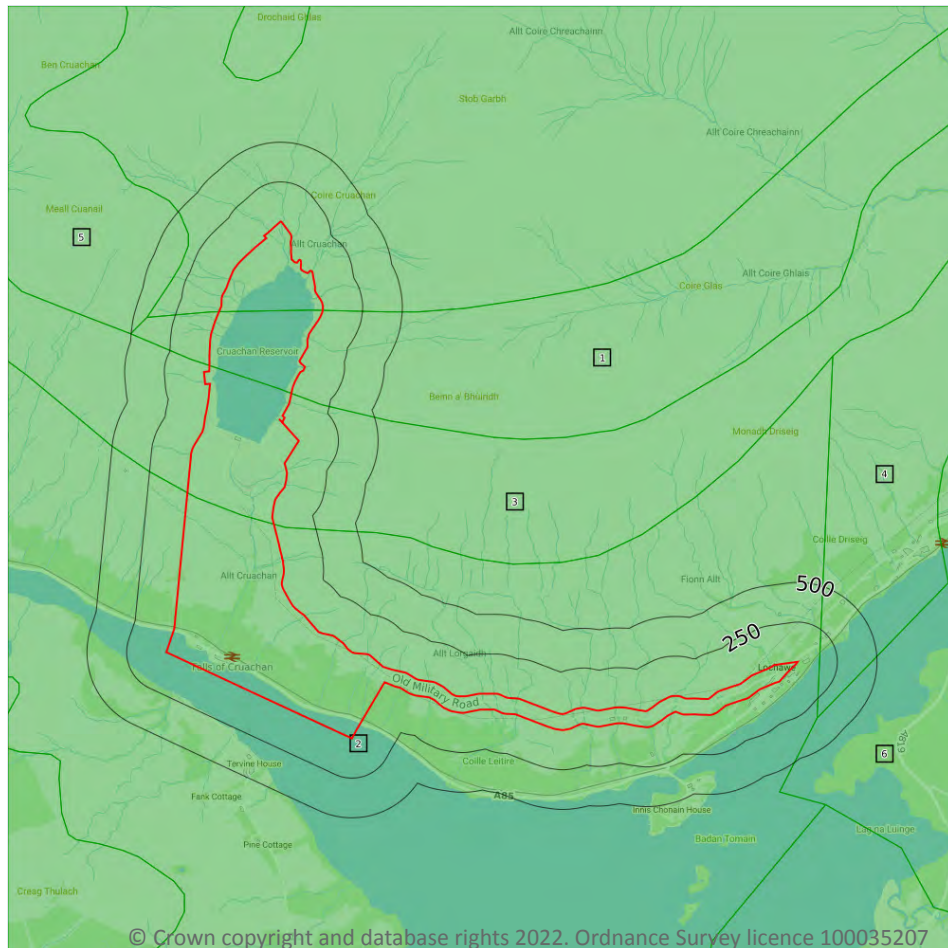
0

Records of groundwater classification within superficial geology.

*This data is sourced from the British Geological Survey.*



## Bedrock aquifer



- Site Outline**
- Search buffers in metres (m)**
- Highly productive - fissures/discontinuities
  - Highly productive - intergranular
  - Moderately productive - fissures/discontinuities
  - Moderately productive - intergranular
  - Low productive - fissures/discontinuities
  - Low productive - intergranular
  - No significant groundwater

### 5.2 Bedrock aquifer

#### Records within 500m

6

Records of groundwater classification within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 24**

ID	Location	Description	Flow	Summary	Rock description
1	On site	Low productivity aquifer	Flow is virtually all through fractures and other discontinuities	Small amounts of groundwater in near surface weathered zone and secondary fractures, rare springs yielding up to 2 L/s.	UNNAMED EXTRUSIVE ROCKS, SILURIAN TO DEVONIAN



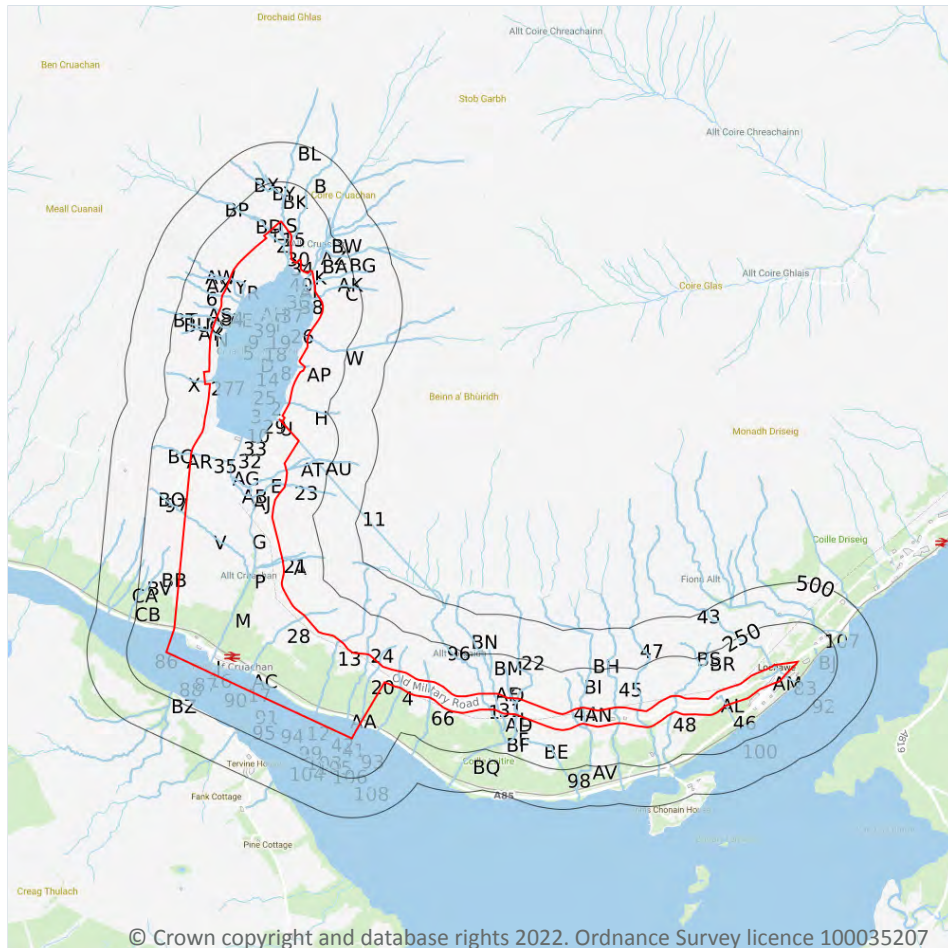


ID	Location	Description	Flow	Summary	Rock description
2	On site	Low productivity aquifer	Flow is virtually all through fractures and other discontinuities	Small amounts of groundwater in near surface weathered zone and fractures.	ARGYLL GROUP
3	On site	Low productivity aquifer	Flow is virtually all through fractures and other discontinuities	Small amounts of groundwater in near surface weathered zone and secondary fractures; rare springs.	UNNAMED IGNEOUS INTRUSION, LATE SILURIAN TO EARLY DEVONIAN
4	138m E	Low productivity aquifer	Flow is virtually all through fractures and other discontinuities	Small amounts of groundwater in near surface weathered zone and secondary fractures.	APPIN GROUP
5	319m W	Low productivity aquifer	Flow is virtually all through fractures and other discontinuities	Small amounts of groundwater in near surface weathered zone and secondary fractures; rare springs.	UNNAMED IGNEOUS INTRUSION, LATE SILURIAN TO EARLY DEVONIAN
6	331m SE	Low productivity aquifer	Flow is virtually all through fractures and other discontinuities	Small amounts of groundwater in near surface weathered zone and secondary fractures.	UNNAMED IGNEOUS INTRUSION, NEOPROTEROZOIC

*This data is sourced from the British Geological Survey.*



## 6 Hydrology



- Site Outline
- Search buffers in metres (m)
- Water Network (OS MasterMap)
- Surface water features (wider than 5m)
- Surface water features (narrower than 5m)

### 6.1 Water Network (OS MasterMap)

Records within 250m

186

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 26**

ID	Location	Type of water feature	Ground level	Permanence	Name
1	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Lorgaidh



ID	Location	Type of water feature	Ground level	Permanence	Name
2	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
3	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
4	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
5	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
6	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
7	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
8	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
9	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
10	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
11	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
12	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
13	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
14	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan





ID	Location	Type of water feature	Ground level	Permanence	Name
15	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
16	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
17	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
18	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
19	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
20	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
21	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
22	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
23	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
24	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
25	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
26	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
27	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
28	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
29	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
30	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
31	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
32	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
33	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
34	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
35	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
36	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
37	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
38	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
39	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
40	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
41	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
42	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
43	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
44	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
45	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
46	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
47	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
48	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
A	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
66	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
B	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
C	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
D	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan





ID	Location	Type of water feature	Ground level	Permanence	Name
E	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
F	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
G	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
H	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
I	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
I	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
I	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
J	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
J	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
J	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
K	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
L	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
L	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
M	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
N	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
O	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
P	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
P	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Q	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
R	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
R	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
S	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
T	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
U	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
U	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
V	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
W	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
X	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Y	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Y	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
Y	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Z	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
Z	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
Z	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AA	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
AA	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AA	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AA	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
AB	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan





ID	Location	Type of water feature	Ground level	Permanence	Name
AB	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
AC	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AC	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
AD	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AE	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AF	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AG	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
AG	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
AG	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
AH	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AH	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AH	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AI	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan



ID	Location	Type of water feature	Ground level	Permanence	Name
AI	On site	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AJ	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
AJ	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
AJ	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
AK	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AL	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AL	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AL	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AM	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AM	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
AM	On site	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
AM	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AM	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
AN	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AP	On site	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
83	3m SE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AR	3m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
84	4m W	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
AS	9m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AT	19m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AU	19m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AV	25m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AW	37m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AX	37m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
86	48m SW	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
AY	53m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-





ID	Location	Type of water feature	Ground level	Permanence	Name
AY	53m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
87	60m SW	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
88	60m SW	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
BA	69m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AZ	69m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
BB	76m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BC	77m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AR	77m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
90	79m SW	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
91	79m SW	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
BD	92m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BD	92m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
92	92m SE	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe



ID	Location	Type of water feature	Ground level	Permanence	Name
93	93m SE	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
94	109m SW	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
95	109m SW	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
BE	110m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BF	114m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Lorgaidh
BG	118m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
AZ	118m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
96	125m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Lorgaidh
BH	126m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BI	126m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BJ	128m E	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BK	131m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BL	131m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
BM	135m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BN	135m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
97	150m W	Inland river not influenced by normal tidal action.	Underground	Watercourse contains water year round (in normal circumstances)	-
98	153m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BO	158m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
99	162m SW	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
BP	162m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
100	166m SE	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
BQ	184m S	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Lorgaidh
BR	188m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BS	189m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BT	199m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BU	199m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-





ID	Location	Type of water feature	Ground level	Permanence	Name
BV	200m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BW	203m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BW	203m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
103	205m SW	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
104	205m SW	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
BX	205m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BY	209m N	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
BW	210m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Allt Cruachan
BW	210m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
105	213m SW	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
106	216m SW	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe
BZ	216m SW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
CA	229m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-



ID	Location	Type of water feature	Ground level	Permanence	Name
107	234m NE	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	Fionn Allt
CB	239m W	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
108	247m S	Reservoir. An area of non-tidal water used for storing water.	On ground surface	Watercourse contains water year round (in normal circumstances)	Loch Awe

*This data is sourced from the Ordnance Survey.*

## 6.2 Surface water features

**Records within 250m**

**35**

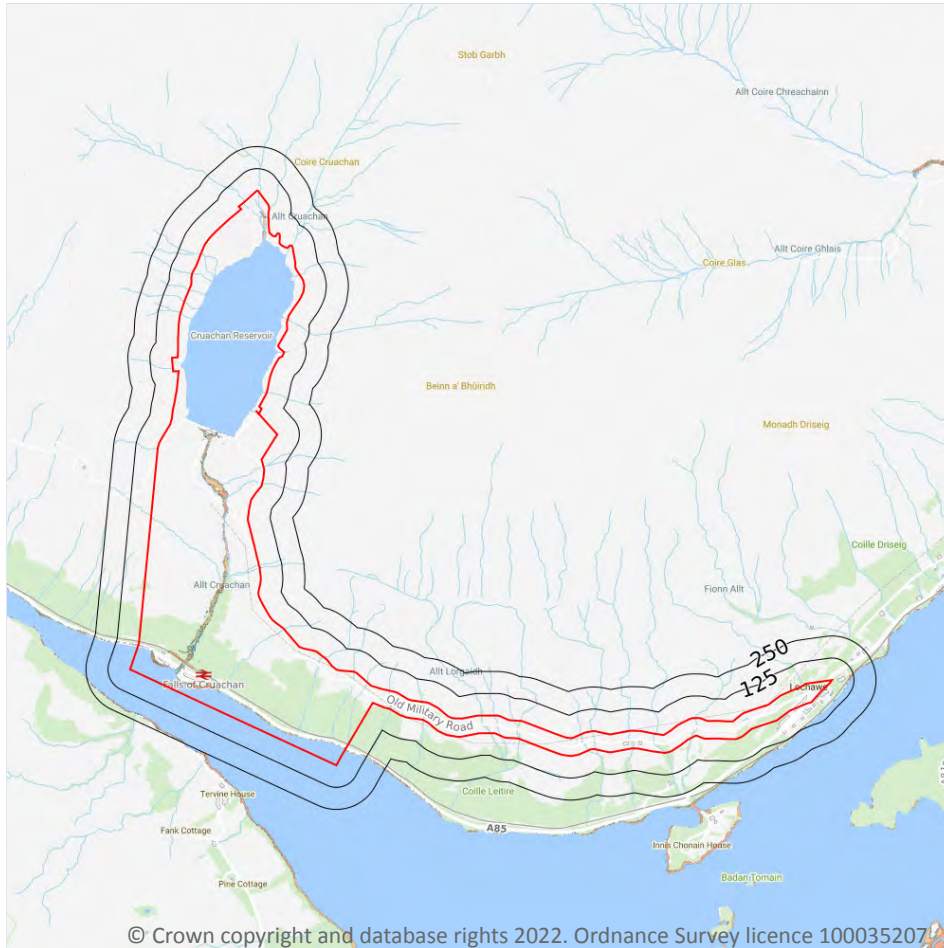
Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 26**

*This data is sourced from the Ordnance Survey.*



## 7 River flooding



— Site Outline

Search buffers in metres (m)

1 in 1000 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

### 7.1 River flooding

**Highest risk on site**

**1 in 30 year, Greater than 1.0m**

**Highest risk within 50m**

**1 in 30 year, Greater than 1.0m**

This is an assessment of flood risk for rivers in Scotland produced using modelled data, provided by Ambiental Risk Analytics. It also takes account of flood defence information provided by the Scottish Environment Protection Agency (SEPA). It shows the chance of flooding from rivers presented in the following categories:

- 1 in 30 year (3.33%)
- 1 in 100 year (1%)
- 1 in 250 year (0.4%)



- and 1 in 1,000 year (0.1%)

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site. The table below shows the maximum flood depths for a range of return periods for the site.

Features are displayed on the River flooding map on **page 42**

Return period	Maximum modelled depth
1 in 1000 year	Greater than 1.0m
1 in 250 year	Greater than 1.0m
1 in 100 year	Greater than 1.0m
1 in 30 year	Greater than 1.0m

*This data is sourced from Ambiantal Risk Analytics.*



## 8 Coastal flooding - Coastal flooding

### 8.1 Coastal flooding

Highest risk on site

Negligible

Highest risk within 50m

Negligible

This is an assessment of coastal flood risk in Scotland produced using modelled data, provided by Ambiantal Risk Analytics. It also takes account of flood defence information provided by the Scottish Environment Protection Agency (SEPA). It shows the chance of coastal flooding presented in the following categories:

- 1 in 30 year (3.33%)
- 1 in 100 year (1%)
- 1 in 250 year (0.4%)
- and 1 in 1,000 year (0.1%)

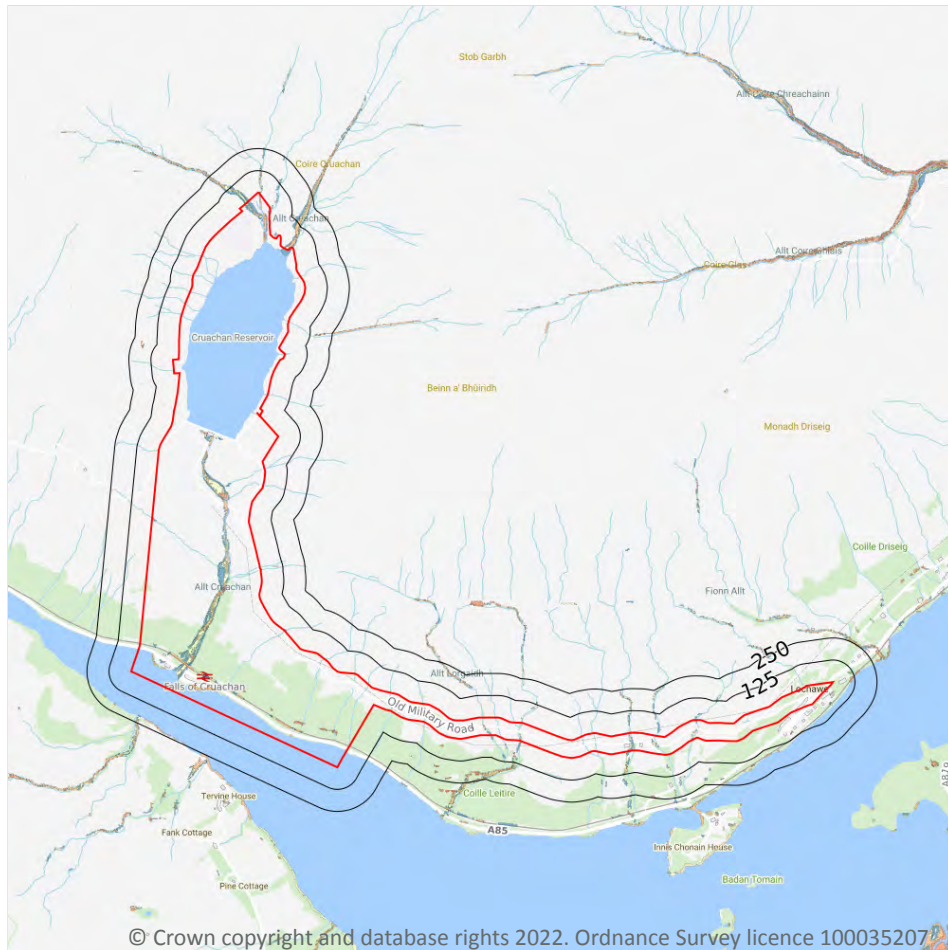
The data shown on the map shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site. The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Negligible
1 in 250 year	Negligible
1 in 100 year	Negligible
1 in 30 year	Negligible

*This data is sourced from Ambiantal Risk Analytics.*



## 9 Surface water flooding



— Site Outline

Search buffers in metres (m)

1 in 1000 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period

- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

### 9.1 Surface water flooding

**Highest risk on site**

**1 in 30 year, Greater than 1.0m**

**Highest risk within 50m**

**1 in 30 year, Greater than 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 45**

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.



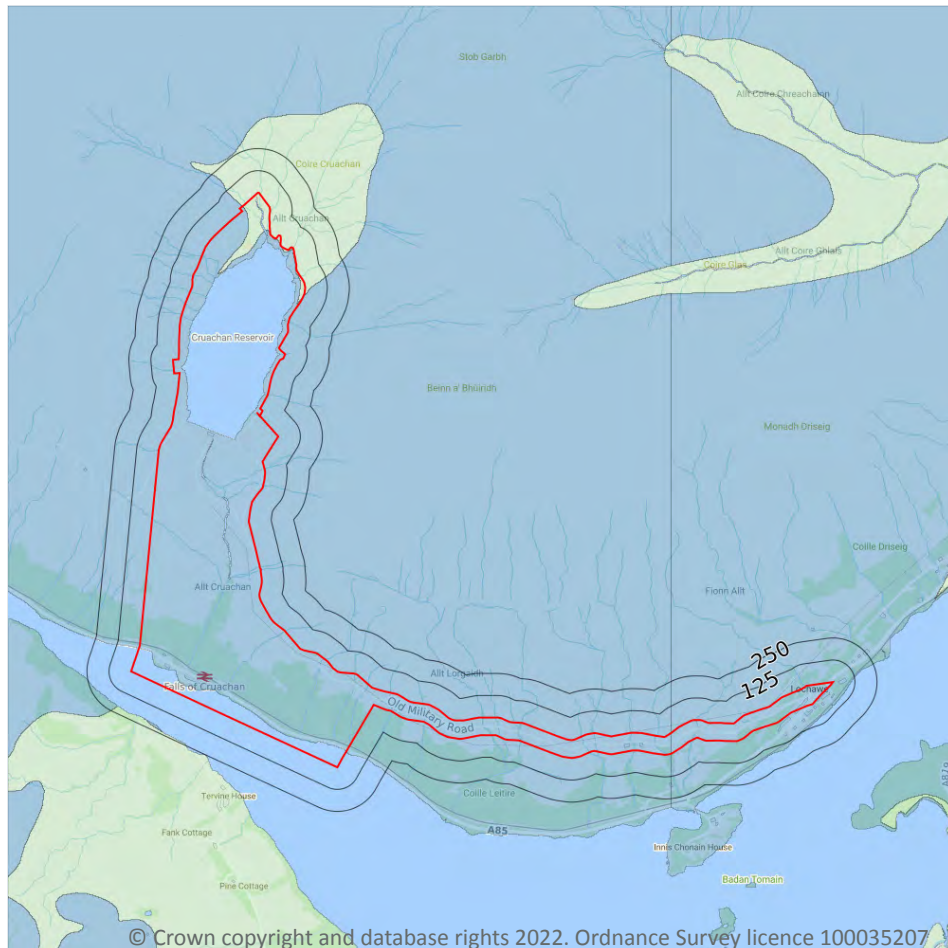
The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Greater than 1.0m
1 in 250 year	Greater than 1.0m
1 in 100 year	Greater than 1.0m
1 in 30 year	Greater than 1.0m

*This data is sourced from Ambiantal Risk Analytics.*



## 10 Groundwater flooding



— Site Outline  
Search buffers in metres (m)

- High
- Moderate - High
- Moderate
- Low
- Negligible

### 10.1 Groundwater flooding

Highest risk on site

Low

Highest risk within 50m

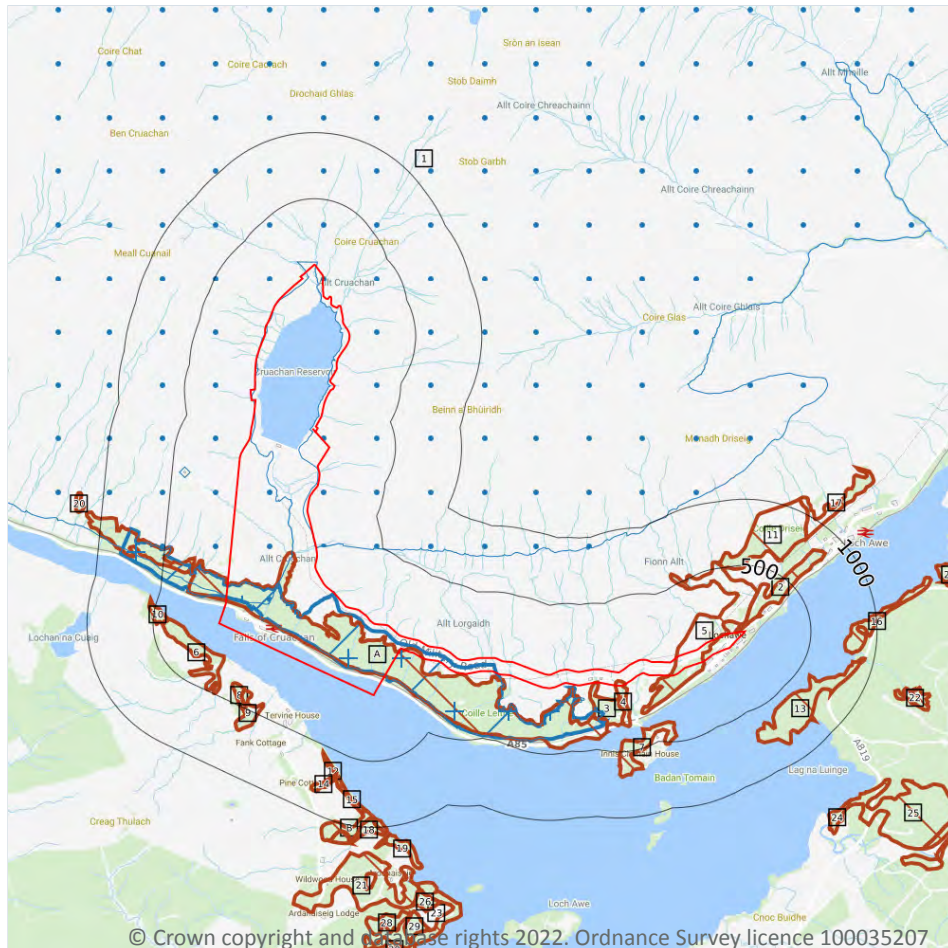
Low

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 47**

*This data is sourced from Ambienta Risk Analytics.*

## 11 Environmental designations



- Site Outline
- Search buffers in metres (m)
- Sites of Special Scientific Interest (SSSI)
- + Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)
- Designated Ancient Woodland

### 11.1 Sites of Special Scientific Interest (SSSI)

#### Records within 2000m

1

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on **page 48**

ID	Location	Name	Data source
A	On site	Coille Leitire	Scottish Natural Heritage





*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 11.2 Conserved wetland sites (Ramsar sites)

**Records within 2000m**

**0**

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 11.3 Special Areas of Conservation (SAC)

**Records within 2000m**

**1**

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

Features are displayed on the Environmental designations map on **page 48**

ID	Location	Name	Features of interest	Habitat description	Data source
A	On site	Loch Etive Woods	Blanket bog; Mixed woodland on base-rich soils associated with rocky slopes; Western acidic oak woodland; Alder woodland on floodplains; Otter.	Coniferous woodland; Inland rocks, Scree, Sands, Permanent Snow and ice; Broad-leaved deciduous woodland; Heath, Scrub, Maquis and Garrigue, Phygrana; Humid grassland, Mesophile grassland; Bogs, Marshes, Water fringed vegetation, Fens	Scottish Natural Heritage

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 11.4 Special Protection Areas (SPA)

**Records within 2000m**

**1**

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

Features are displayed on the Environmental designations map on **page 48**



ID	Location	Name	Species of interest	Habitat description	Data source
1	On site	Glen Etive and Glen Fyne	Golden eagle	Inland rocks, Scree, Sands, Permanent Snow and ice; Humid grassland, Mesophile grassland; Inland water bodies (Standing water, Running water); Dry grassland, Steppes; Other arable land; Bogs, Marshes, Water fringed vegetation, Fens; Coniferous woodland; Improved grassland; Broad-leaved deciduous woodland; Mixed woodland; Alpine and sub-Alpine grassland; Heath, Scrub, Maquis and Garrigue, Phygrana	Scottish Natural Heritage

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 11.5 National Nature Reserves (NNR)

<b>Records within 2000m</b>	<b>0</b>
-----------------------------	----------

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 11.6 Local Nature Reserves (LNR)

<b>Records within 2000m</b>	<b>0</b>
-----------------------------	----------

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 11.7 Designated Ancient Woodland

<b>Records within 2000m</b>	<b>35</b>
-----------------------------	-----------

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 48**

ID	Location	Name	Woodland Type
2	On site	Coille Driseig	Ancient (of semi-natural origin)

ID	Location	Name	Woodland Type
3	On site	Coille Leitire	Ancient (of semi-natural origin)
4	On site	Coille Leitire	Ancient (of semi-natural origin)
5	On site	Coille Driseig	Ancient (of semi-natural origin)
A	On site	Coille Leitire	Ancient (of semi-natural origin)
6	208m SW	Unknown	Ancient (of semi-natural origin)
7	351m S	Unknown	Ancient (of semi-natural origin)
8	354m SW	Unknown	Ancient (of semi-natural origin)
9	374m SW	Unknown	Ancient (of semi-natural origin)
10	384m W	Unknown	Other (on Roy map)
11	477m N	Coille Driseig	Ancient (of semi-natural origin)
12	552m SW	Unknown	Ancient (of semi-natural origin)
13	577m SE	Unknown	Long-Established (of plantation origin)
14	662m SW	Unknown	Ancient (of semi-natural origin)
15	722m S	Unknown	Long-Established (of plantation origin)
16	763m E	Unknown	Ancient (of semi-natural origin)
17	843m NE	Coille Driseig	Ancient (of semi-natural origin)
B	877m S	Unknown	Other (on Roy map)
18	931m S	Unknown	Ancient (of semi-natural origin)
B	1057m S	Unknown	Other (on Roy map)
19	1059m S	Unknown	Ancient (of semi-natural origin)
20	1137m W	Coille Leitire	Ancient (of semi-natural origin)
21	1193m S	Unknown	Long-Established (of plantation origin)
22	1224m E	Unknown	Ancient (of semi-natural origin)
23	1464m S	Unknown	Ancient (of semi-natural origin)
24	1464m SE	Unknown	Ancient (of semi-natural origin)
25	1471m SE	Unknown	Ancient (of semi-natural origin)
26	1521m S	Unknown	Other (on Roy map)
27	1525m E	Unknown	Ancient (of semi-natural origin)





ID	Location	Name	Woodland Type
28	1650m S	Unknown	Long-Established (of plantation origin)
29	1663m S	Unknown	Other (on Roy map)
30	1824m S	Unknown	Ancient (of semi-natural origin)
-	1828m E	Unknown	Ancient (of semi-natural origin)
32	1862m NE	Unknown	Ancient (of semi-natural origin)
-	2000m S	Unknown	Ancient (of semi-natural origin)

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 11.8 Biosphere Reserves

**Records within 2000m**

**0**

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 11.9 Forest Parks

**Records within 2000m**

**0**

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

*This data is sourced from the Forestry Commission.*

## 11.10 Marine Conservation Zones

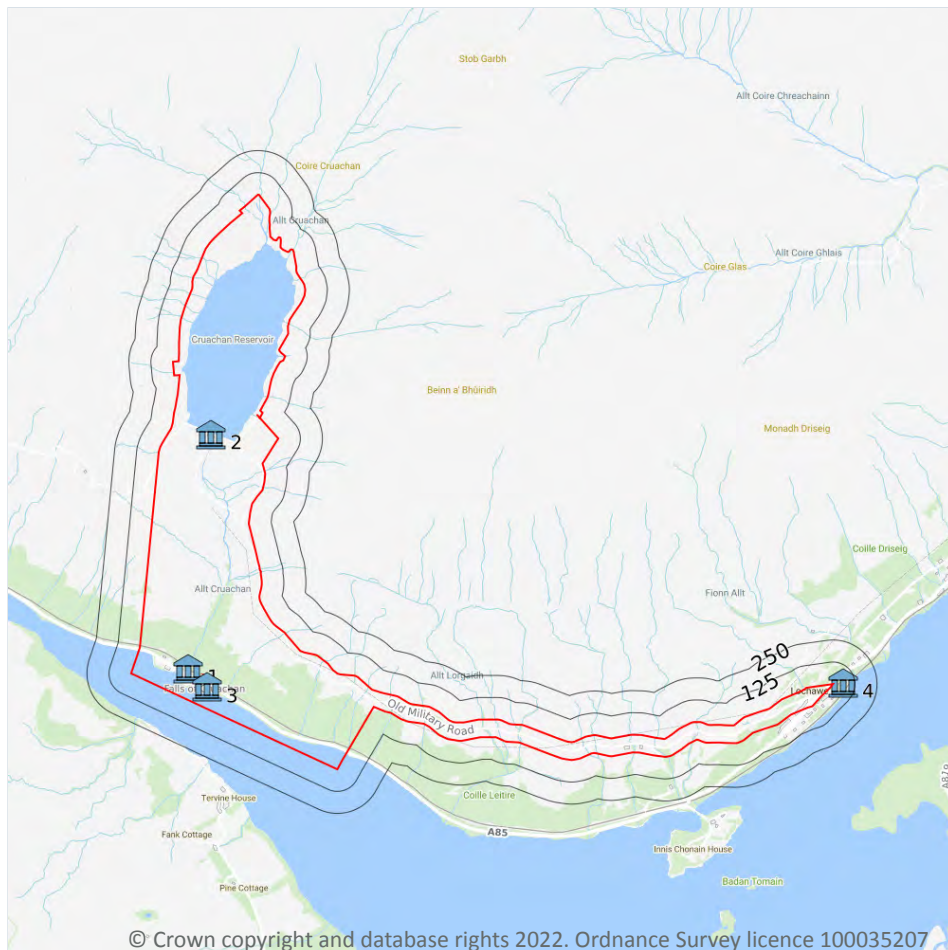
**Records within 2000m**

**0**

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 12 Visual and cultural designations



- Site Outline
- Search buffers in metres (m)
- Listed buildings
- Conservation areas
- Conservation areas - no data
- National Parks
- Areas of Outstanding Natural Beauty
- Registered parks and gardens
- Scheduled Monuments
- World Heritage Sites

### 12.1 World Heritage Sites

Records within 250m

0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

*This data is sourced from Historic England, Cadw and Historic Environment Scotland.*

## 12.2 Area of Outstanding Natural Beauty

Records within 250m

0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

*This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.*

## 12.3 National Parks

Records within 250m

0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

*This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.*

## 12.4 Listed Buildings

Records within 250m

4

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

Features are displayed on the Visual and cultural designations map on **page 53**

ID	Location	Name	Grade	Reference Number	Listed date
1	On site	Falls Of Cruachan Railway Viaduct, Argyll and Bute	A	399338	01/02/2007
2	On site	Cruachan Dam, Ben Cruachan Hydro Electric Scheme, Argyll and Bute	B	400598	11/02/2011
3	On site	Turbine Hall, Ben Cruachan Hydro Electric Scheme, Argyll and Bute	A	400599	11/02/2011
4	59m E	St Conan's Church, Lochawe, Argyll and Bute	A	335982	20/07/1971

*This data is sourced from Historic England, Cadw and Historic Environment Scotland.*





## 12.5 Conservation Areas

Records within 250m

0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

*This data is sourced from Historic England, Cadw and Historic Environment Scotland.*

## 12.6 Scheduled Ancient Monuments

Records within 250m

0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

*This data is sourced from Historic England, Cadw and Historic Environment Scotland.*

## 12.7 Registered Parks and Gardens

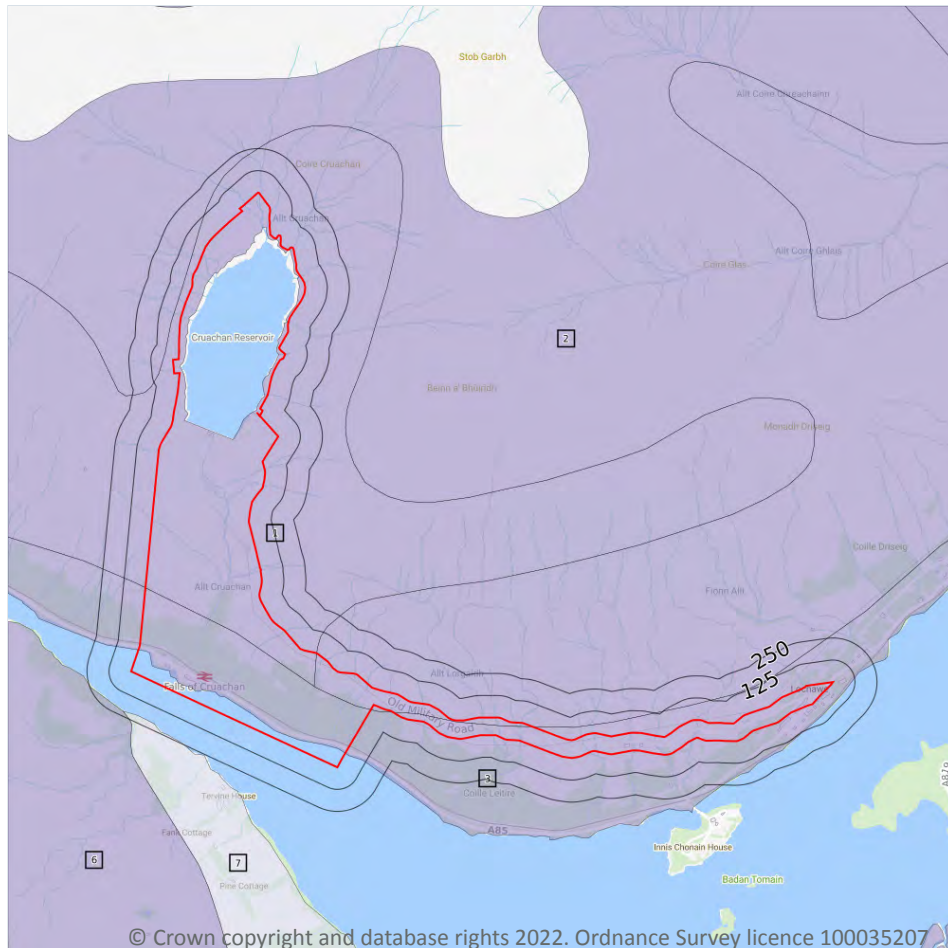
Records within 250m

0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

*This data is sourced from Historic England, Cadw and Historic Environment Scotland.*

## 13 Agricultural designations



- Site Outline
- Search buffers in metres (m)
- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 4 - good quality
- Grade 5 - moderate quality
- Grade 6 - poor quality
- Grade 7 - very poor quality

### 13.1 Agricultural Land Classification

Records within 250m

5

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 56**

ID	Location	Classification	Description
1	On site	Grade 6.3	Land Suited only to Improved Grassland and Rough Grazings
2	On site	Grade 6.2	Land Suited only to Improved Grassland and Rough Grazings
3	On site	Grade 6.1	Land Suited only to Improved Grassland and Rough Grazings

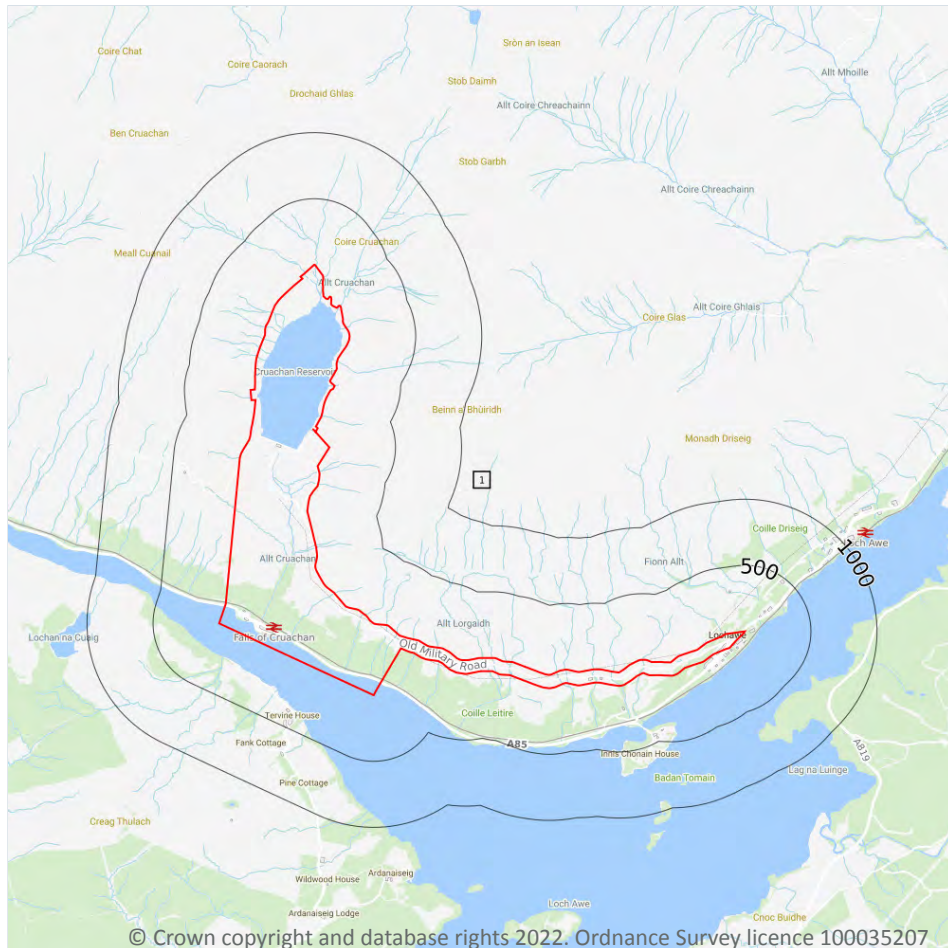
ID	Location	Classification	Description
6	208m SW	Grade 6.3	Land Suited only to Improved Grassland and Rough Grazings
7	210m SW	Grade 5.1	Land Suited only to Improved Grassland and Rough Grazings

*This data is sourced from the James Hutton Institute.*





## 14 Geology 1:10,000 scale - Availability



— Site Outline  
Search buffers in metres (m)

- Full coverage
- Partial coverage
- No coverage

### 14.1 10k Availability

Records within 500m

1

An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 58**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	No coverage	No coverage	No coverage	NoCov

*This data is sourced from the British Geological Survey.*



## Geology 1:10,000 scale - Artificial and made ground

### 14.2 Artificial and made ground (10k)

Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

*This data is sourced from the British Geological Survey.*



## Geology 1:10,000 scale - Superficial

### 14.3 Superficial geology (10k)

Records within 500m

0

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

*This data is sourced from the British Geological Survey.*

### 14.4 Landslip (10k)

Records within 500m

0

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

*This data is sourced from the British Geological Survey.*





## Geology 1:10,000 scale - Bedrock

### 14.5 Bedrock geology (10k)

Records within 500m

0

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

*This data is sourced from the British Geological Survey.*

### 14.6 Bedrock faults and other linear features (10k)

Records within 500m

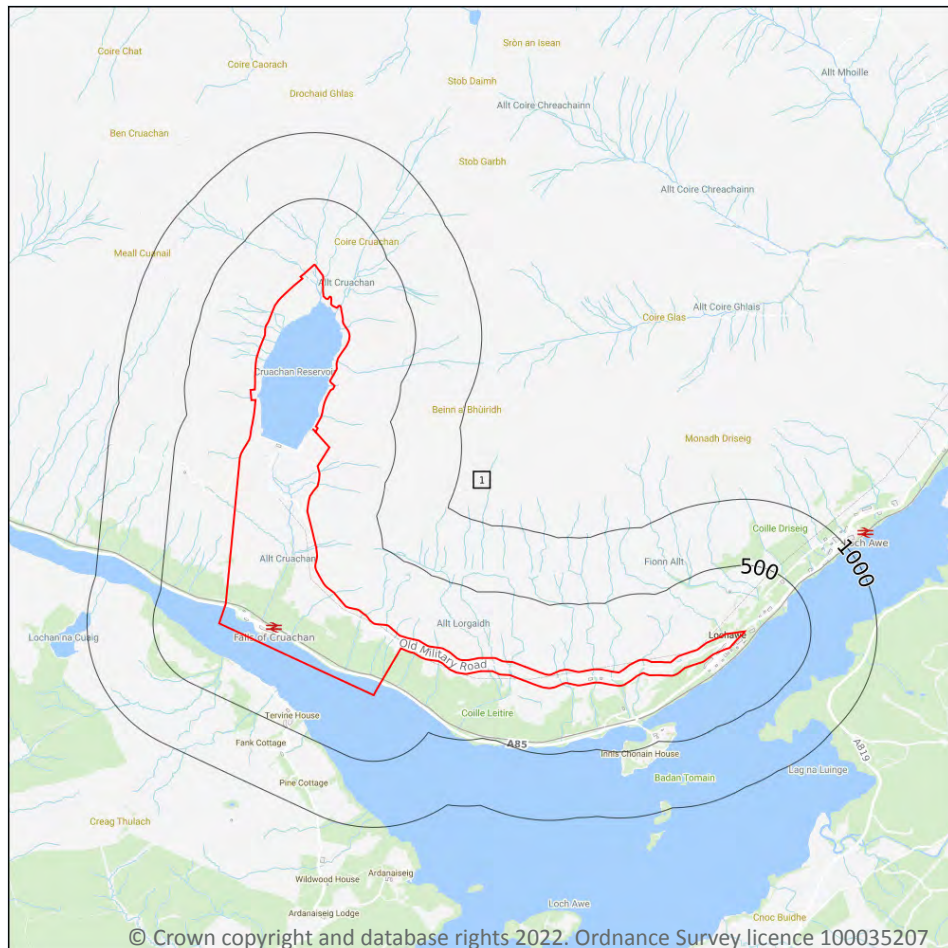
0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

*This data is sourced from the British Geological Survey.*



## 15 Geology 1:50,000 scale - Availability



— Site Outline  
Search buffers in metres (m)

☐ Geological map tile

### 15.1 50k Availability

Records within 500m

1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 62**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	On site	No coverage	Full	Full	No coverage	SC045e_Dalmally_v4

*This data is sourced from the British Geological Survey.*



## Geology 1:50,000 scale - Artificial and made ground

### 15.2 Artificial and made ground (50k)

Records within 500m

0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

*This data is sourced from the British Geological Survey.*

### 15.3 Artificial ground permeability (50k)

Records within 50m

0

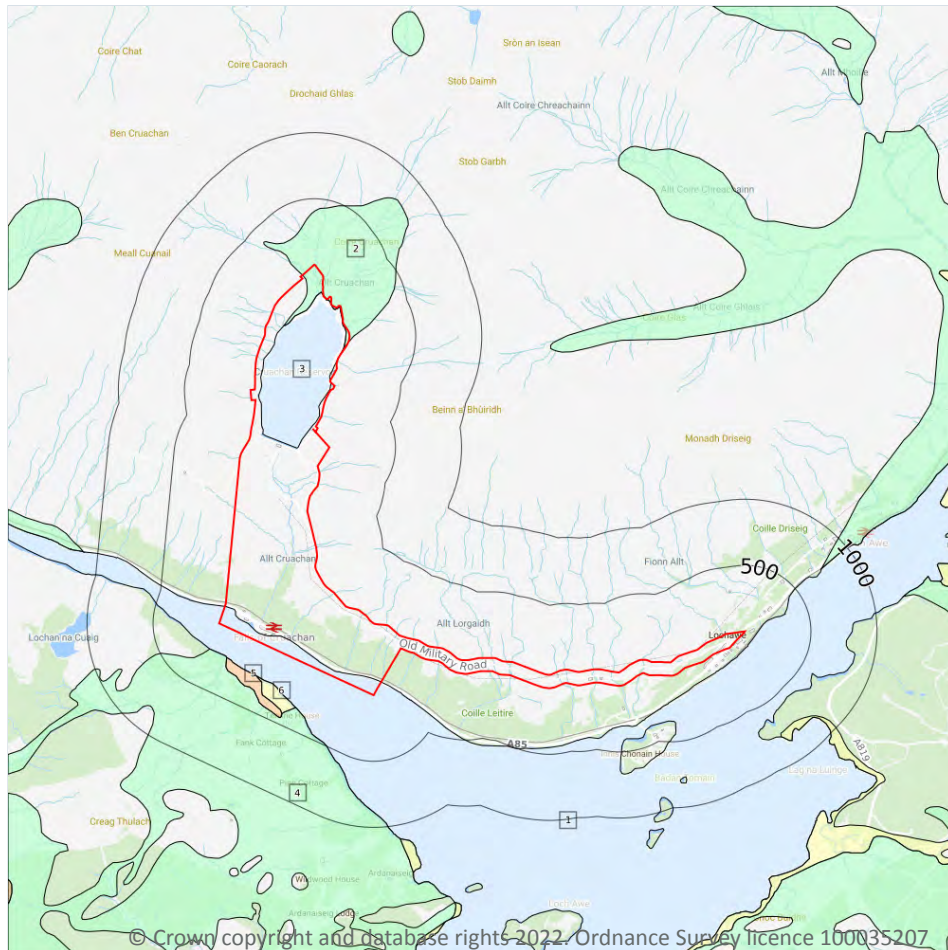
A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

*This data is sourced from the British Geological Survey.*





## Geology 1:50,000 scale - Superficial



**Site Outline**

Search buffers in metres (m)

**Landslip (50k)**

**Superficial geology (50k)**  
Please see table for more details.

### 15.4 Superficial geology (50k)

Records within 500m

6

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 64**

ID	Location	LEX Code	Description	Rock description
1	On site	SUPNM-WATR	SUPERFICIAL THEME NOT MAPPED [FOR DIGITAL MAP USE ONLY]	WATER, TYPE UNSPECIFIED
2	On site	HMGD-XDSV	HUMMOCKY (MOUNDY) GLACIAL DEPOSITS	DIAMICTON, SAND AND GRAVEL

ID	Location	LEX Code	Description	Rock description
3	On site	SUPNM-WATR	SUPERFICIAL THEME NOT MAPPED [FOR DIGITAL MAP USE ONLY]	WATER, TYPE UNSPECIFIED
4	202m SW	HMGD-XDSV	HUMMOCKY (MOUNDY) GLACIAL DEPOSITS	DIAMICTON, SAND AND GRAVEL
5	210m SW	RTDU-XVSZC	RIVER TERRACE DEPOSITS (UNDIFFERENTIATED)	GRAVEL, SAND, SILT AND CLAY
6	240m SW	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL

*This data is sourced from the British Geological Survey.*

## 15.5 Superficial permeability (50k)

<b>Records within 50m</b>	<b>1</b>
---------------------------	----------

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Mixed	High	Low

*This data is sourced from the British Geological Survey.*

## 15.6 Landslip (50k)

<b>Records within 500m</b>	<b>0</b>
----------------------------	----------

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

*This data is sourced from the British Geological Survey.*

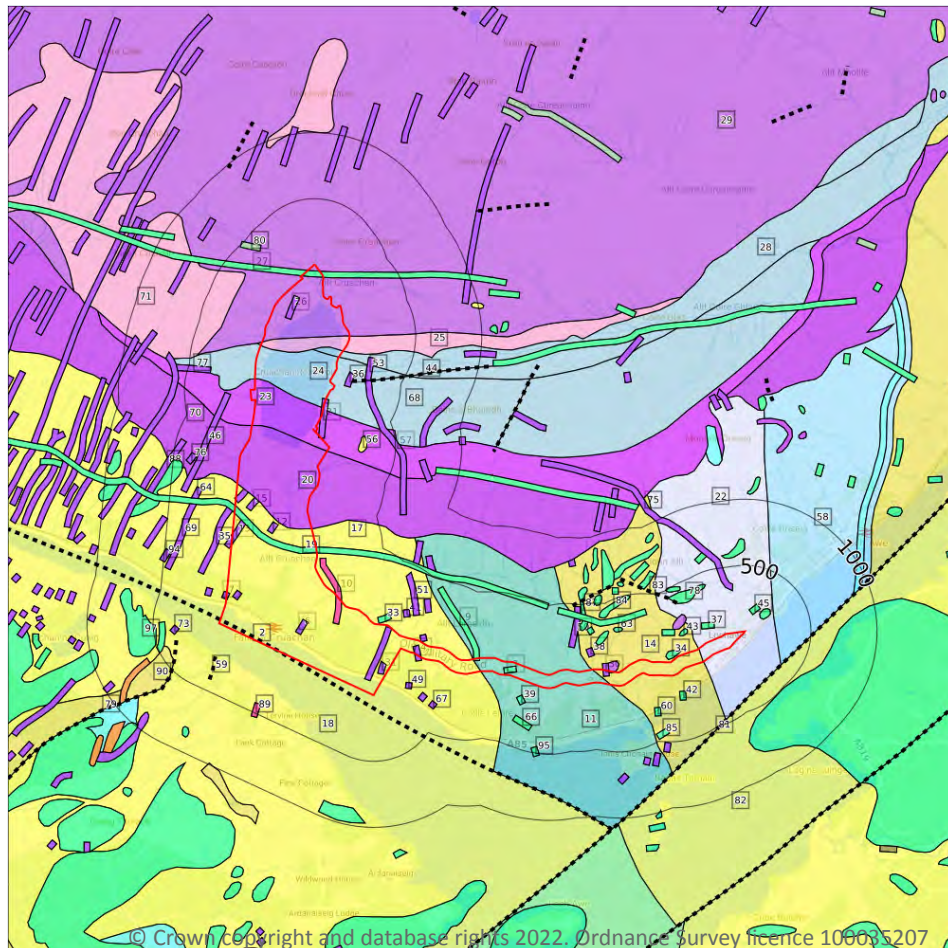
## 15.7 Landslip permeability (50k)

<b>Records within 50m</b>	<b>0</b>
---------------------------	----------

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

*This data is sourced from the British Geological Survey.*

## Geology 1:50,000 scale - Bedrock



- Site Outline
- Search buffers in metres (m)
- Bedrock faults and other linear features (50k)
- Bedrock geology (50k)  
Please see table for more details.

### 15.8 Bedrock geology (50k)

Records within 500m

92

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 66**

ID	Location	LEX Code	Description	Rock age
1	On site	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
3	On site	MDCRU-QMZDI	MONZODIORITE FACIES, CRUACHAN INTRUSION - QUARTZ-MONZODIORITE	-





ID	Location	LEX Code	Description	Rock age
4	On site	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
5	On site	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
6	On site	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
7	On site	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
8	On site	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
9	On site	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
10	On site	SDCAD-MCGNP	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICROGRANITE, PORPHYRITIC	-
11	On site	DBES-PELGP	EASDALE SLATE FORMATION - PELITE, GRAPHITIC	-
12	On site	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
13	On site	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
14	On site	DBCM-QZITE	CARN MAIRG QUARTZITE FORMATION - QUARTZITE	-
15	On site	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
16	On site	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
17	On site	DBAP-QMPS	ARDRISHAIG PHYLLITE FORMATION - QUARTZITE, METALIMESTONE AND PHYLLITIC SEMIPELITE	-
18	On site	DBAP-QMPS	ARDRISHAIG PHYLLITE FORMATION - QUARTZITE, METALIMESTONE AND PHYLLITIC SEMIPELITE	-
19	On site	CSTD-MCQGB	CENTRAL SCOTLAND LATE CARBONIFEROUS THOLEIITIC DYKE SWARM - QUARTZ-MICROGABBRO	-
20	On site	QARRY-QDI	QUARRY INTRUSION - QUARTZ-DIORITE	-
21	On site	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
22	On site	DBIQ-SEMPEL	ISLAY QUARTZITE - SEMIPELITE	-



ID	Location	LEX Code	Description	Rock age
23	On site	QARRY-DI	QUARRY INTRUSION - DIORITE	-
24	On site	LPVO-ANDB	LORN PLATEAU VOLCANIC FORMATION - ANDESITE AND BASALT	-
25	On site	MLODR-MZGN	MEALL ODHAR INTRUSION - MONZOGRANITE	-
26	On site	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
27	On site	CSTD-MCQGB	CENTRAL SCOTLAND LATE CARBONIFEROUS THOLEIITIC DYKE SWARM - QUARTZ-MICROGABBRO	-
28	On site	LPVO-ANDB	LORN PLATEAU VOLCANIC FORMATION - ANDESITE AND BASALT	-
29	On site	MDCRU-QMZDI	MONZODIORITE FACIES, CRUACHAN INTRUSION - QUARTZ-MONZODIORITE	-
30	On site	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
31	On site	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
32	2m NE	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
33	8m N	CSTD-MCQGB	CENTRAL SCOTLAND LATE CARBONIFEROUS THOLEIITIC DYKE SWARM - QUARTZ-MICROGABBRO	-
34	15m NW	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
35	16m W	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
36	74m E	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
37	80m NW	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
38	97m N	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
39	108m S	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
40	109m W	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
41	126m NE	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-



ID	Location	LEX Code	Description	Rock age
42	130m S	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
43	134m N	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
45	141m NE	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
46	152m W	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
47	155m NE	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
48	157m N	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
49	165m SE	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
50	173m N	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
51	176m N	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
52	184m N	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
53	189m SE	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
54	193m N	MDCRU-QMZDI	MONZODIORITE FACIES, CRUACHAN INTRUSION - QUARTZ-MONZODIORITE	-
55	217m N	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
56	218m E	DBAP-QMPS	ARDRISHAIG PHYLLITE FORMATION - QUARTZITE, METALIMESTONE AND PHYLLITIC SEMIPELITE	-
57	231m E	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
58	232m E	DALS-PESP	LEVEN SCHIST FORMATION - PELITE AND SEMIPELITE	-
60	243m S	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
61	250m S	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
62	252m SE	LPVO-ANDB	LORN PLATEAU VOLCANIC FORMATION - ANDESITE AND BASALT	-





ID	Location	LEX Code	Description	Rock age
63	259m NW	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
64	259m W	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
65	263m N	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
66	267m S	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
67	271m SW	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
68	275m E	LPVO-ANDB	LORN PLATEAU VOLCANIC FORMATION - ANDESITE AND BASALT	-
69	292m W	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
70	293m W	QARRY-QDI	QUARRY INTRUSION - QUARTZ-DIORITE	-
71	298m NW	MLODR-MZGN	MEALL ODHAR INTRUSION - MONZOGRANITE	-
72	304m N	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
73	306m W	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
74	310m N	CSTD-MCQGB	CENTRAL SCOTLAND LATE CARBONIFEROUS THOLEIITIC DYKE SWARM - QUARTZ-MICROGABBRO	-
75	318m N	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
76	324m W	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
77	330m NW	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
78	341m NW	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
80	362m NW	CSTD-CAMO	CENTRAL SCOTLAND LATE CARBONIFEROUS THOLEIITIC DYKE SWARM - CAMPTONITE AND MONCHIQUE	-
82	363m SE	DBAP-QMPS	ARDRISHAIG PHYLLITE FORMATION - QUARTZITE, METALIMESTONE AND PHYLLITIC SEMIPELITE	-
84	390m N	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-



ID	Location	LEX Code	Description	Rock age
85	398m S	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
86	410m W	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
87	415m N	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
88	421m W	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
89	422m SW	SDCAD-MCGNP	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICROGRANITE, PORPHYRITIC	-
90	425m SW	DBCR-QZITE	CRINAN GRIT FORMATION - QUARTZITE	-
91	426m W	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
92	433m N	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
93	447m NW	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
94	449m W	SDCAD-MDADR	NORTH BRITAIN SILURO-DEVONIAN CALC-ALKALINE DYKE SUITE - MICRODIORITE AND APPINITIC DIORITIC-ROCK	-
95	449m S	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
96	461m E	QARRY-DI	QUARRY INTRUSION - DIORITE	-
97	478m W	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-
98	484m N	DALN-MGMG	DALRADIAN SUPERGROUP - METAGABBRO AND METAMICROGABBRO	-

*This data is sourced from the British Geological Survey.*

## 15.9 Bedrock permeability (50k)



**Records within 50m**

**35**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	Fracture	Low	Low




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Location	Flow type	Maximum permeability	Minimum permeability
On site	Fracture	Moderate	Low
On site	Fracture	Low	Low
2m SE	Fracture	Low	Low
8m SE	Fracture	Low	Low
15m E	Fracture	Low	Low
16m W	Fracture	Low	Low

*This data is sourced from the British Geological Survey.*

## 15.10 Bedrock faults and other linear features (50k)

Records within 500m

7

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

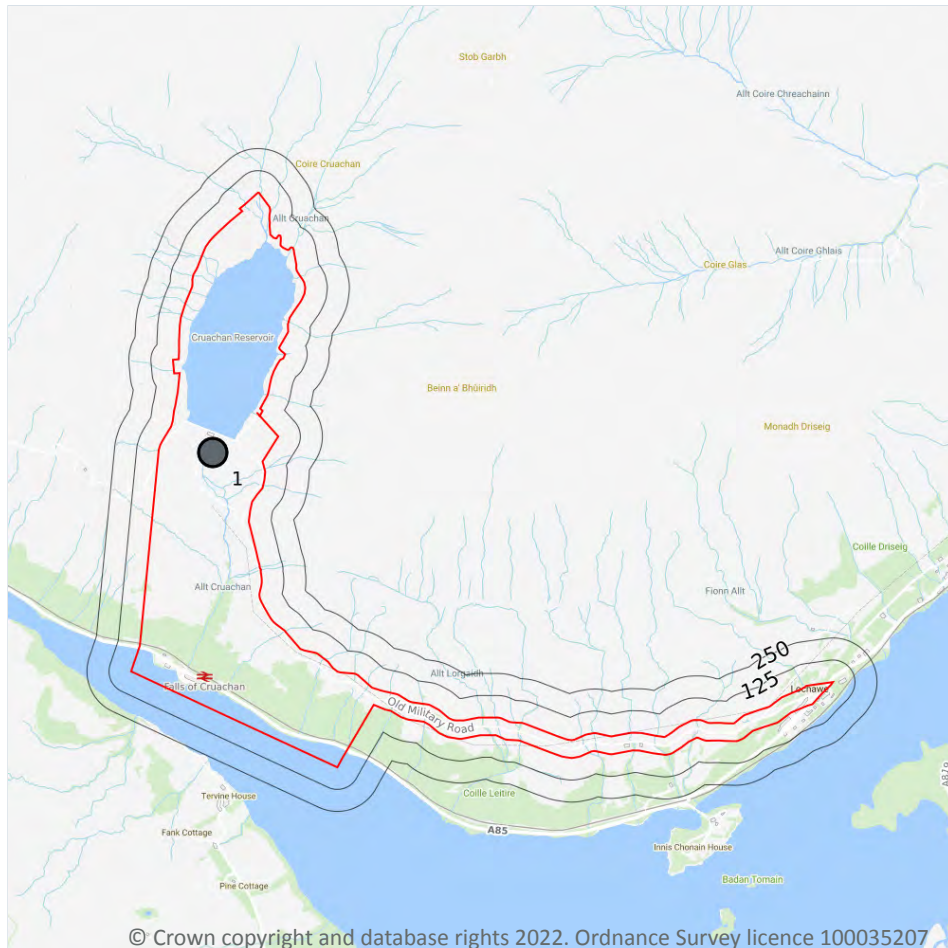
Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 66**

ID	Location	Category	Description
2	On site	FAULT	Fault, inferred, displacement unknown
44	138m E	FAULT	Fault, inferred, displacement unknown
59	239m SW	FAULT	Fault, inferred, displacement unknown
79	342m W	FAULT	Reverse or thrust fault, inferred
81	363m SE	FAULT	Fault, inferred, displacement unknown
83	370m NW	FAULT	Fault, inferred, displacement unknown
99	487m N	FAULT	Fault, inferred, displacement unknown

*This data is sourced from the British Geological Survey.*



## 16 Boreholes



— Site Outline  
Search buffers in metres (m)

- Confidential
- 0 - 10m
- 10 - 30m
- 30m+
- Unknown

### 16.1 BGS Boreholes

#### Records within 250m

1

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

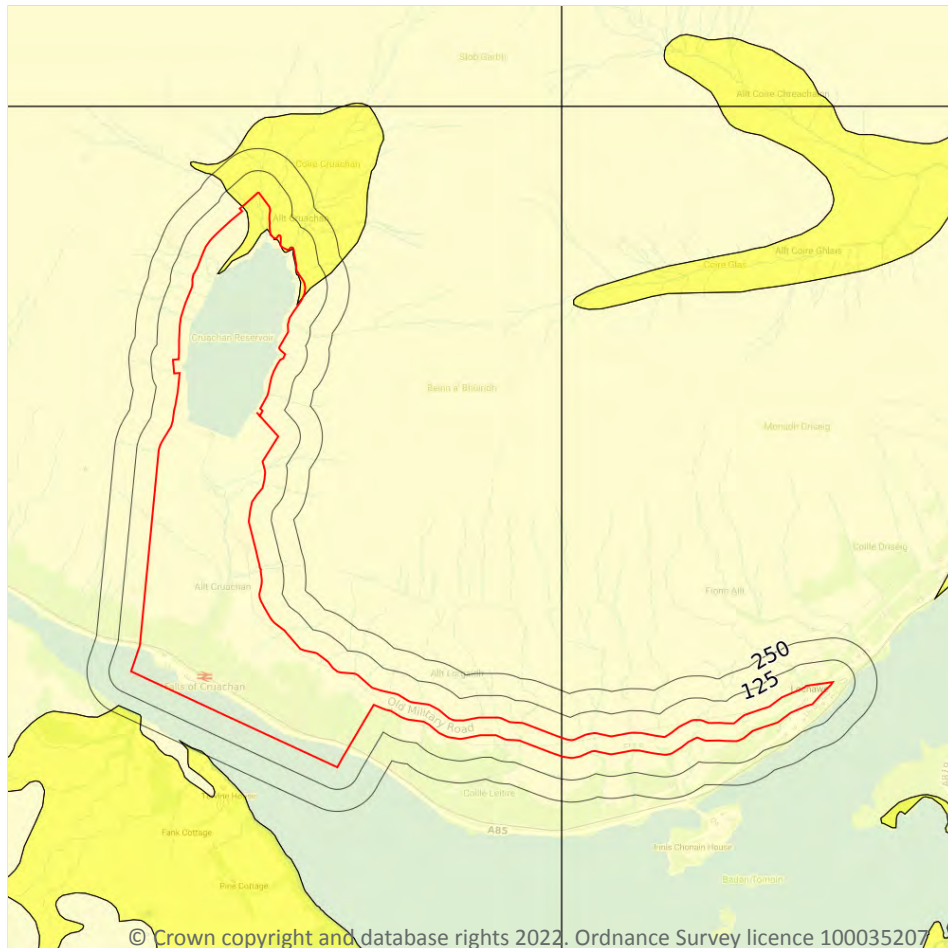
Features are displayed on the Boreholes map on **page 74**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	On site	208021 728037	CRUACHAN 1	-	Y	N/A

*This data is sourced from the British Geological Survey.*



## 17 Natural ground subsidence - Shrink swell clays



— Site Outline  
Search buffers in metres (m)

- ☐ No data
- ☐ Negligible
- ☐ Very low
- ☐ Low
- ☐ Moderate
- ☐ High

### 17.1 Shrink swell clays

Records within 50m

2

The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 75**

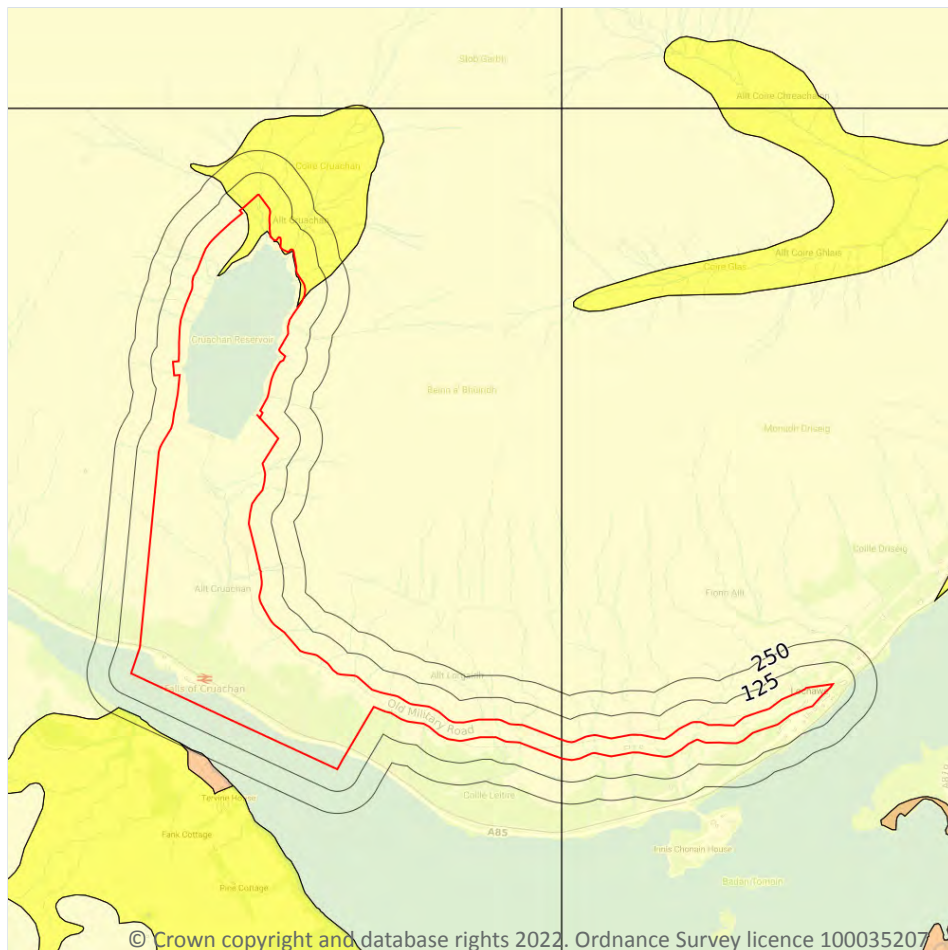
Location	Hazard rating	Details
On site	Negligible	Ground conditions predominantly non-plastic.
On site	Very low	Ground conditions predominantly low plasticity.

*This data is sourced from the British Geological Survey.*





## Natural ground subsidence - Running sands



- Site Outline
- Search buffers in metres (m)
- ☐ No data
  - ☐ Negligible
  - ☐ Very low
  - ☐ Low
  - ☐ Moderate
  - ☐ High

### 17.2 Running sands

#### Records within 50m

2

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

Features are displayed on the Natural ground subsidence - Running sands map on **page 76**

Location	Hazard rating	Details
On site	Negligible	Running sand conditions are not thought to occur whatever the position of the water table. No identified constraints on lands use due to running conditions.

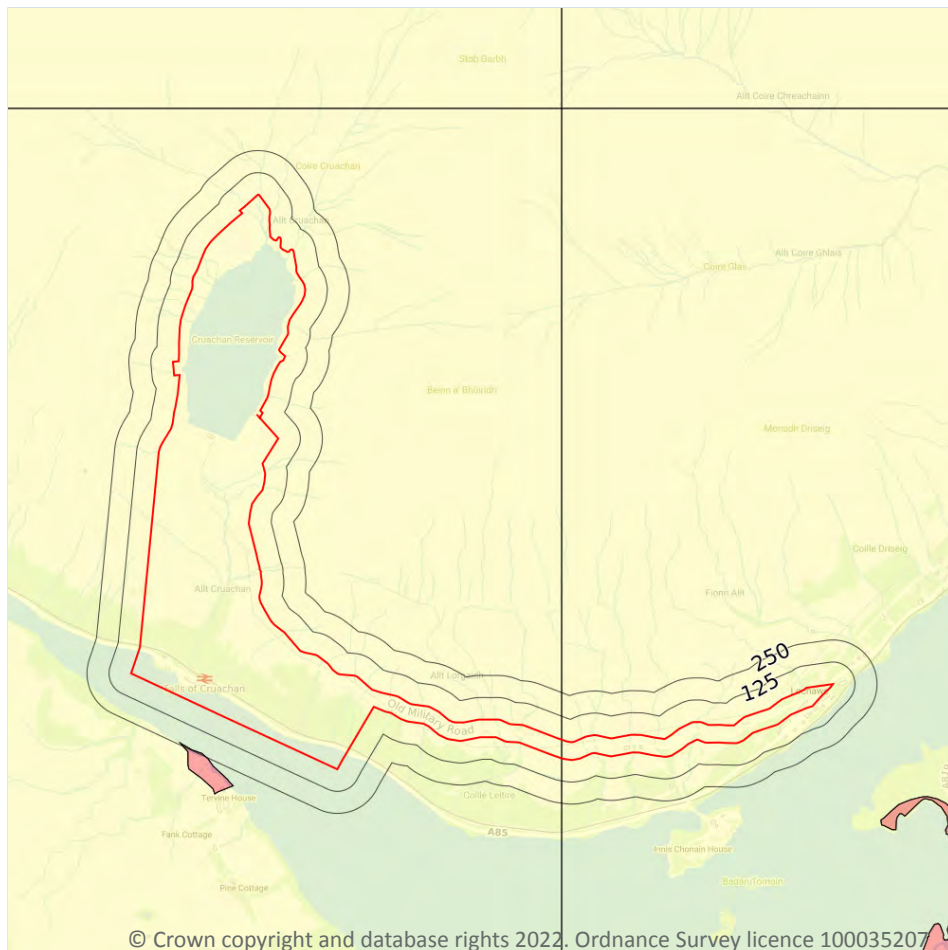


Location	Hazard rating	Details
On site	Very low	Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.

*This data is sourced from the British Geological Survey.*



## Natural ground subsidence - Compressible deposits



— Site Outline  
Search buffers in metres (m)

- ☐ No data
- ☐ Negligible
- ☐ Very low
- ☐ Low
- ☐ Moderate
- ☐ High

### 17.3 Compressible deposits

#### Records within 50m

1

The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 78**

Location	Hazard rating	Details
On site	Negligible	Compressible strata are not thought to occur.

*This data is sourced from the British Geological Survey.*





Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

250



125

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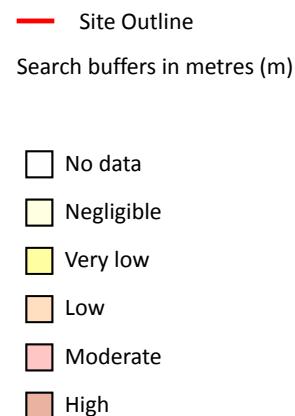
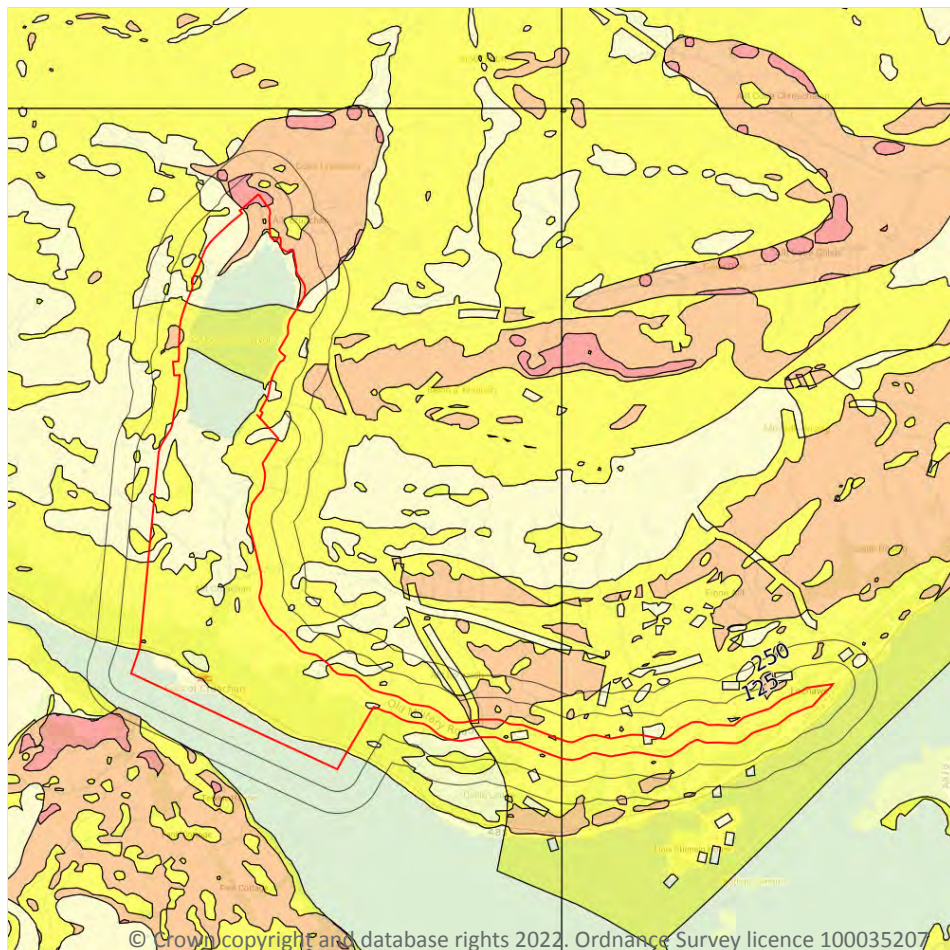
Records within 50m	2
--------------------	---

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 79**

Location	Hazard rating	Details
On site	Negligible	Deposits with potential to collapse when loaded and saturated are believed not to be present.
On site	Very low	Deposits with potential to collapse when loaded and saturated are unlikely to be present.


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## Natural ground subsidence - Landslides



### 17.5 Landslides

#### Records within 50m

15

The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 80**

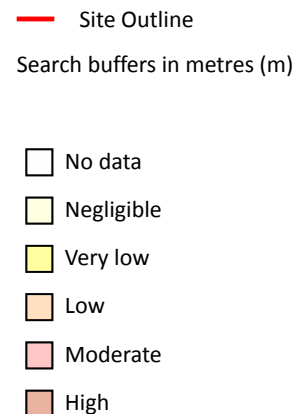
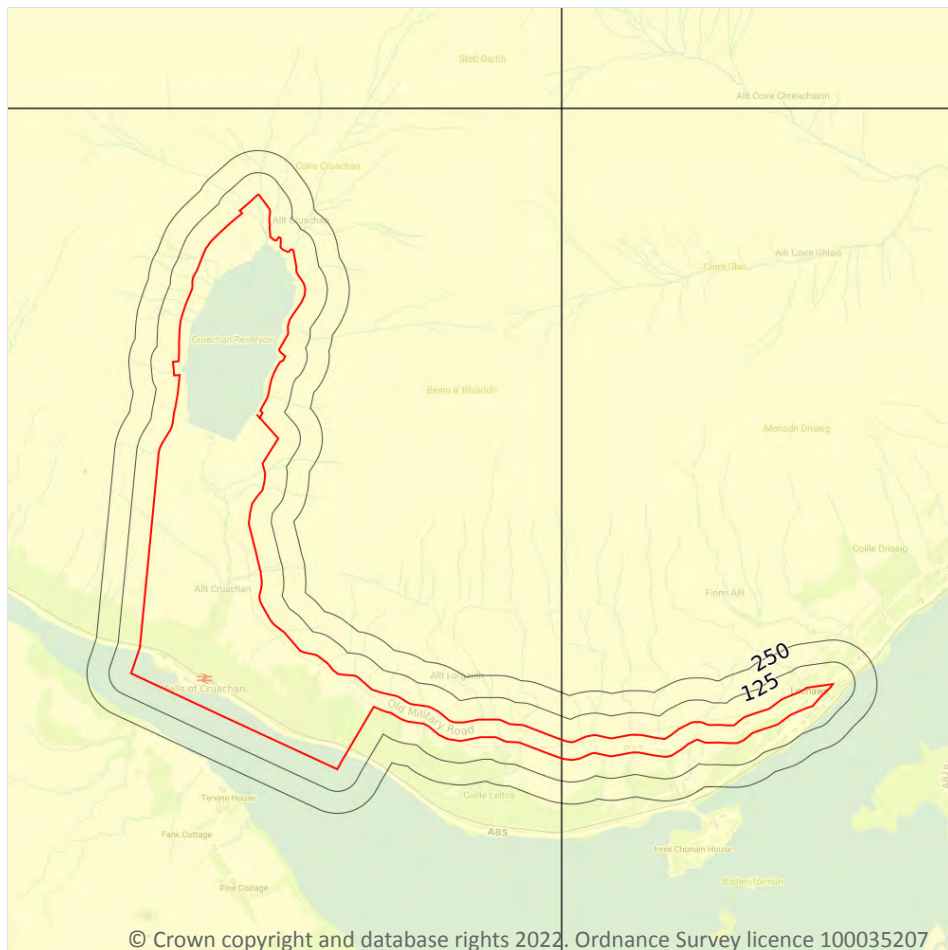
Location	Hazard rating	Details
On site	Negligible	Slope instability problems are not thought to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

Location	Hazard rating	Details
On site	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
On site	Low	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.
On site	Moderate	Slope instability problems are probably present or have occurred in the past. Land use should consider specifically the stability of the site.
15m NW	Negligible	Slope instability problems are not thought to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
15m S	Low	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.
29m N	Low	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.
32m S	Low	Slope instability problems may be present or anticipated. Site investigation should consider specifically the slope stability of the site.
35m W	Negligible	Slope instability problems are not thought to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
39m N	Negligible	Slope instability problems are not thought to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
40m NE	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
42m N	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
43m NE	Negligible	Slope instability problems are not thought to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
47m N	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.
49m W	Very low	Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.

*This data is sourced from the British Geological Survey.*



## Natural ground subsidence - Ground dissolution of soluble rocks



### 17.6 Ground dissolution of soluble rocks

#### Records within 50m

1

The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 82**

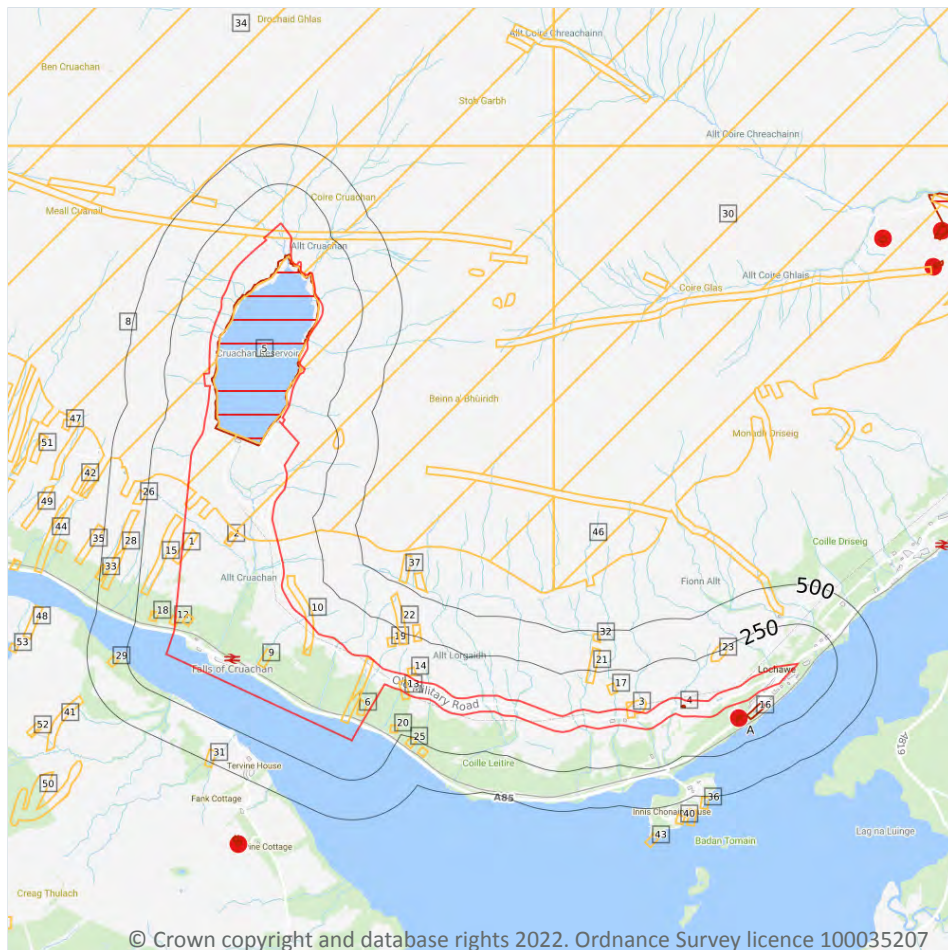
Location	Hazard rating	Details
On site	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.

*This data is sourced from the British Geological Survey.*





## 18 Mining, ground workings and natural cavities



- Site Outline
- Search buffers in metres (m)
- Natural cavities (Area)
- Natural cavities (Point)
- BritPits
- Surface ground workings
- Underground workings
- Historical Mineral Planning Areas
- Mining Cavities
- Non Coal Mining
- Sporadic underground mining of restricted extent possible
- Localised small scale underground mining possible
- Small scale mining possible
- Underground mining known or likely within or in close proximity
- Underground mining known within or in very close proximity

### 18.1 Natural cavities

Records within 500m

0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

*This data is sourced from Stantec UK Ltd.*

## 18.2 BritPits

### Records within 500m

**1**

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

Features are displayed on the Mining, ground workings and natural cavities map on **page 83**

ID	Location	Details	Description
A	89m S	Name: Creag a 'Chuil Address: Lochawe, OBAN, Argyll and Bute Commodity: Igneous & Metamorphic Rock Status: Ceased	Type: A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site Status description: Site which, at date of entry, has ceased to extract minerals. May be considered as Closed by operator. May be considered to have Active, Dormant or Expired planning permissions by Mineral Planning Authority

*This data is sourced from the British Geological Survey.*

## 18.3 Surface ground workings

### Records within 250m

**4**

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 83**

ID	Location	Land Use	Year of mapping	Mapping scale
4	On site	Unspecified Disused Pit	1976	1:10000
5	On site	Reservoir	1973	1:10000
16	62m SE	Sewage Works	1976	1:10000
A	76m S	Unspecified Disused Quarry	1976	1:10000

*This data is sourced from Ordnance Survey/Groundsure.*

## 18.4 Underground workings

### Records within 1000m

**0**

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

*This data is sourced from Ordnance Survey/Groundsure.*



## 18.5 Historical Mineral Planning Areas

Records within 500m

0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

*This data is sourced from the British Geological Survey.*

## 18.6 Non-coal mining

Records within 1000m

51

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

Features are displayed on the Mining, ground workings and natural cavities map on **page 83**

ID	Location	Name	Commodity	Class	Likelihood
1	On site	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
2	On site	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
3	On site	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
6	On site	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
7	On site	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
8	On site	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered



ID	Location	Name	Commodity	Class	Likelihood
9	On site	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
10	On site	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
11	On site	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
12	On site	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
13	On site	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
14	2m NE	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
15	16m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
17	97m N	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
18	109m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
19	126m NE	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered





ID	Location	Name	Commodity	Class	Likelihood
20	165m SE	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
21	173m N	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
22	176m N	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
23	193m N	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
24	217m N	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
25	250m S	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
26	259m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
27	271m SW	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
28	292m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
29	306m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered



ID	Location	Name	Commodity	Class	Likelihood
30	318m N	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
31	422m SW	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
32	433m N	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
33	449m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
34	490m N	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
35	500m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
36	504m S	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
37	516m N	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
38	529m NE	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
39	564m SE	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered



ID	Location	Name	Commodity	Class	Likelihood
40	568m S	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
41	603m SW	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
42	611m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
43	661m S	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
44	709m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
45	730m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
46	732m N	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
47	785m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
48	832m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
49	840m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered



ID	Location	Name	Commodity	Class	Likelihood
50	865m SW	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
51	913m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
52	918m SW	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
53	934m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered
54	982m W	Not available	Vein Mineral	B	Localised small scale underground mining may have occurred. Potential for difficult ground conditions are unlikely or localised and are at a level where they need not be considered

*This data is sourced from the British Geological Survey.*

## 18.7 Mining cavities

**Records within 1000m**

**0**

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

*This data is sourced from Stantec UK Ltd.*

## 18.8 JPB mining areas

**Records on site**

**0**

Areas which could be affected by former coal and other mining. This data includes some mine plans unavailable to the Coal Authority.

*This data is sourced from Johnson Poole and Bloomer.*





## 18.9 Coal mining

Records on site	0
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Areas which could be affected by past, current or future coal mining.

*This data is sourced from the Coal Authority.*

## 18.10 Brine areas

Records on site	0
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The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

*This data is sourced from the Cheshire Brine Subsidence Compensation Board.*

## 18.11 Gypsum areas

Records on site	0
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Generalised areas that may be affected by gypsum extraction.

*This data is sourced from British Gypsum.*

## 18.12 Tin mining

Records on site	0
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Generalised areas that may be affected by historical tin mining.

*This data is sourced from Groundsure.*

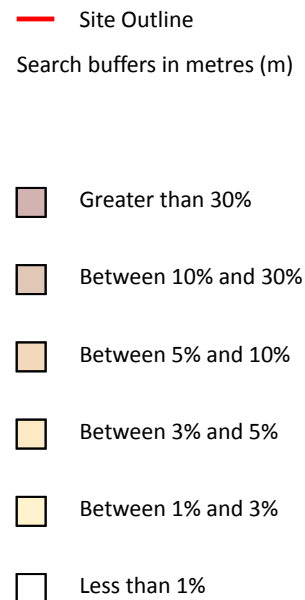
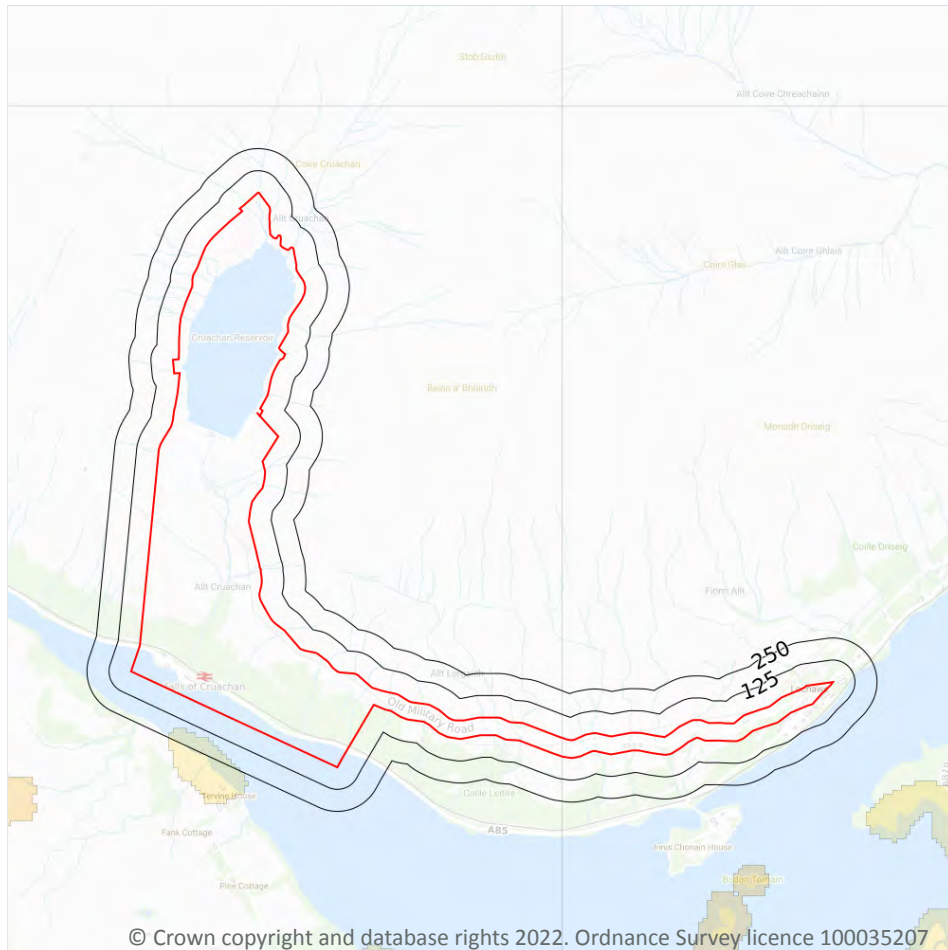
## 18.13 Clay mining

Records on site	0
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Generalised areas that may be affected by kaolin and ball clay extraction.

*This data is sourced from the Kaolin and Ball Clay Association (UK).*

## 19 Radon



### 19.1 Radon

#### Records on site

1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 92**

Location	Estimated properties affected	Radon Protection Measures required
On site	Less than 1%	None**

*This data is sourced from the British Geological Survey and Public Health England.*



## 20 Soil chemistry

### 20.1 BGS Estimated Background Soil Chemistry

Records within 50m

141

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km<sup>2</sup>. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km<sup>2</sup>; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 - 25 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 - 25 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg



Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg





Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg



Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg



Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg



Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg





Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 mg/kg



Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
On site	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
2m SE	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
3m N	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
8m SE	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
9m E	15 - 25 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
15m E	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	40 - 60 mg/kg	15 - 30 mg/kg
15m E	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
16m W	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
31m N	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	20 - 40 mg/kg	15 - 30 mg/kg
33m N	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg
35m SE	15 mg/kg	-	100 mg/kg	60 mg/kg	No data	60 - 90 mg/kg	15 - 30 mg/kg

*This data is sourced from the British Geological Survey.*



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08444 159 000

Date: 7 April 2022

100

## 20.2 BGS Estimated Urban Soil Chemistry

Records within 50m

0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km<sup>2</sup>).

*This data is sourced from the British Geological Survey.*

## 20.3 BGS Measured Urban Soil Chemistry

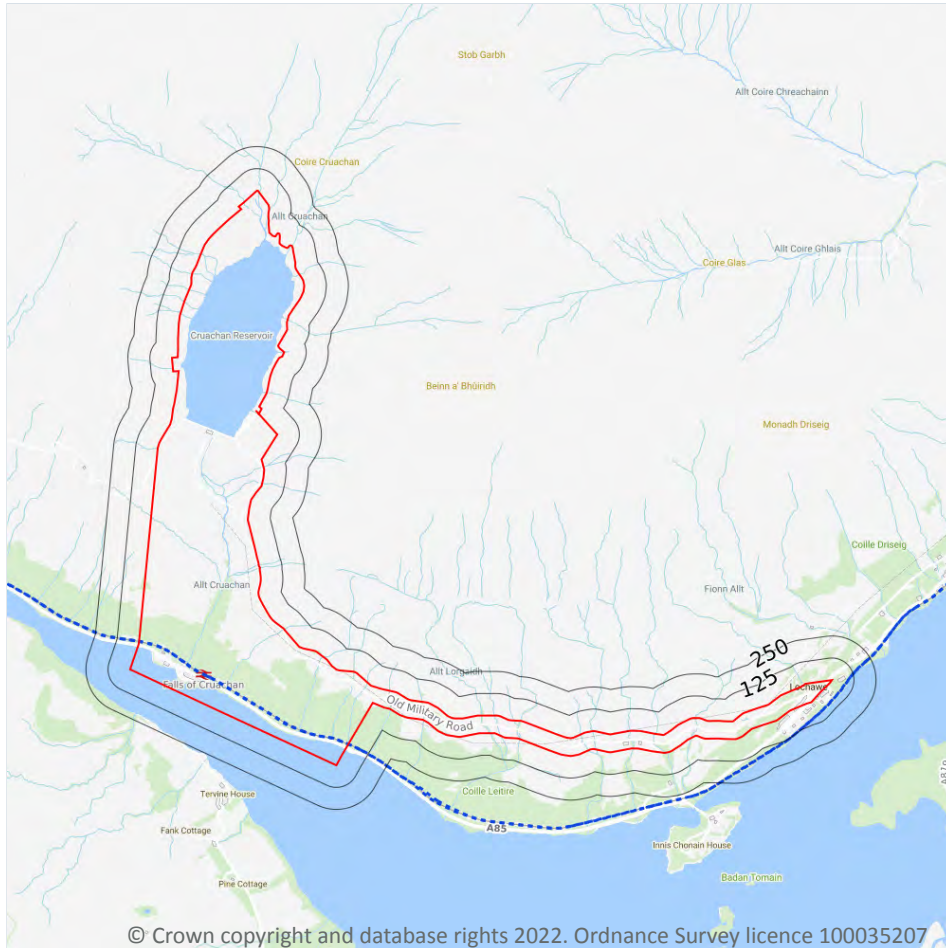
Records within 50m

0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km<sup>2</sup>.

*This data is sourced from the British Geological Survey.*

## 21 Railway infrastructure and projects



- Site Outline
- Search buffers in metres (m)
- C1 Crossrail 1 Stations
- Crossrail 1 Route
- Crossrail 1 Worksites
- C2 Crossrail 2 Stations
- Crossrail 2 Route
- Crossrail 2 Worksites
- Crossrail 2 Safeguarding
- Crossrail 2 Headhouses
- Railway stations
- Active railways
- Active tunnels
- Abandoned railways
- Historic railways
- Historic tunnels
- Underground stations
- Underground Lines
- Royal Mail tunnels
- HS2 optimised route
- HS2 Stations
- HS2 Depots
- HS2 Surface Safeguarding
- HS2 Subsurface Safeguarding

### 21.1 Underground railways (London)

Records within 250m

0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

*This data is sourced from publicly available information by Groundsure.*

### 21.2 Underground railways (Non-London)

Records within 250m

0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.





*This data is sourced from publicly available information by Groundsure.*

### 21.3 Railway tunnels

Records within 250m

0

Railway tunnels taken from contemporary Ordnance Survey mapping.

*This data is sourced from the Ordnance Survey.*

### 21.4 Historical railway and tunnel features

Records within 250m

0

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

*This data is sourced from Ordnance Survey/Groundsure.*

### 21.5 Royal Mail tunnels

Records within 250m

0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

*This data is sourced from Groundsure/the Postal Museum.*

### 21.6 Historical railways

Records within 250m

0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

*This data is sourced from OpenStreetMap.*

### 21.7 Railways

Records within 250m

30

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways. Features are displayed on the Railway infrastructure and projects map on **page 102**



Location	Name	Type
On site	West Highland Line	rail
On site	West Highland Line	rail
On site	West Highland Line	rail
On site	Not given	Single Track
On site	Not given	Single Track
On site	Not given	Single Track
On site	Not given	Single Track
On site	Not given	Single Track
On site	Not given	Single Track
On site	Not given	Single Track
On site	Not given	Single Track
On site	Not given	Single Track
On site	Not given	Single Track
5m W	Not given	Single Track
21m SE	Not given	Single Track
72m SE	Not given	Single Track
75m SE	Not given	Single Track
75m SE	West Highland Line	rail
77m SE	Not given	Single Track
103m W	Not given	Single Track
103m SE	Not given	Single Track
107m E	Not given	Single Track
111m SE	Not given	Single Track
119m E	Not given	Single Track
123m E	Not given	Single Track
141m E	Not given	Single Track
154m SE	Not given	Single Track
213m NE	Not given	Single Track



Location	Name	Type
225m NE	Not given	Single Track
249m NE	Not given	Single Track

*This data is sourced from Ordnance Survey and OpenStreetMap.*

## 21.8 Crossrail 1

**Records within 500m**

**0**

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

*This data is sourced from publicly available information by Groundsure.*

## 21.9 Crossrail 2

**Records within 500m**

**0**

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

*This data is sourced from publicly available information by Groundsure.*

## 21.10 HS2

**Records within 500m**

**0**

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

*This data is sourced from HS2 Ltd.*

## Data providers

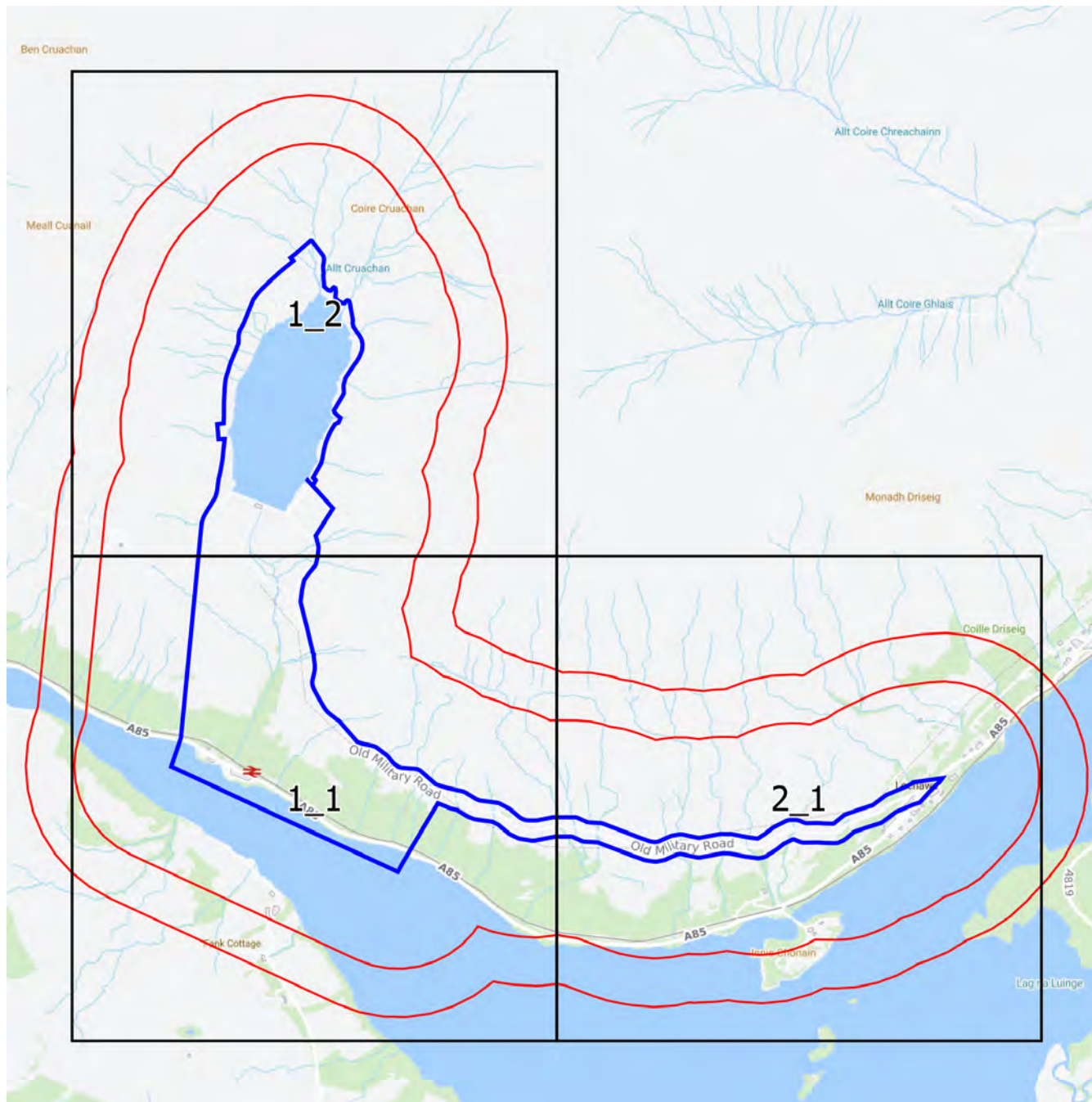
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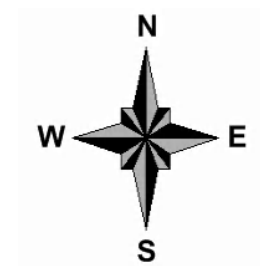






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## Small Scale Grid Index





#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_SS\_1\_1  
**Grid Ref:** 208298, 726632

**Map Name:** County Series

**Map date:** 1870

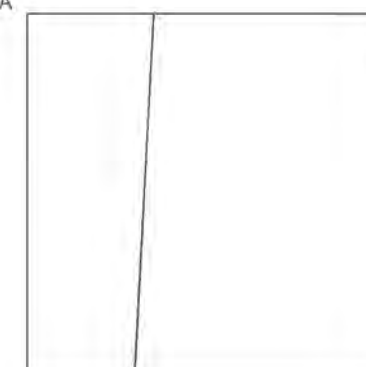
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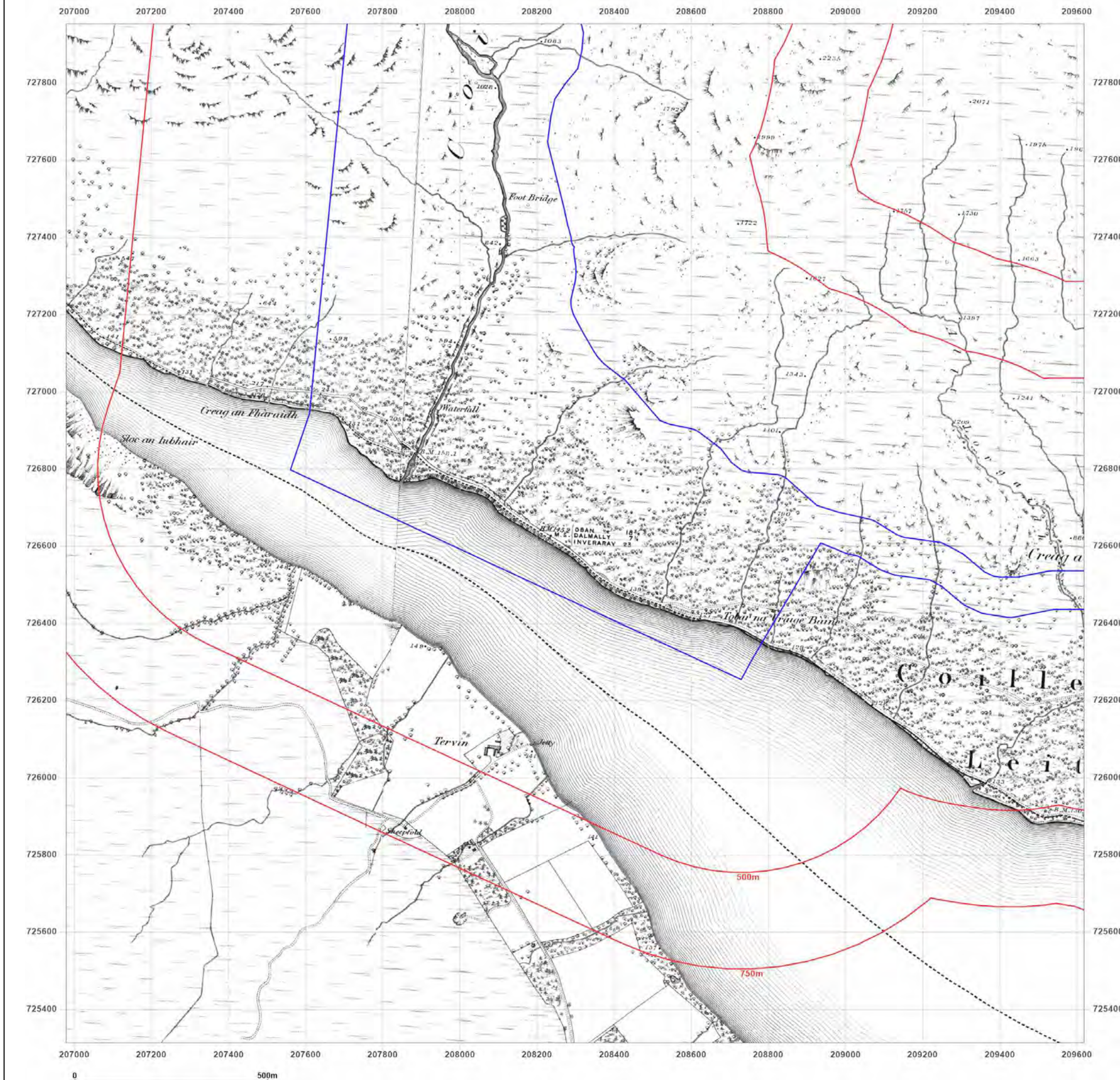


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**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_SS\_1\_1  
**Grid Ref:** 208298, 726632

**Map Name:** County Series

**Map date:** 1900

**Scale:** 1:10,560

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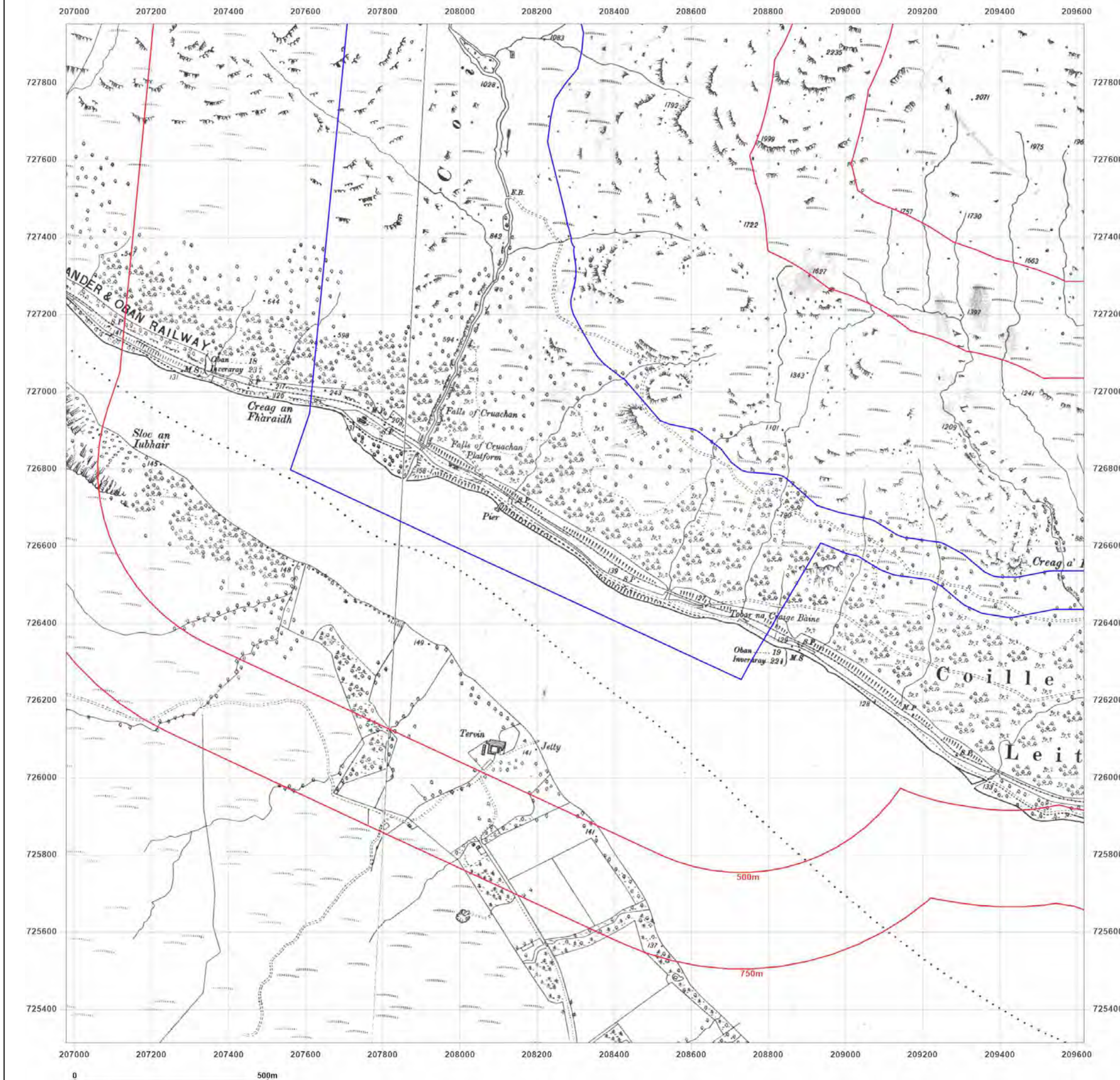


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**Report Ref:** GSIP-2022-12632-9902\_SS\_1\_1  
**Grid Ref:** 208298, 726632

**Map Name:** National Grid

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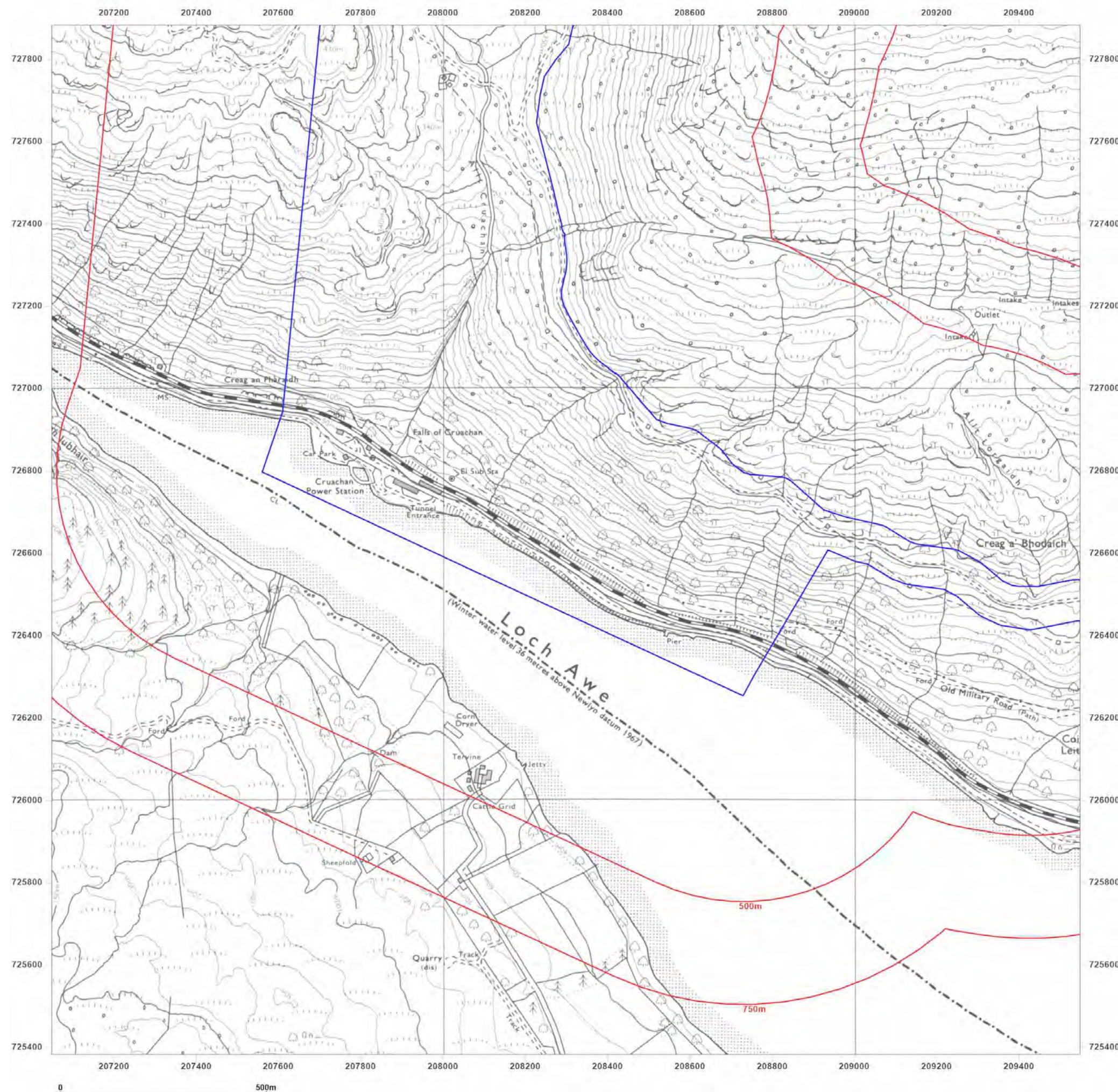


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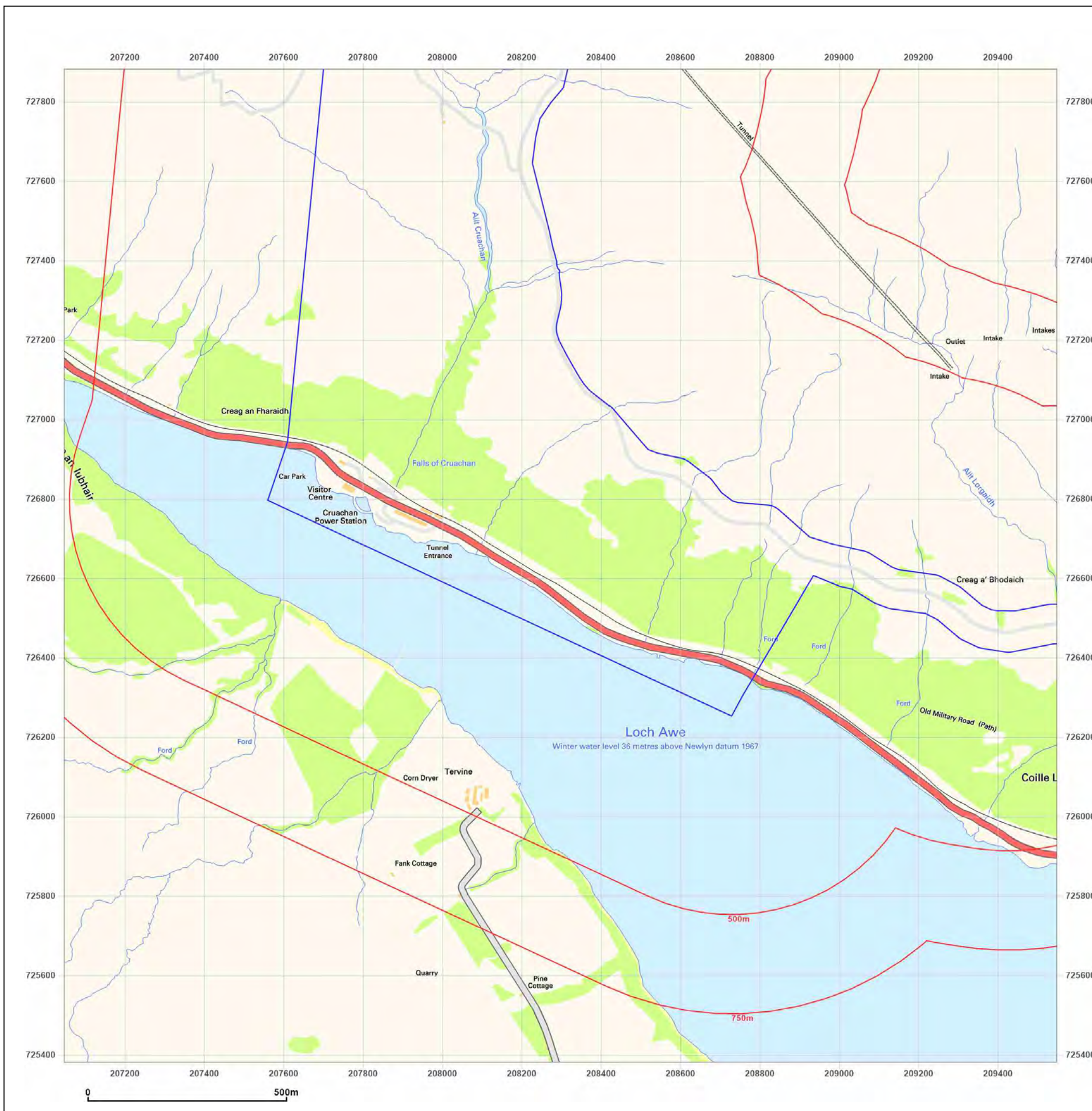


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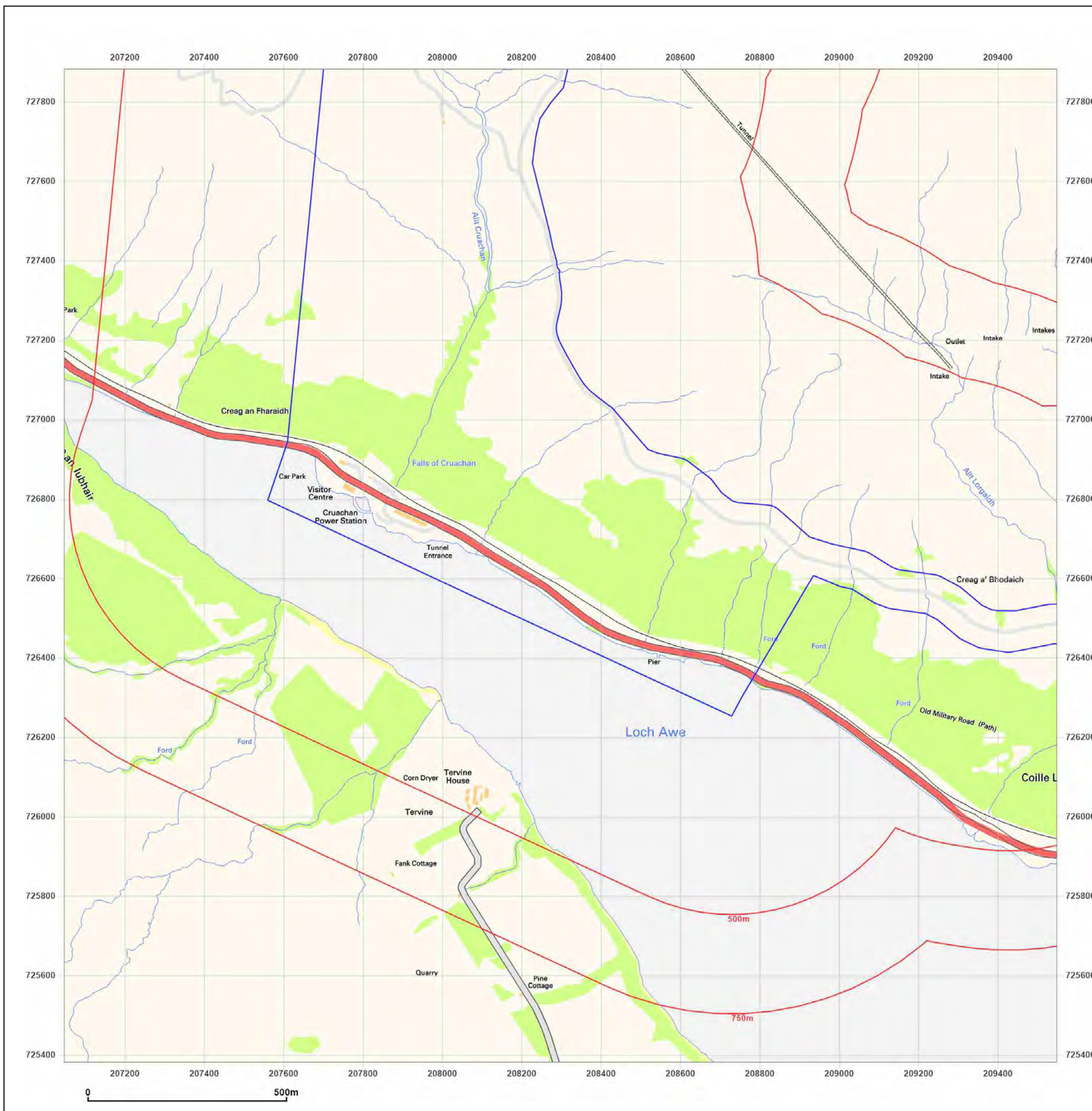


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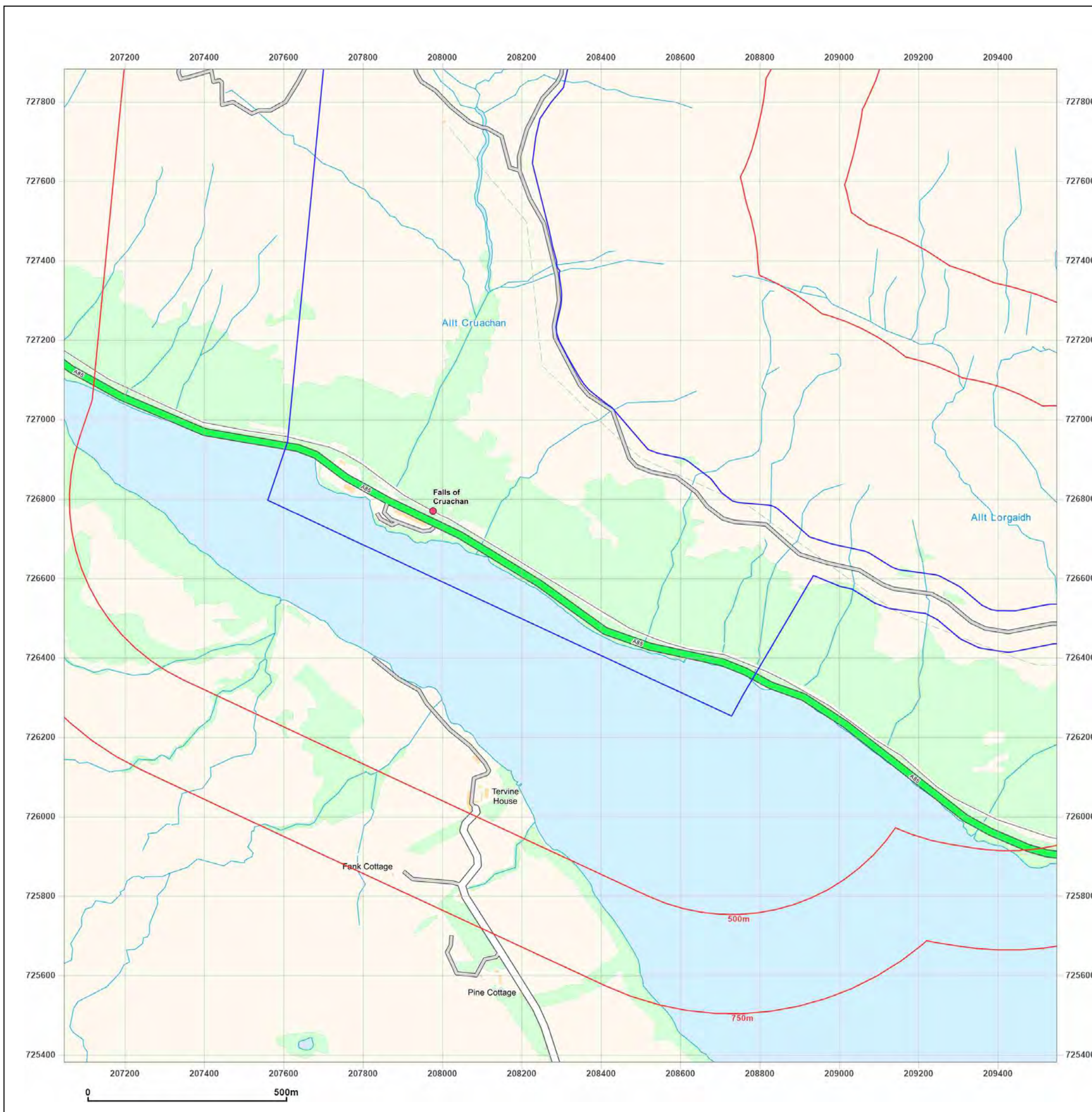


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**Grid Ref:** 208298, 729132

**Map Name:** County Series

**Map date:** 1870

**Scale:** 1:10,560

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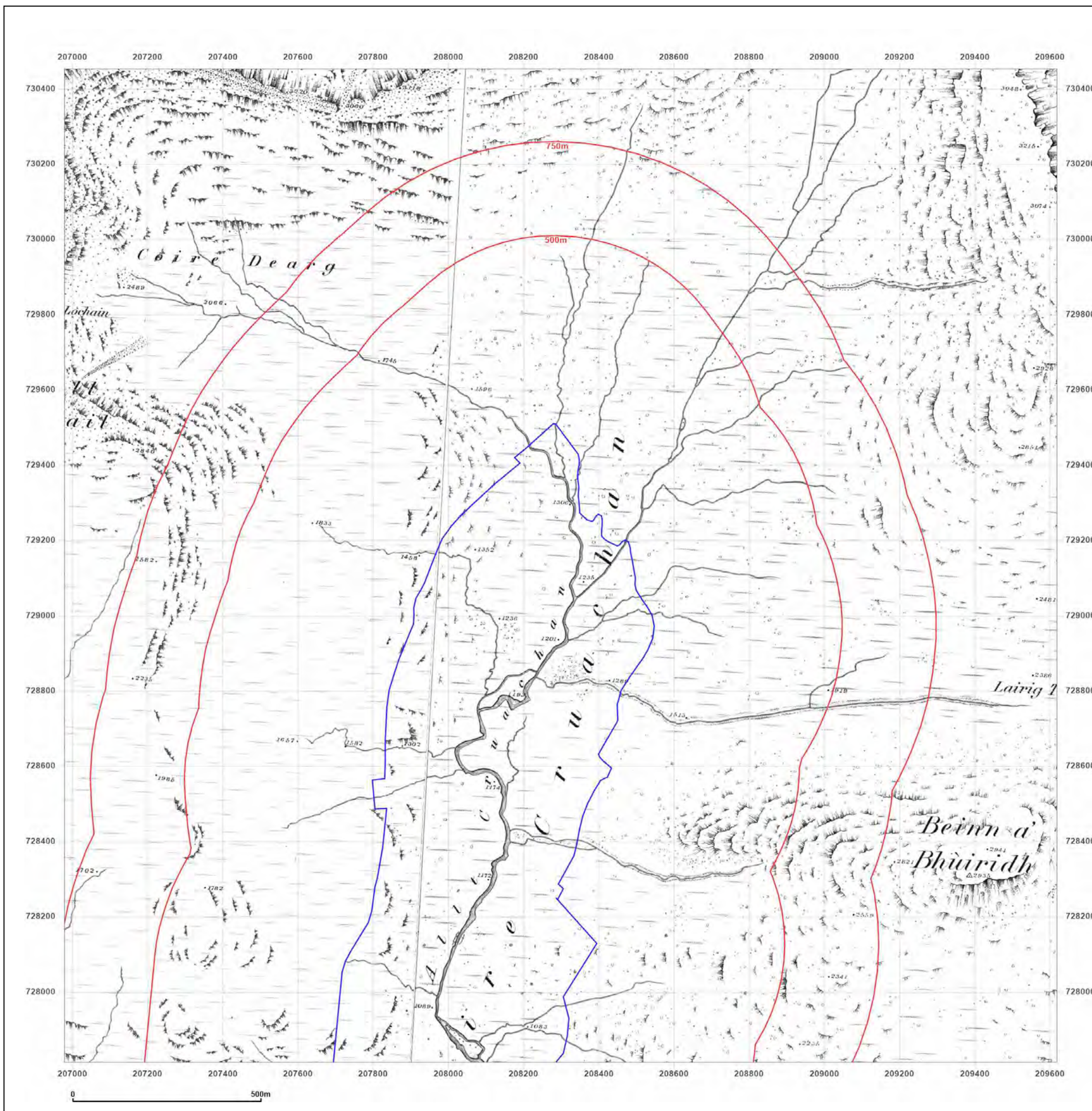


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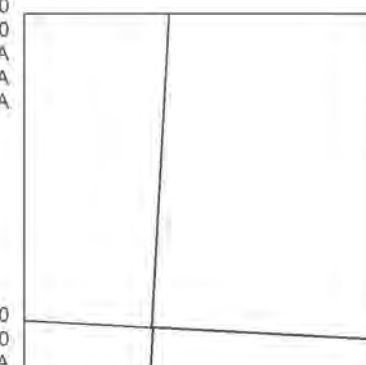
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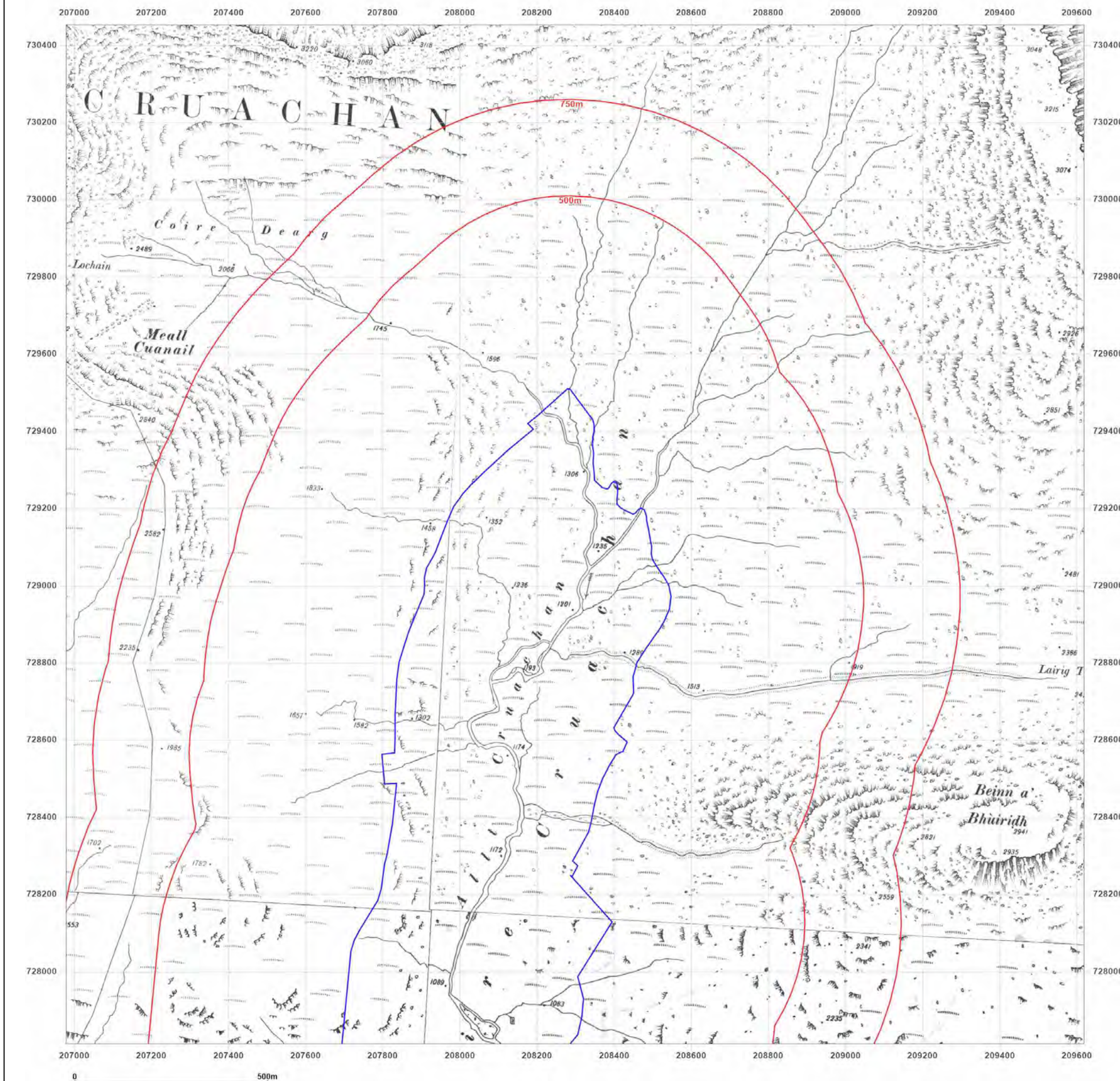


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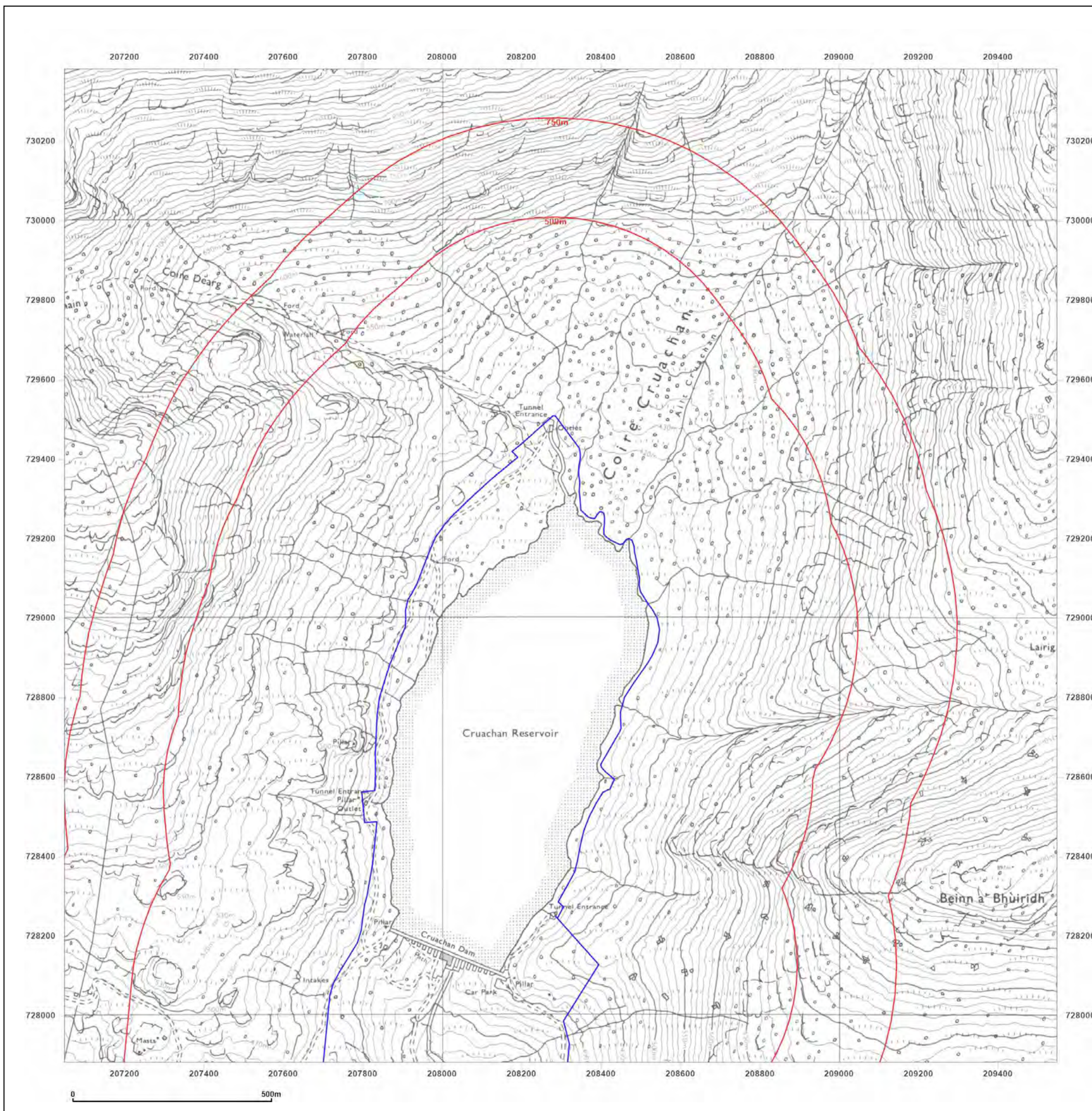


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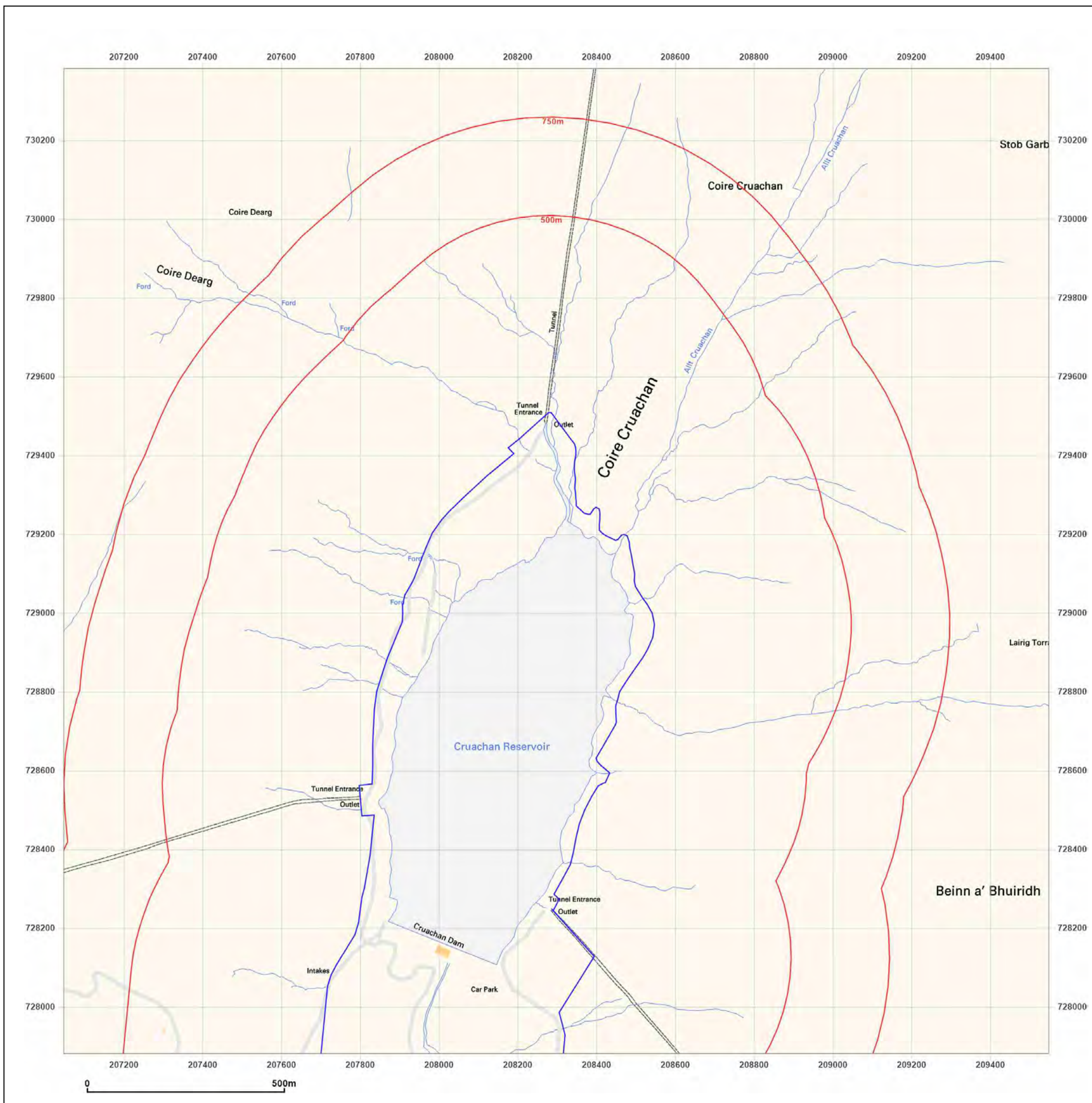


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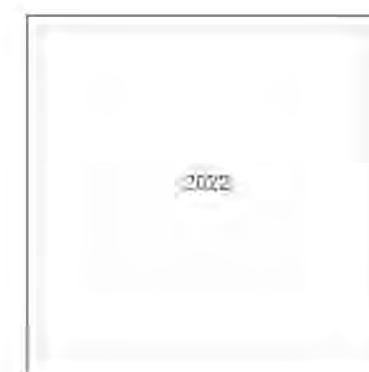
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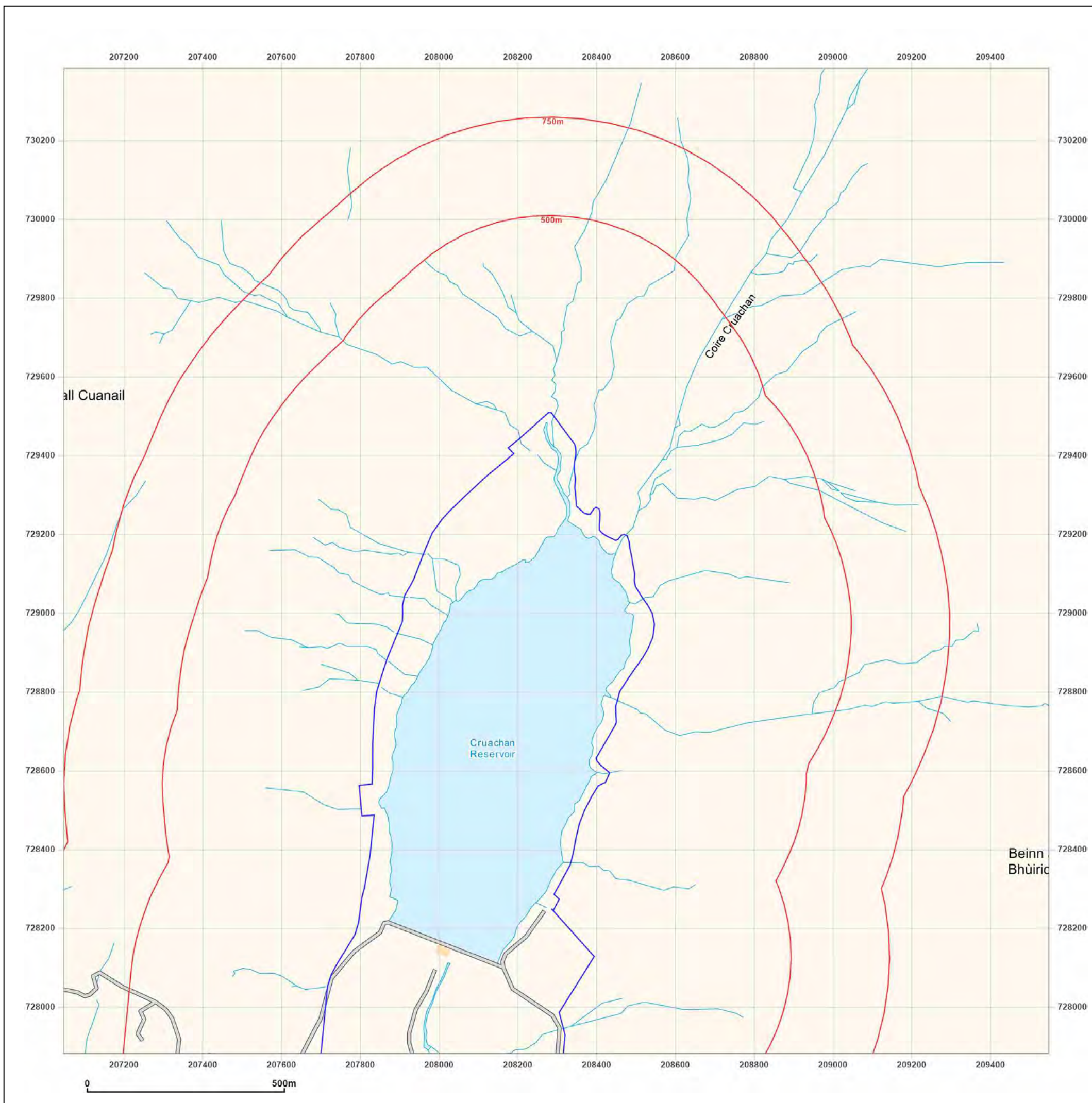


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**Grid Ref:** 210798, 726632

**Map Name:** County Series

**Map date:** 1870

**Scale:** 1:10,560

**Printed at:** 1:10,560



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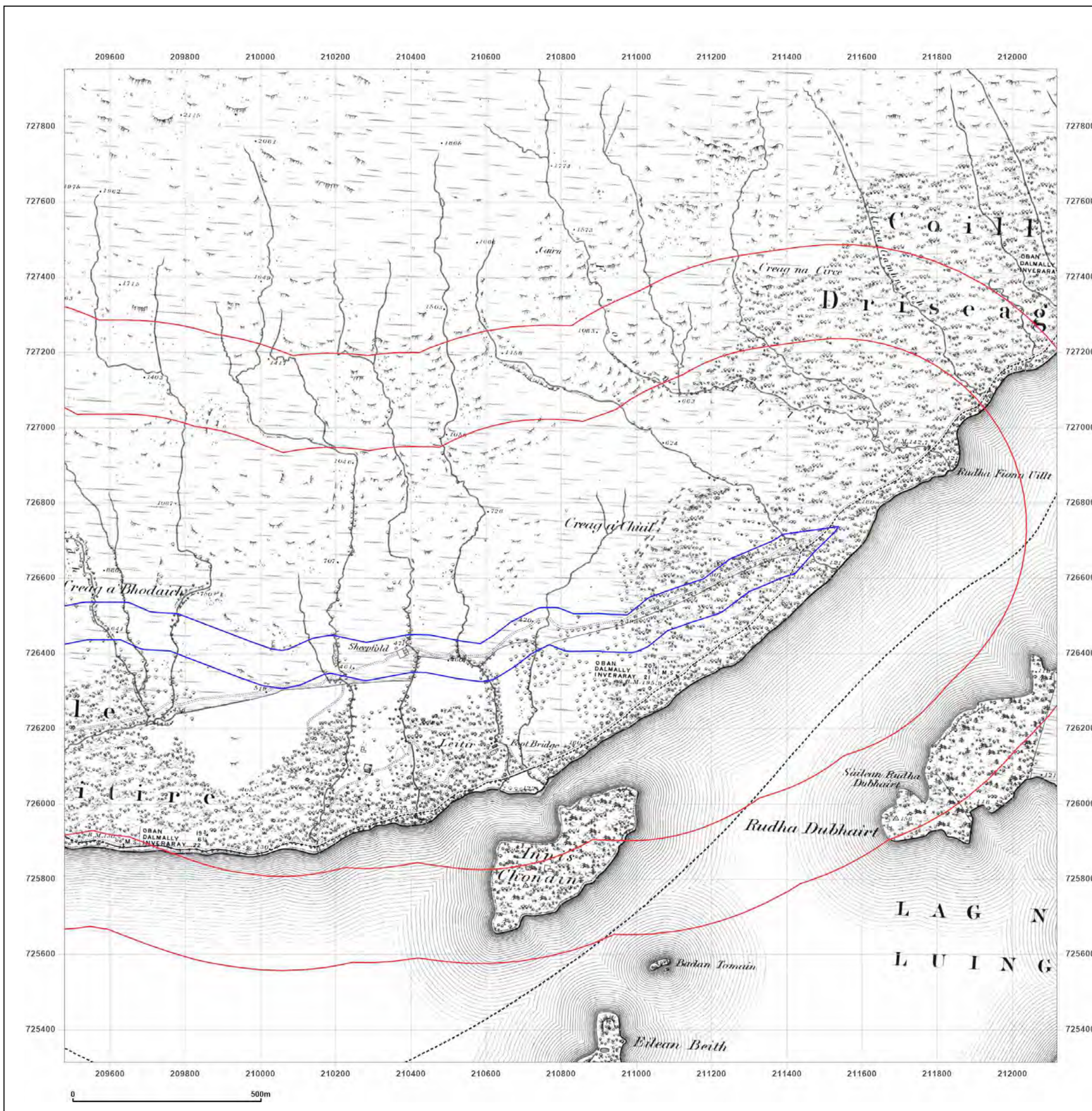


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**Map date:** 1900

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Surveyed 1870  
 Revised 1900  
 Edition N/A  
 Copyright N/A  
 Levelled N/A

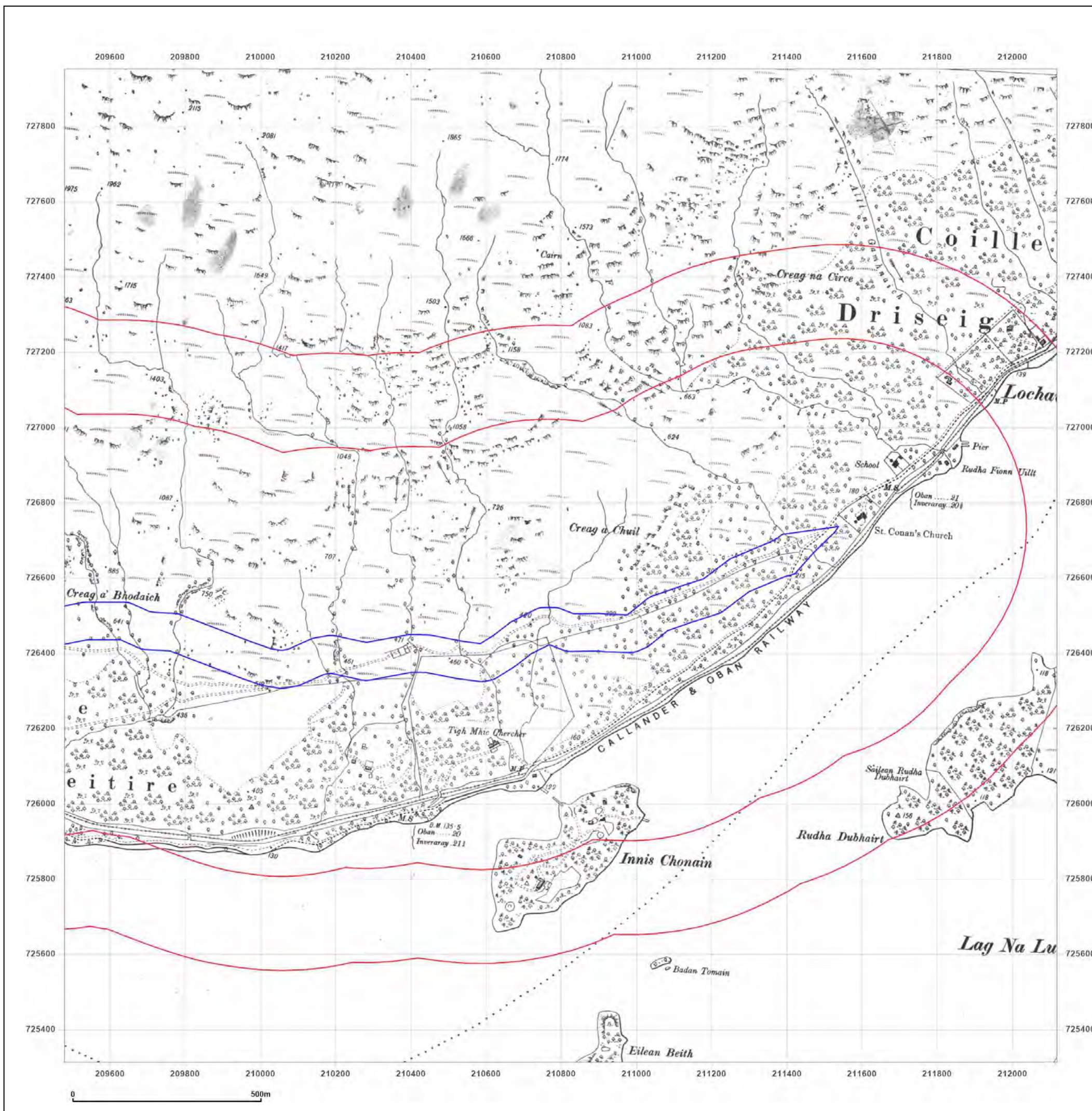


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_SS\_2\_1  
**Grid Ref:** 210798, 726632

**Map Name:** National Grid

**Map date:** 2001

**Scale:** 1:10,000

**Printed at:** 1:10,000



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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_SS\_2\_1  
**Grid Ref:** 210798, 726632

**Map Name:** National Grid

**Map date:** 2010

**Scale:** 1:10,000

**Printed at:** 1:10,000

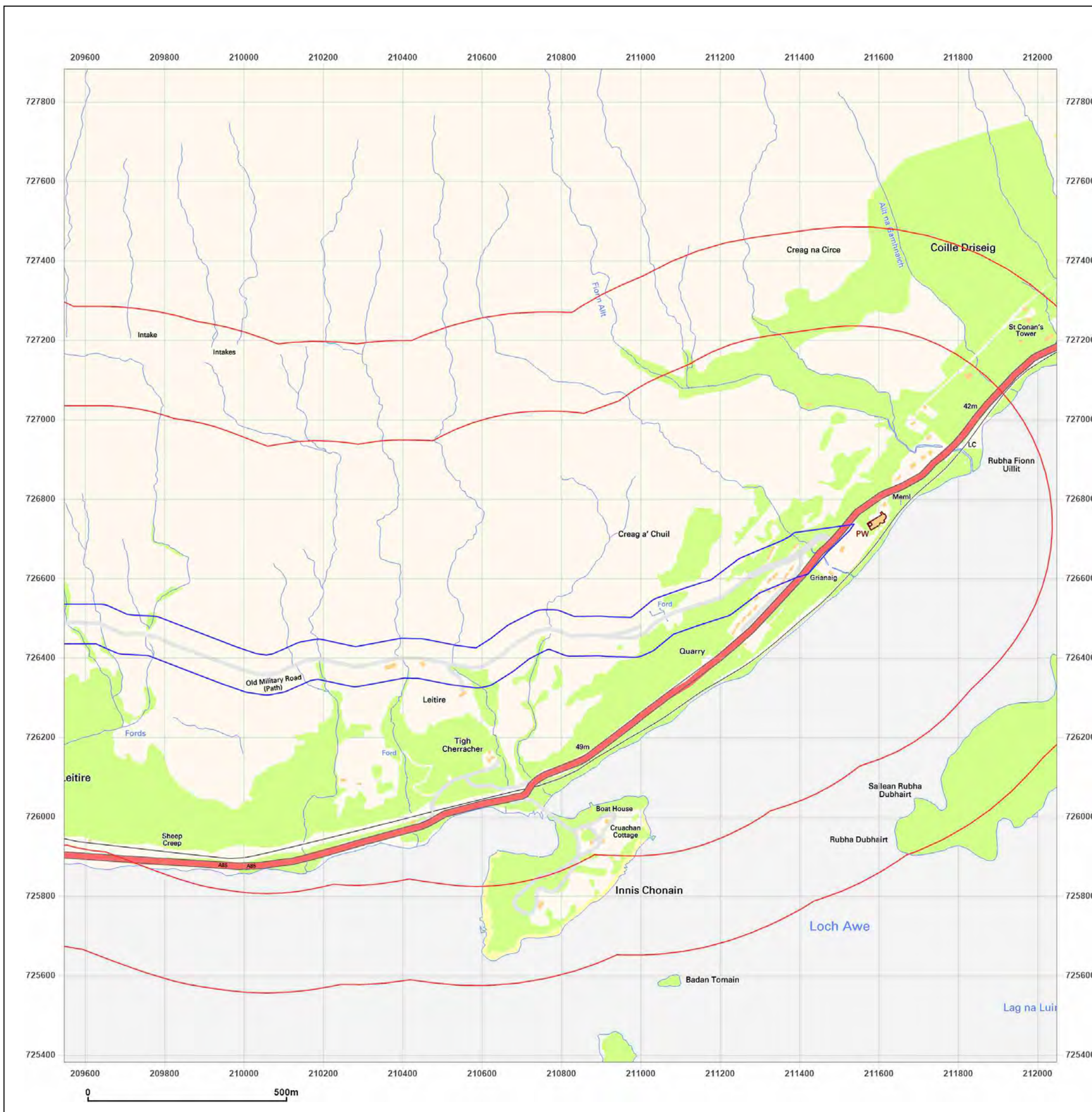


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#### Site Details:

Cruachan 2 West

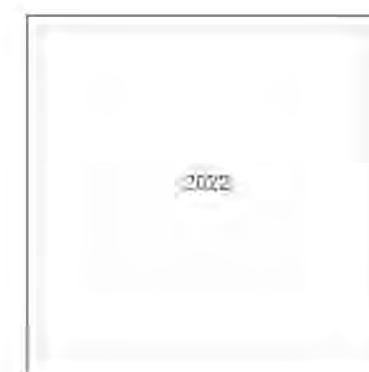
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**Map Name:** National Grid

**Map date:** 2022

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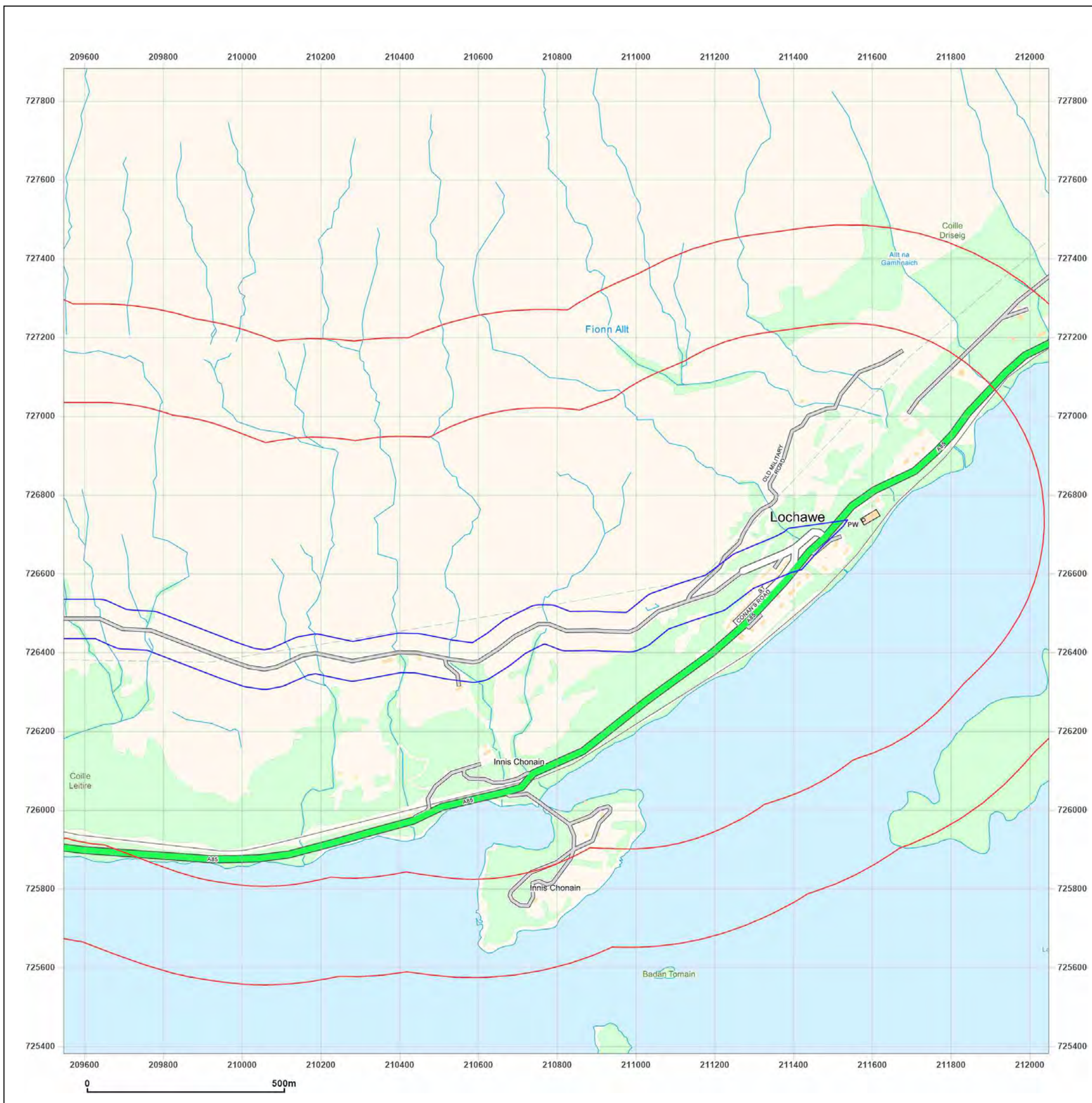


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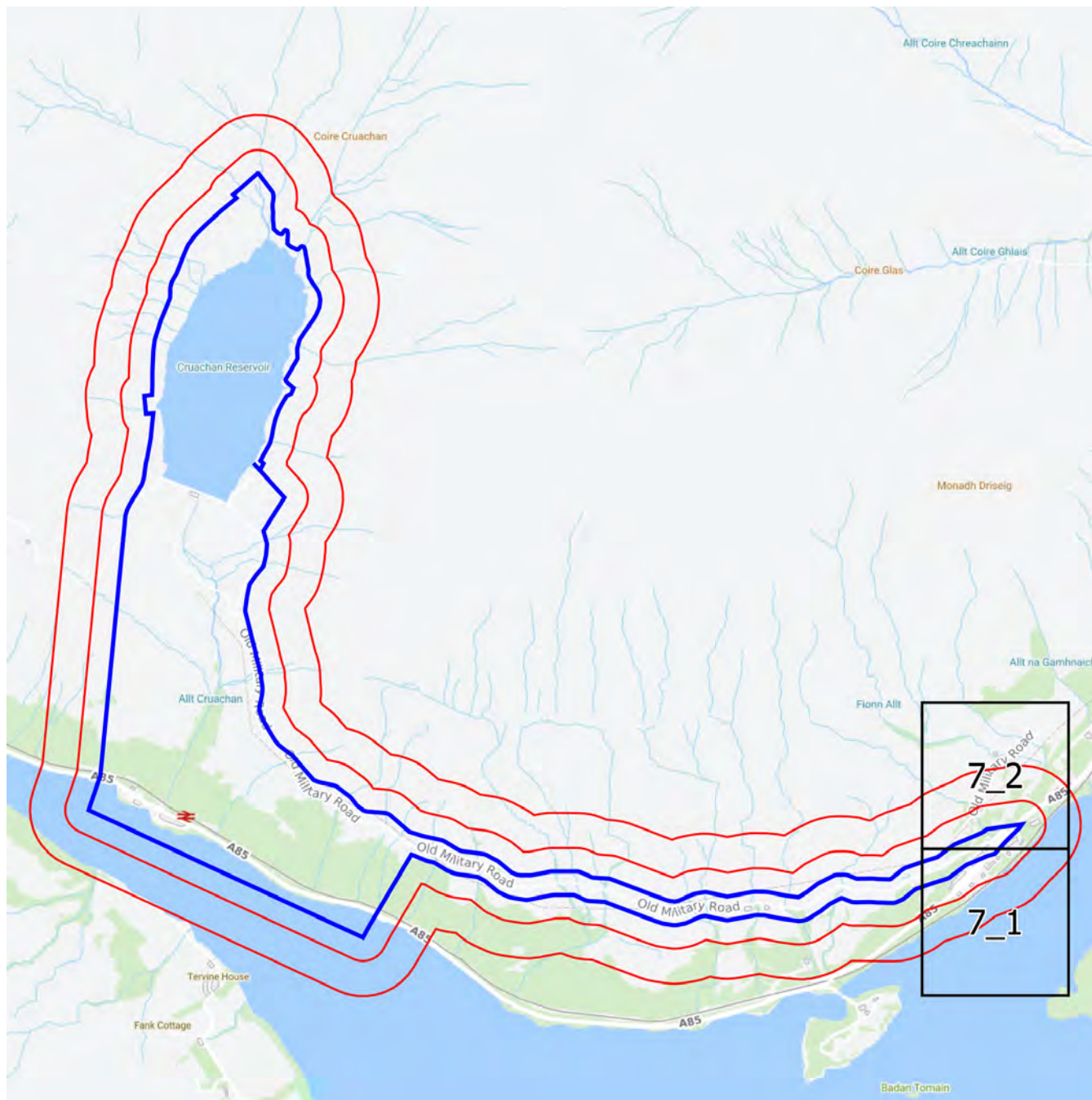
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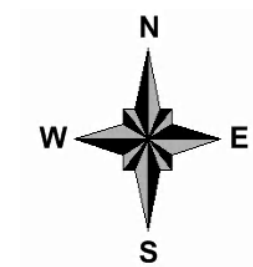
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1:2,500 Scale Grid Index



#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_LS\_7\_1  
**Grid Ref:** 211422, 726319

**Map Name:** National Grid

**Map date:** 1984

**Scale:** 1:2,500

**Printed at:** 1:2,500



Surveyed 1982  
 Revised 1982  
 Edition N/A  
 Copyright 1984  
 Levelled 1974

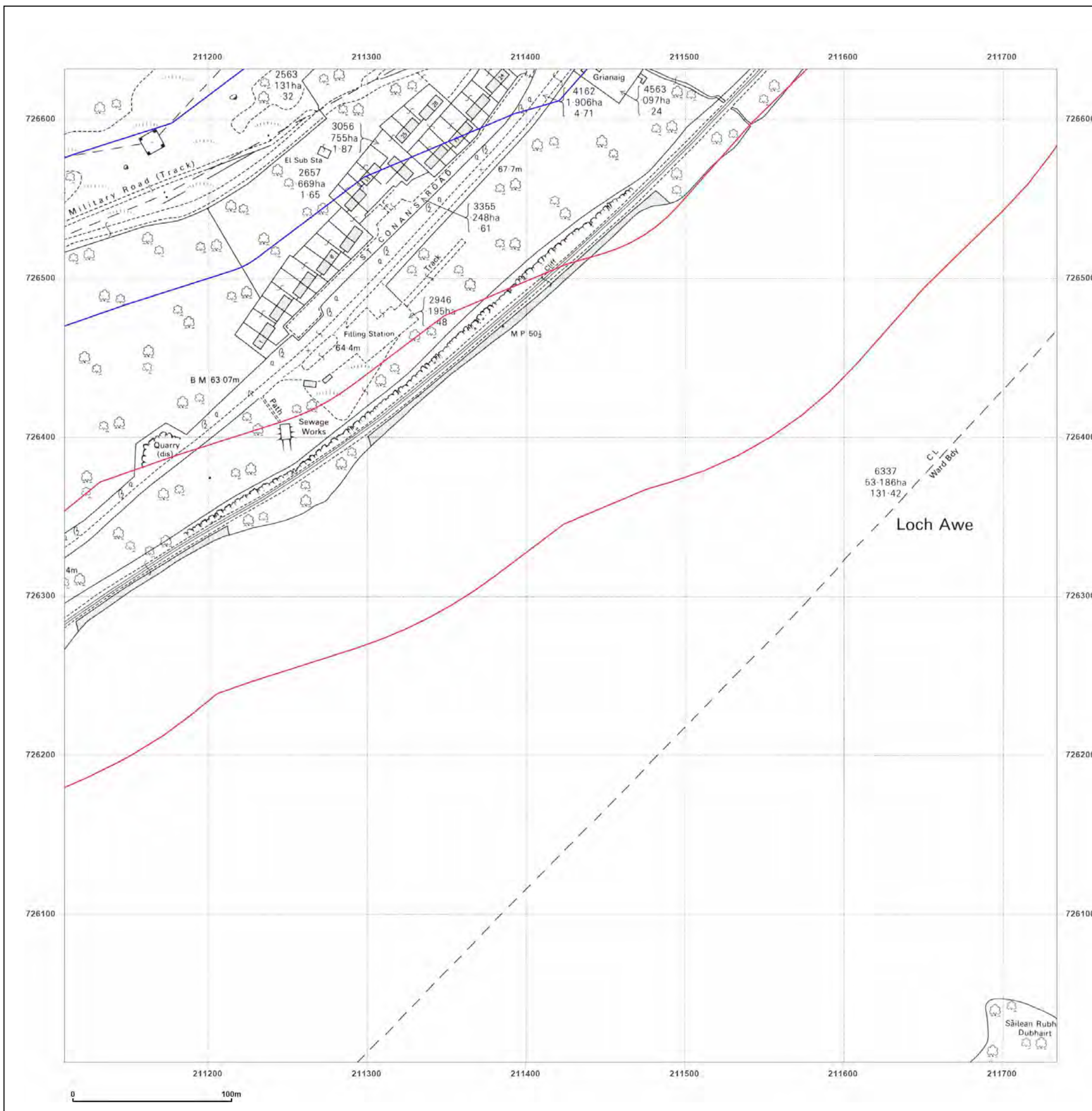


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_LS\_7\_1  
**Grid Ref:** 211422, 726319

**Map Name:** National Grid

**Map date:** 1995

**Scale:** 1:2,500

**Printed at:** 1:2,500



Surveyed N/A  
 Revised N/A  
 Edition N/A  
 Copyright 1995  
 Levelled N/A

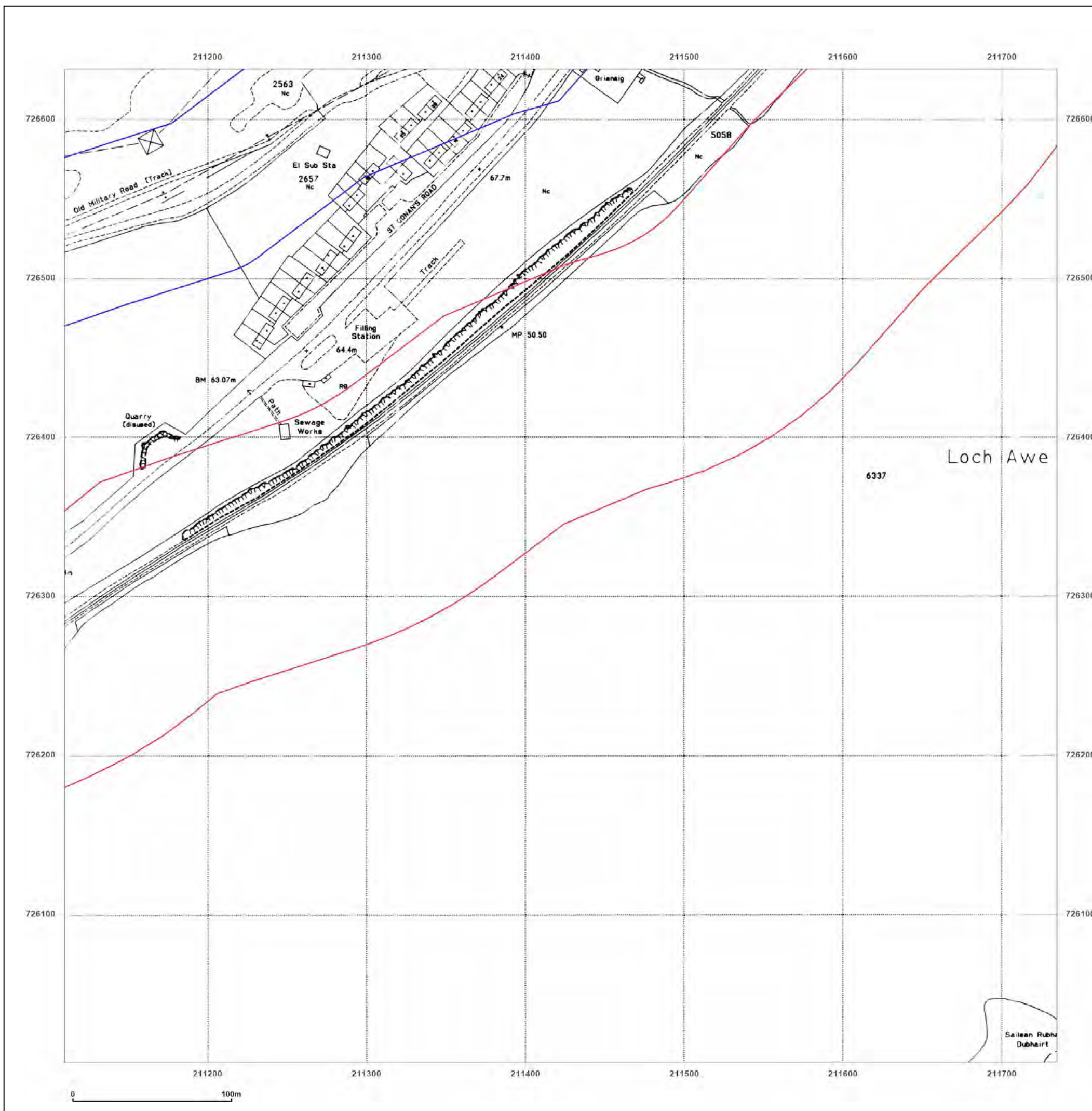


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#### Site Details:

Cruachan 2 West

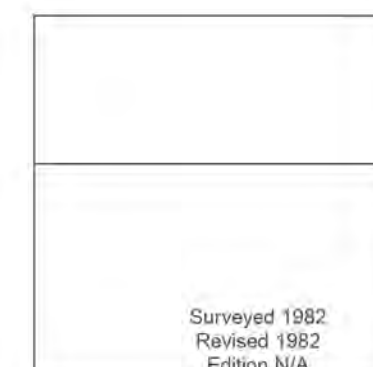
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**Map Name:** National Grid

**Map date:** 1984

**Scale:** 1:2,500

**Printed at:** 1:2,500



Surveyed 1982  
 Revised 1982  
 Edition N/A  
 Copyright 1984  
 Levelled 1974

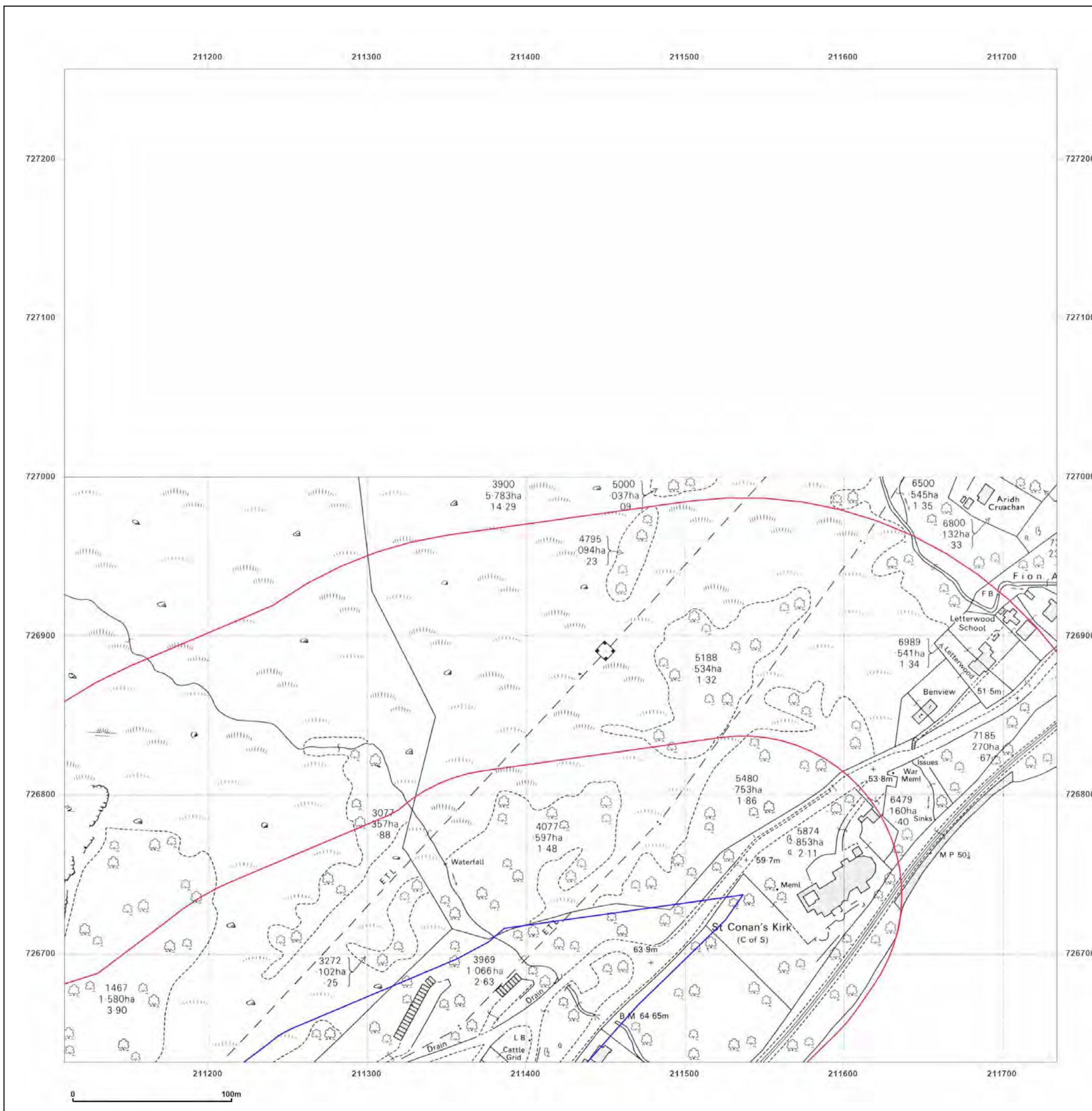


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#### Site Details:

Cruachan 2 West

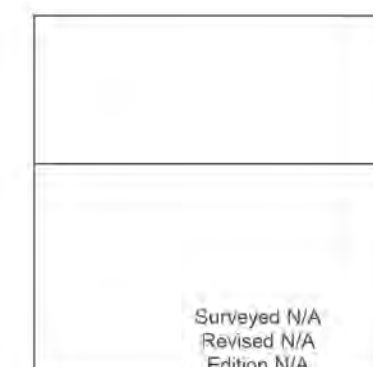
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**Grid Ref:** 211422, 726944

**Map Name:** National Grid

**Map date:** 1995

**Scale:** 1:2,500

**Printed at:** 1:2,500



Surveyed N/A  
 Revised N/A  
 Edition N/A  
 Copyright 1995  
 Levelled N/A

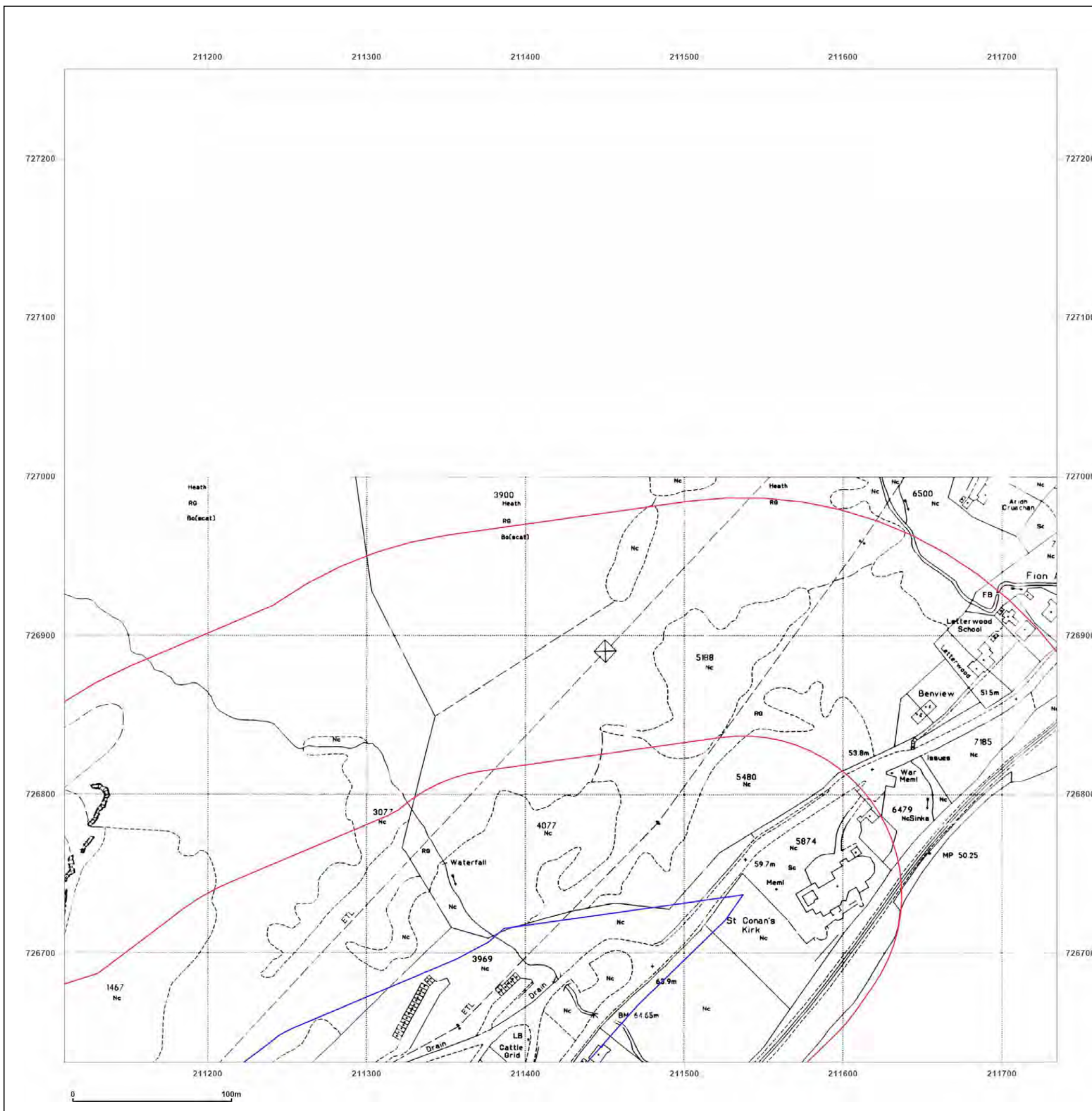


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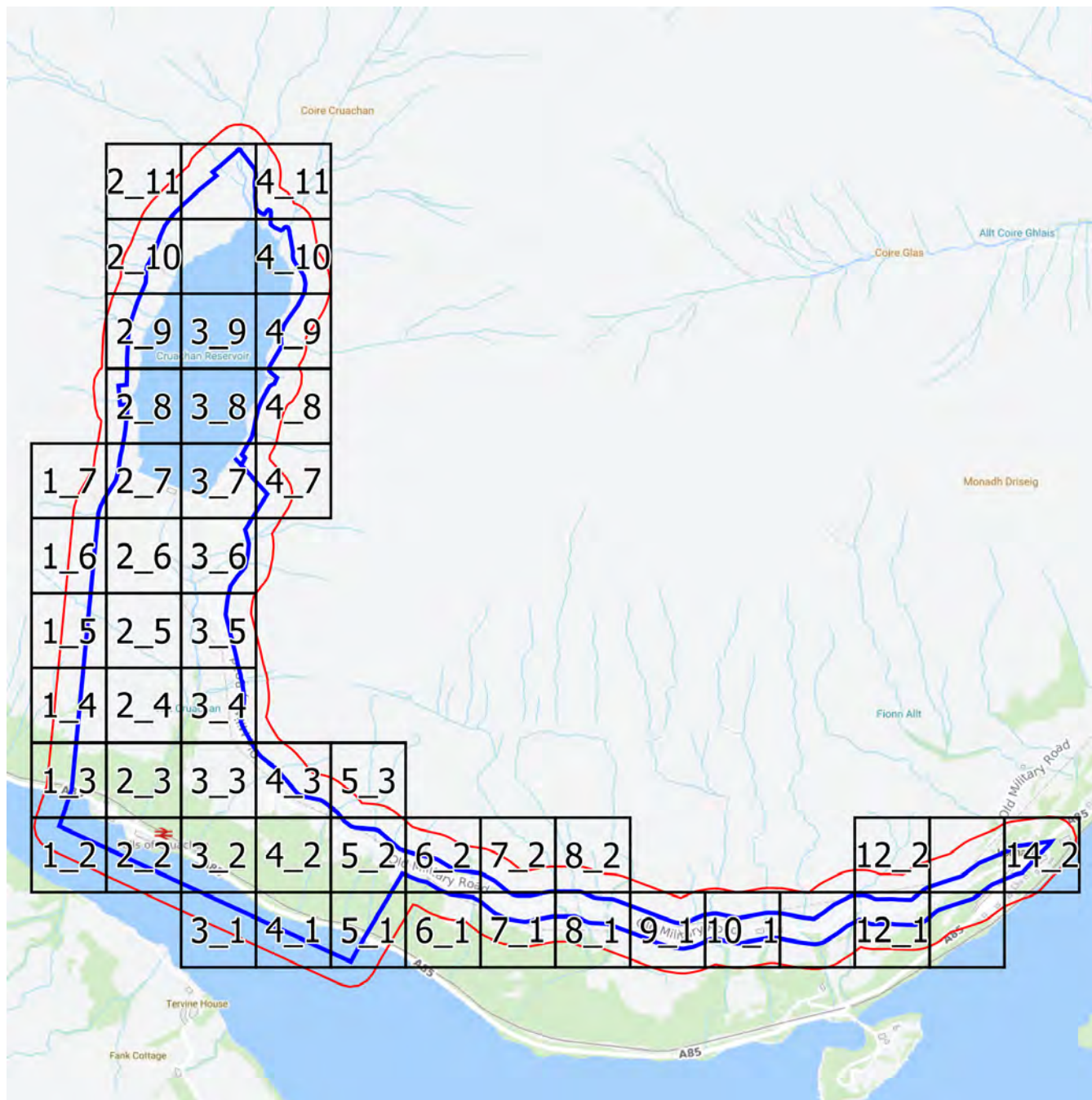
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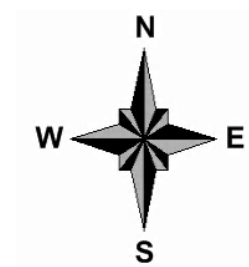
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## Landline Scale Grid Index



#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_1\_2  
**Grid Ref:** 207598, 726682

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

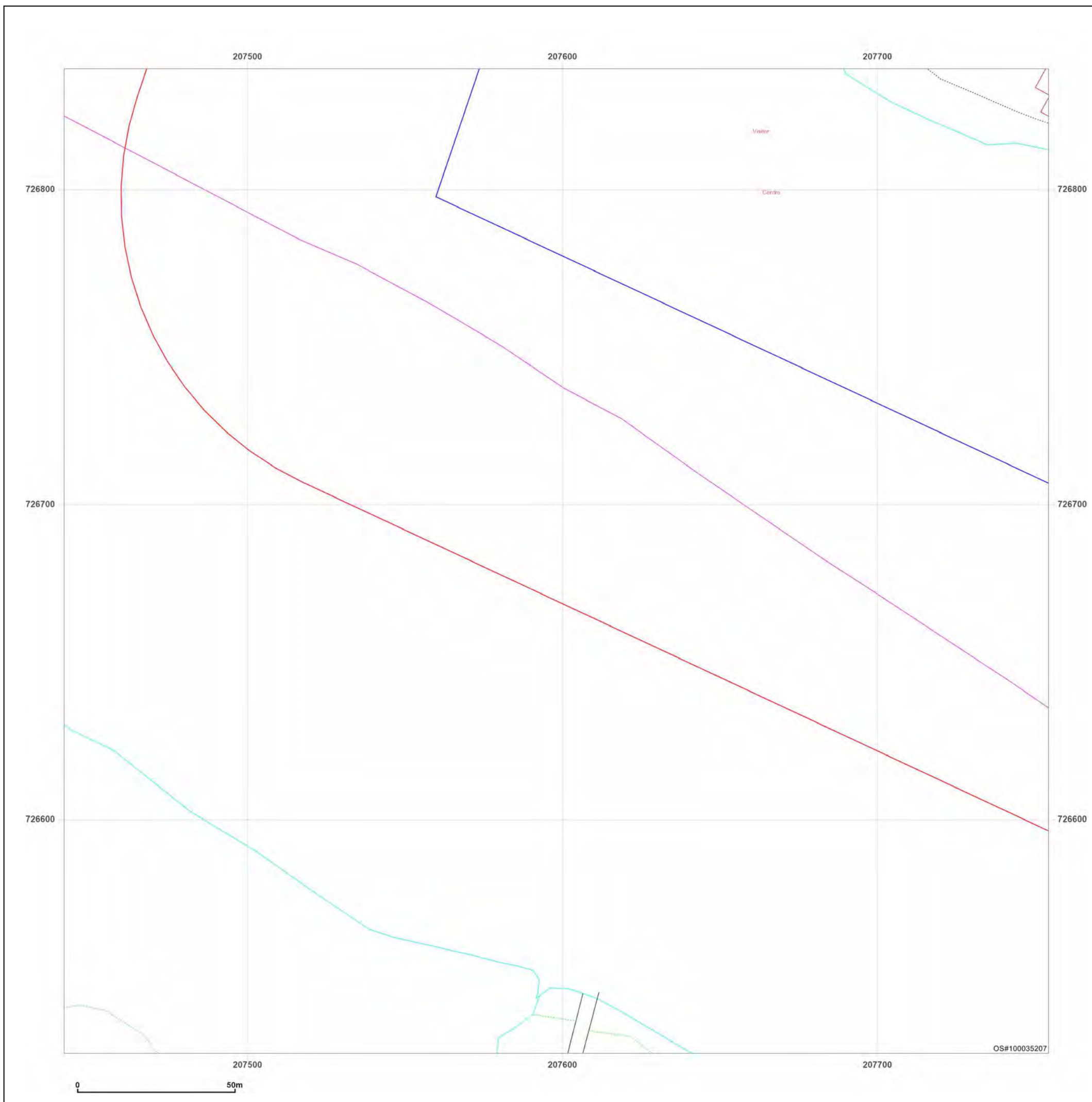


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_1\_4  
**Grid Ref:** 207598, 727282

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

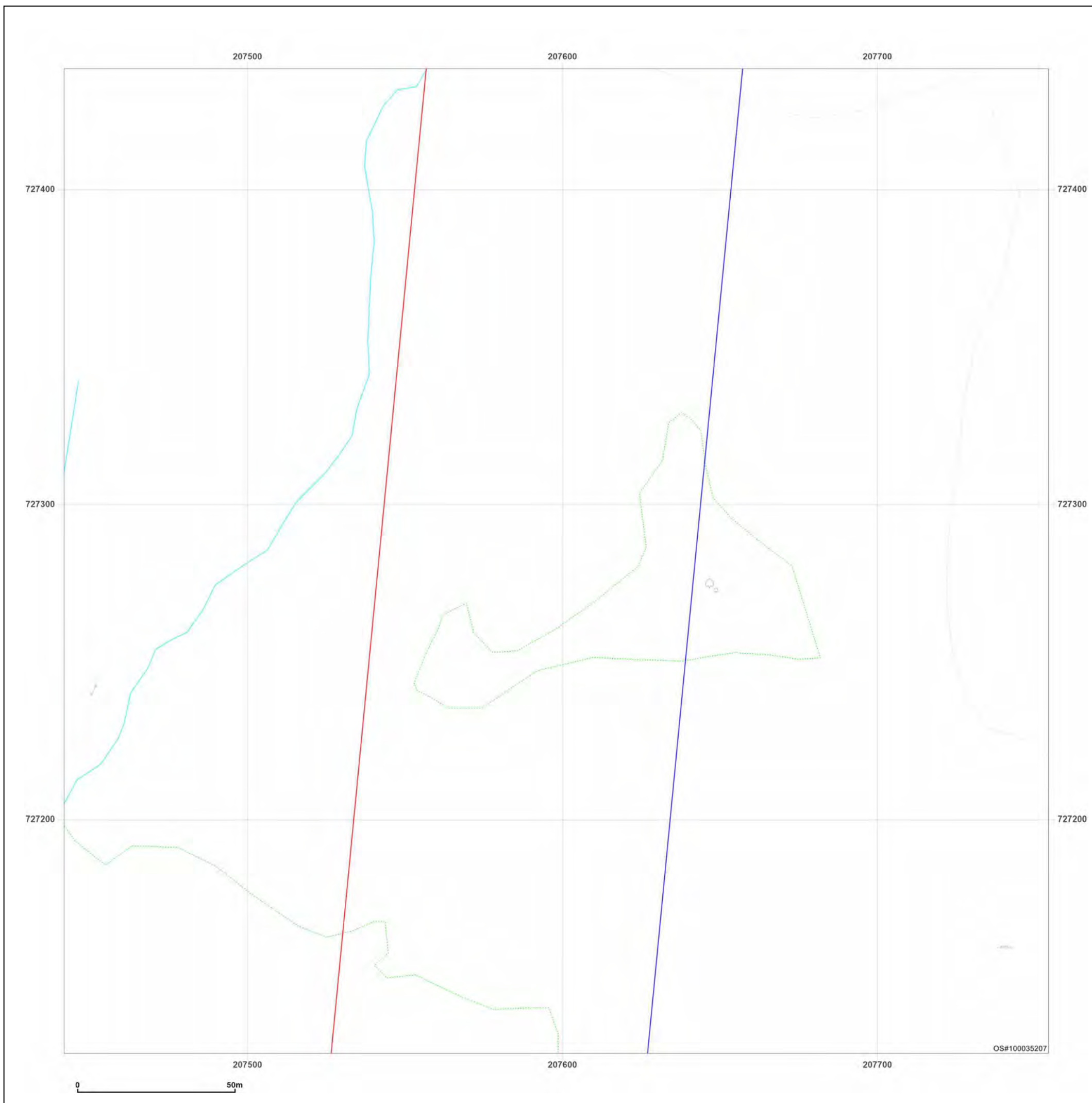


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_1\_5  
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**Map Name:** LandLine

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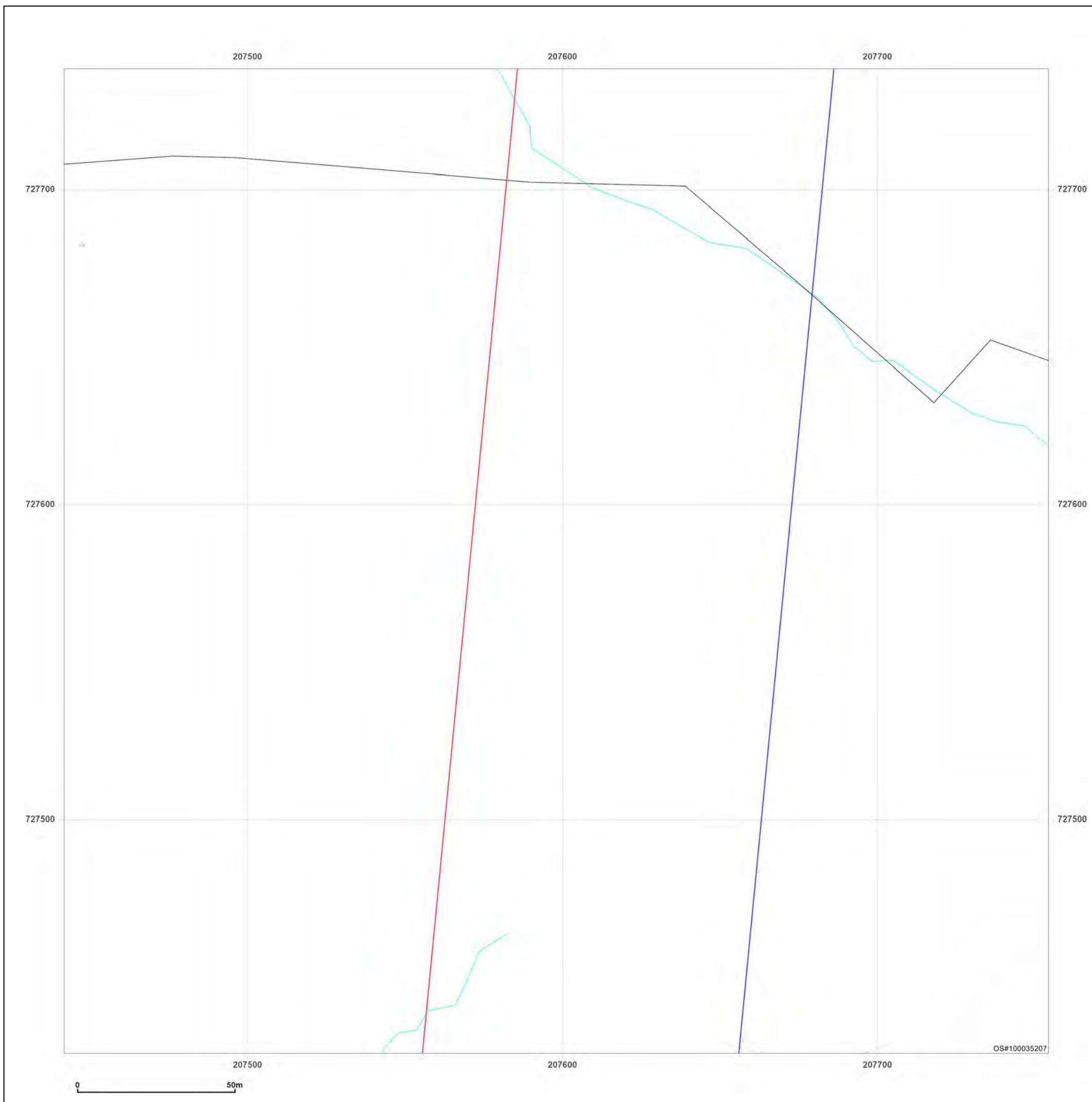


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_1\_6  
**Grid Ref:** 207598, 727882

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

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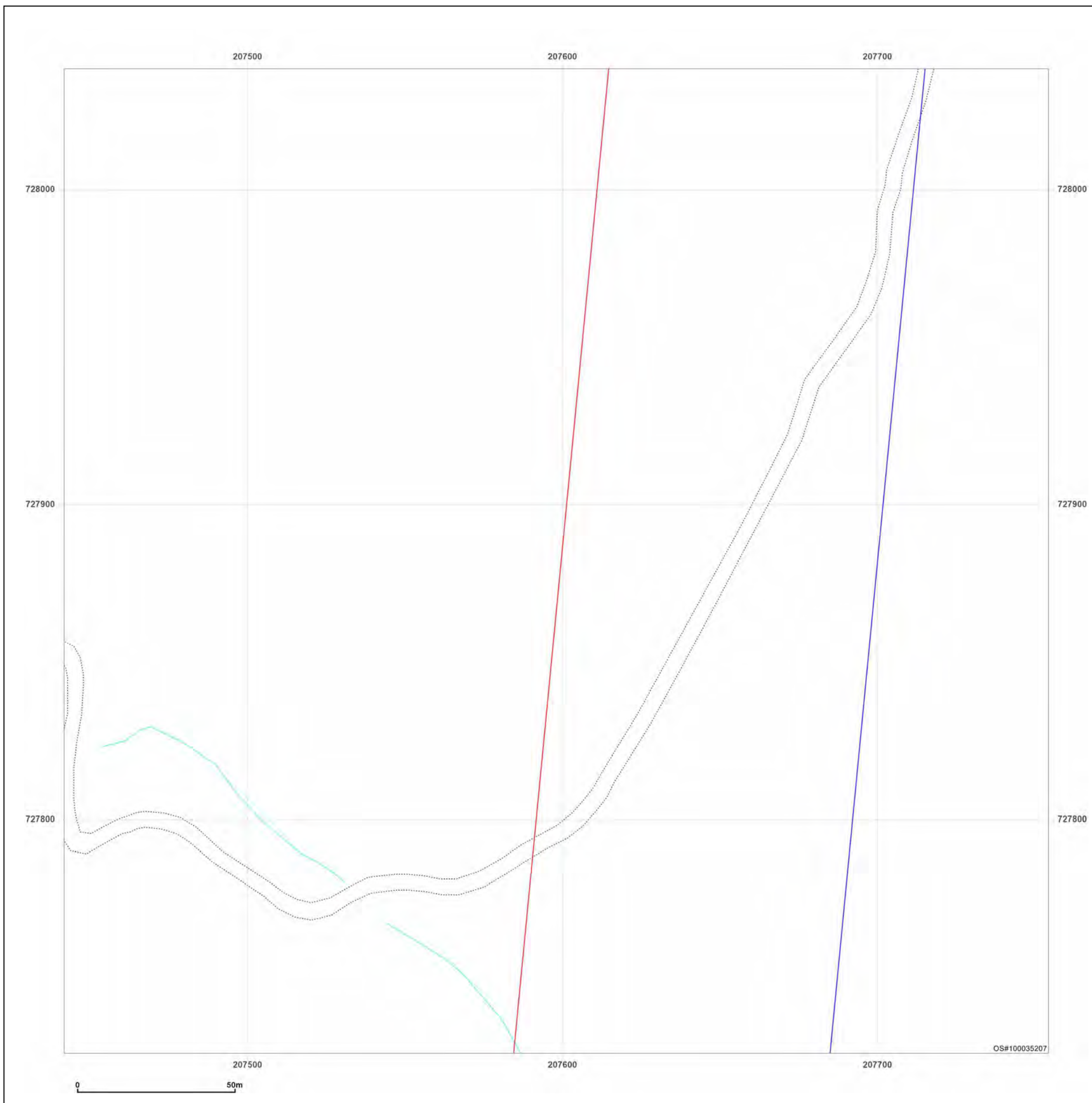


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_1\_7  
**Grid Ref:** 207598, 728182

**Map Name:** LandLine

**Map date:** 2003

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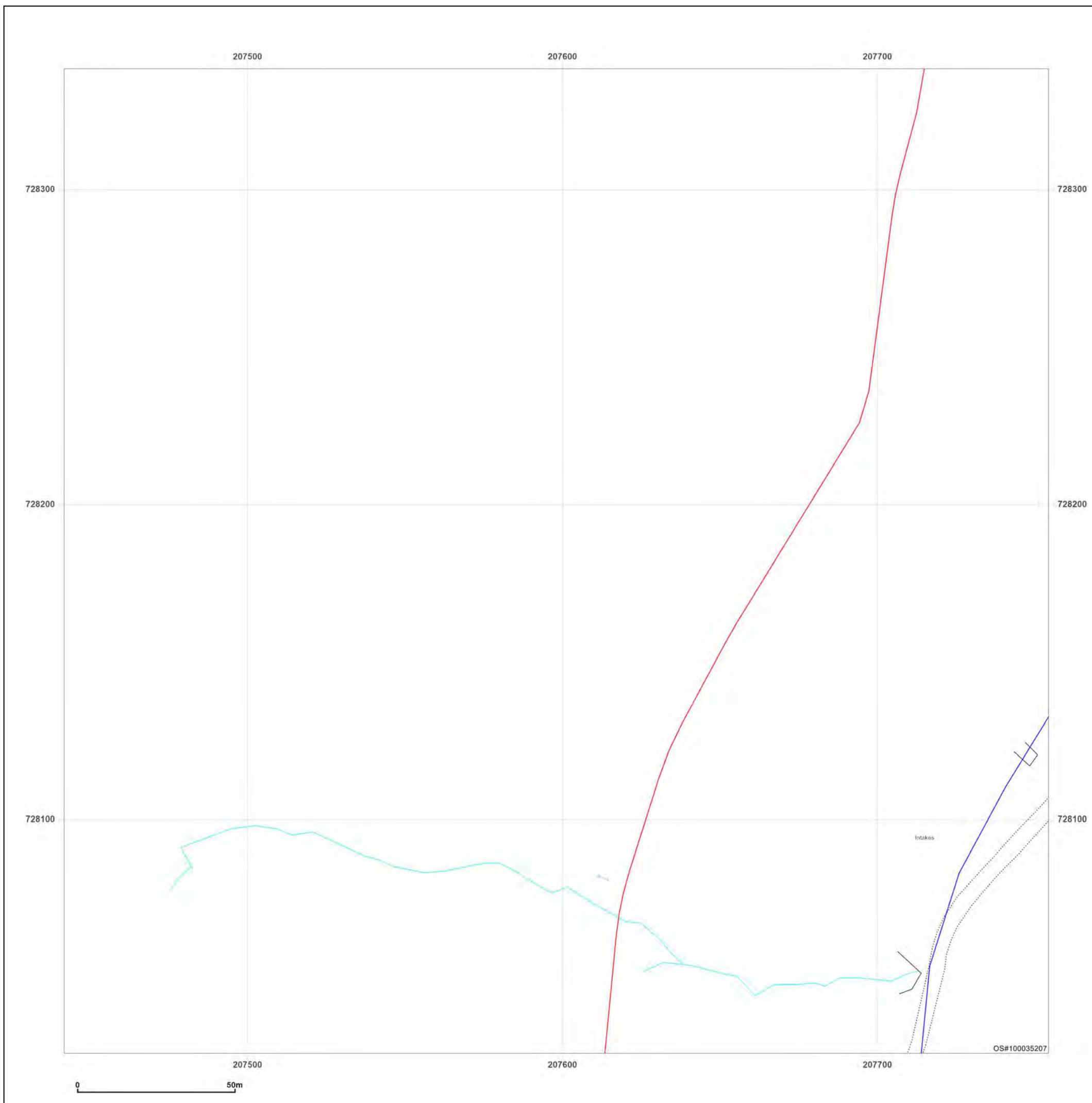


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_2\_2  
**Grid Ref:** 207898, 726682

**Map Name:** LandLine

**Map date:** 2003

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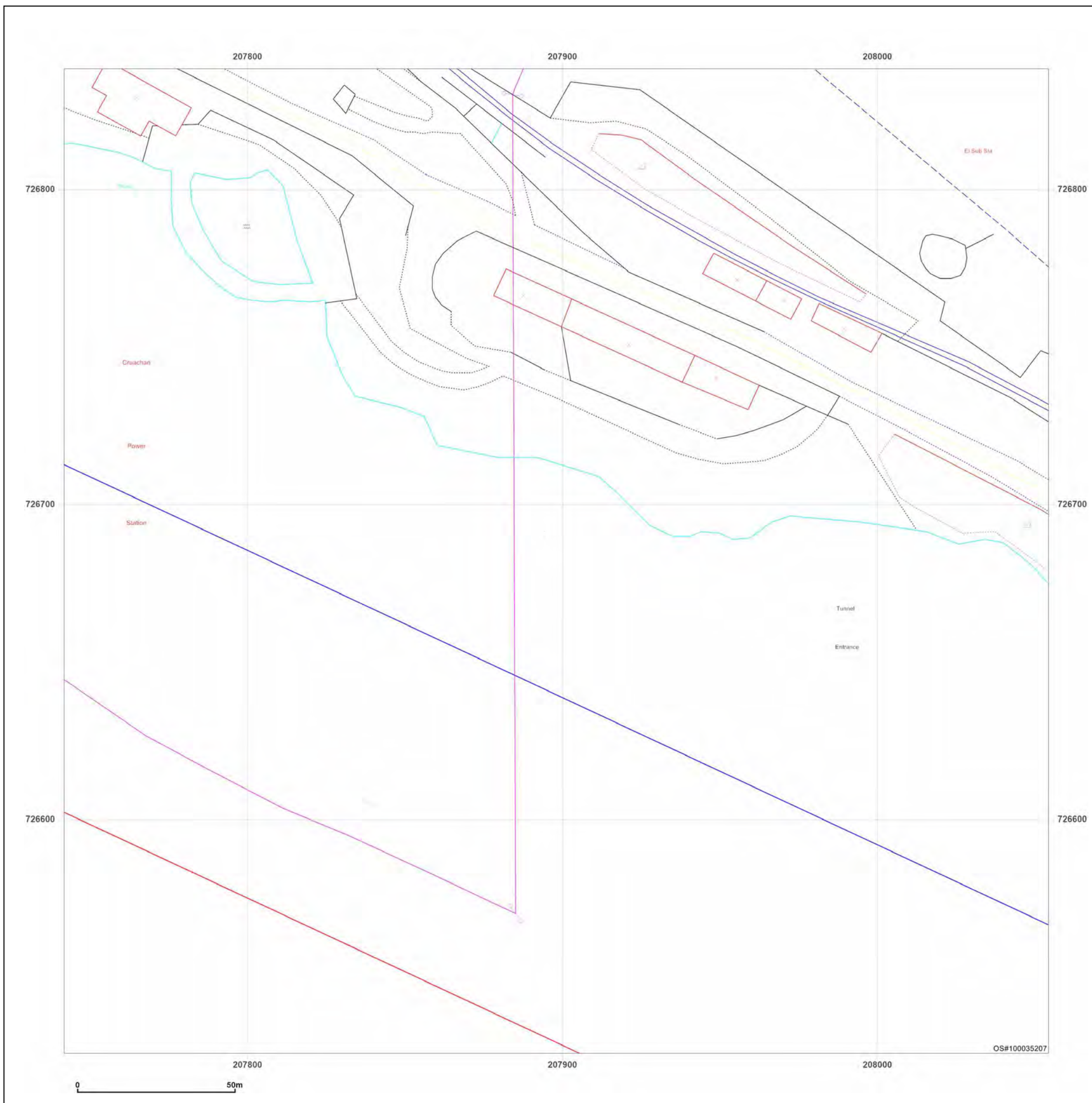


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_2\_3  
**Grid Ref:** 207898, 726982

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**Map date:** 2003

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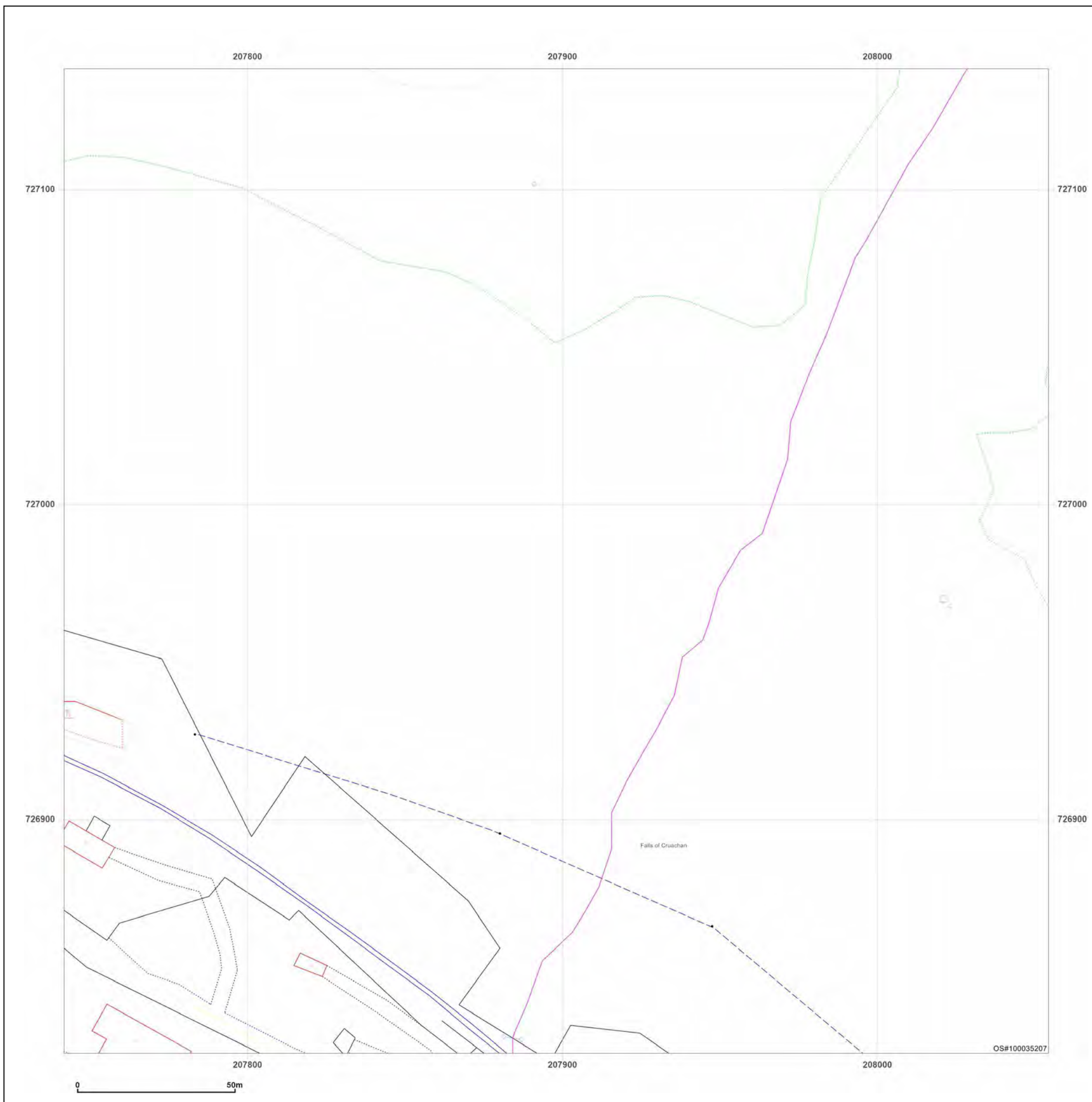


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#### Site Details:

Cruachan 2 West

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**Report Ref:** GSIP-2022-12632-9902\_Landline\_2\_4  
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**Map date:** 2003

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**Printed at:** 1:1,250

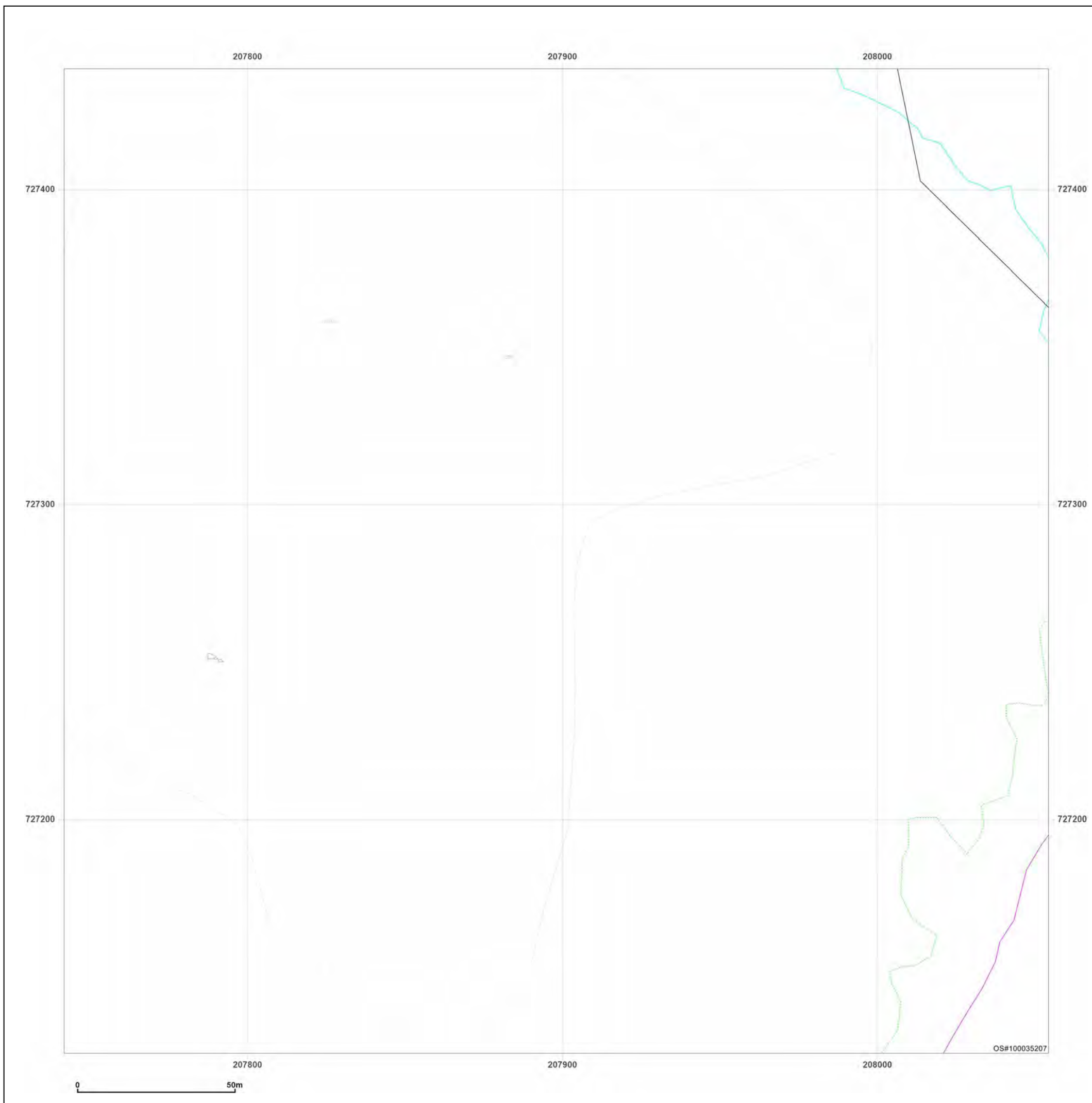


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#### Site Details:

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**Report Ref:** GSIP-2022-12632-9902\_Landline\_2\_5  
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**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

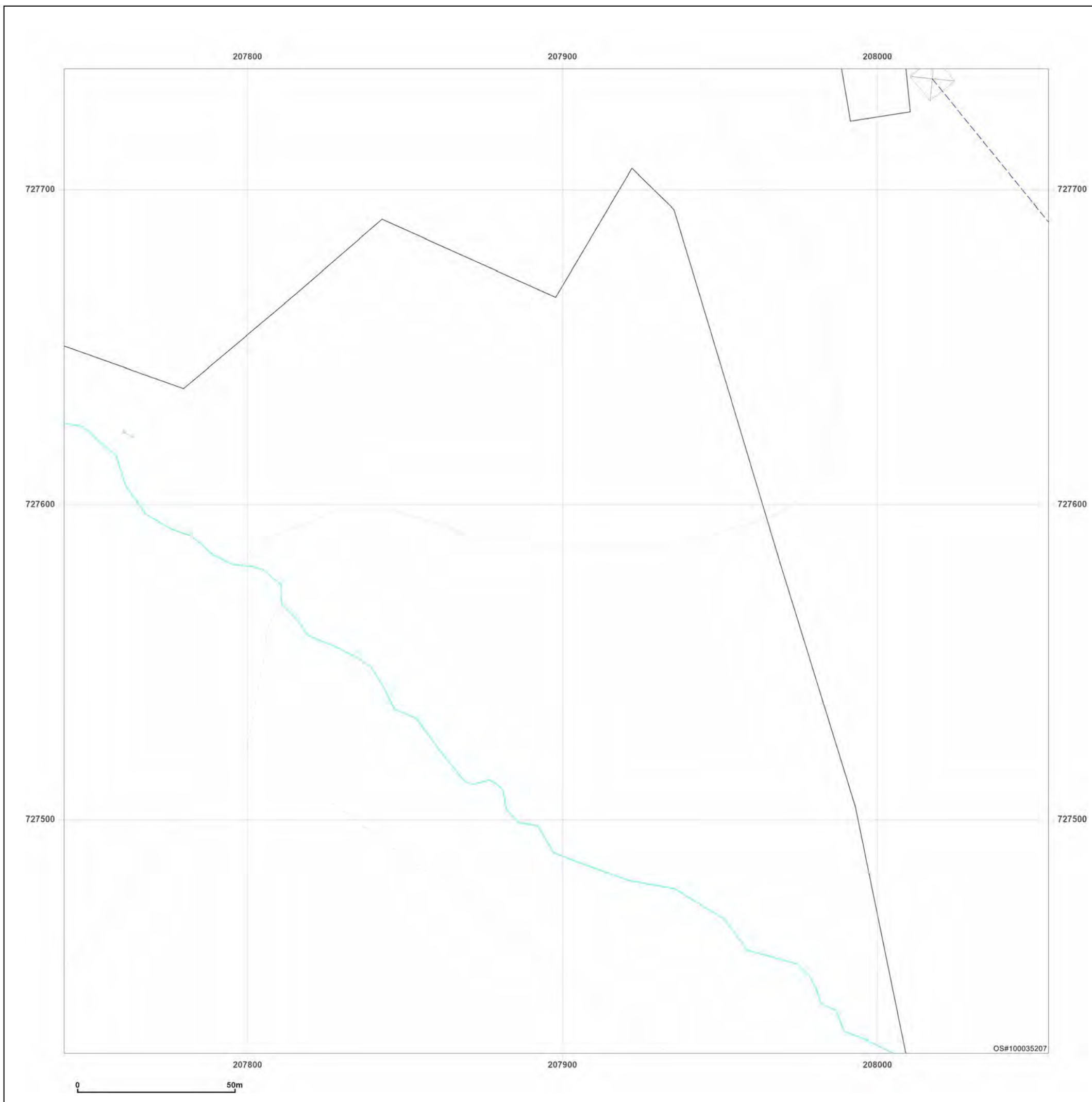


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_2\_6  
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**Map date:** 2003

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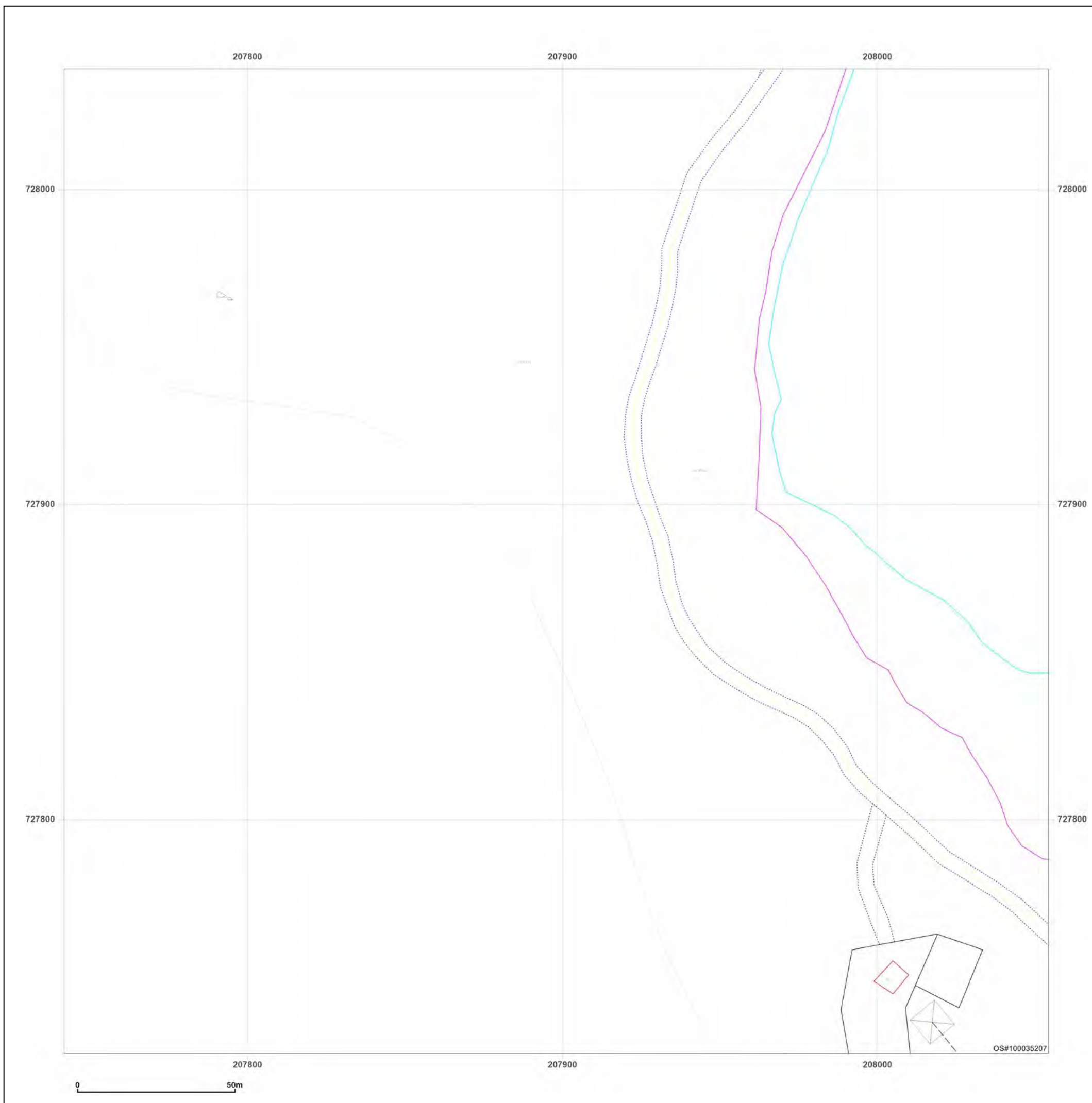


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_2\_7  
**Grid Ref:** 207898, 728182

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250



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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_2\_8  
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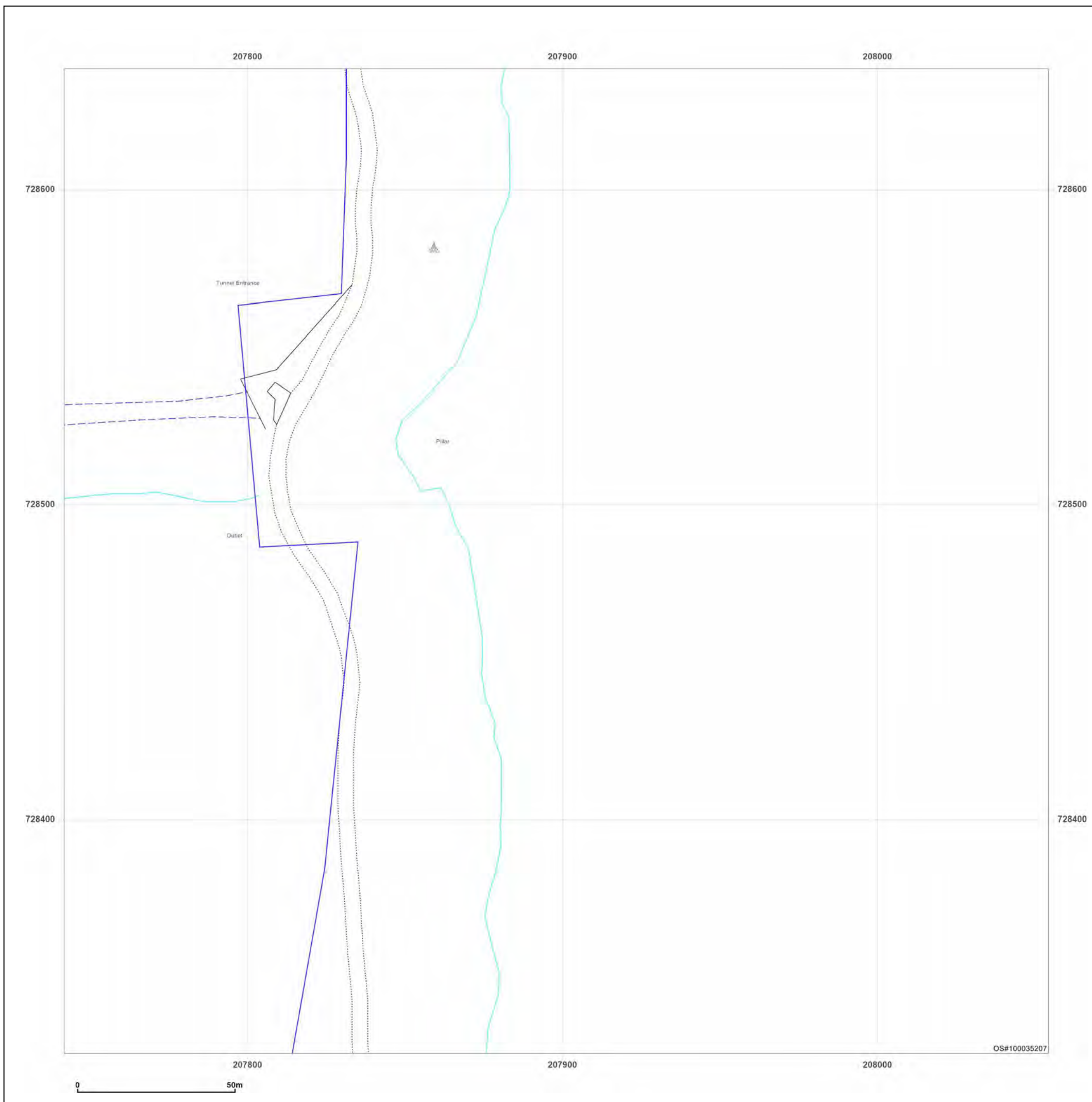


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_2\_9  
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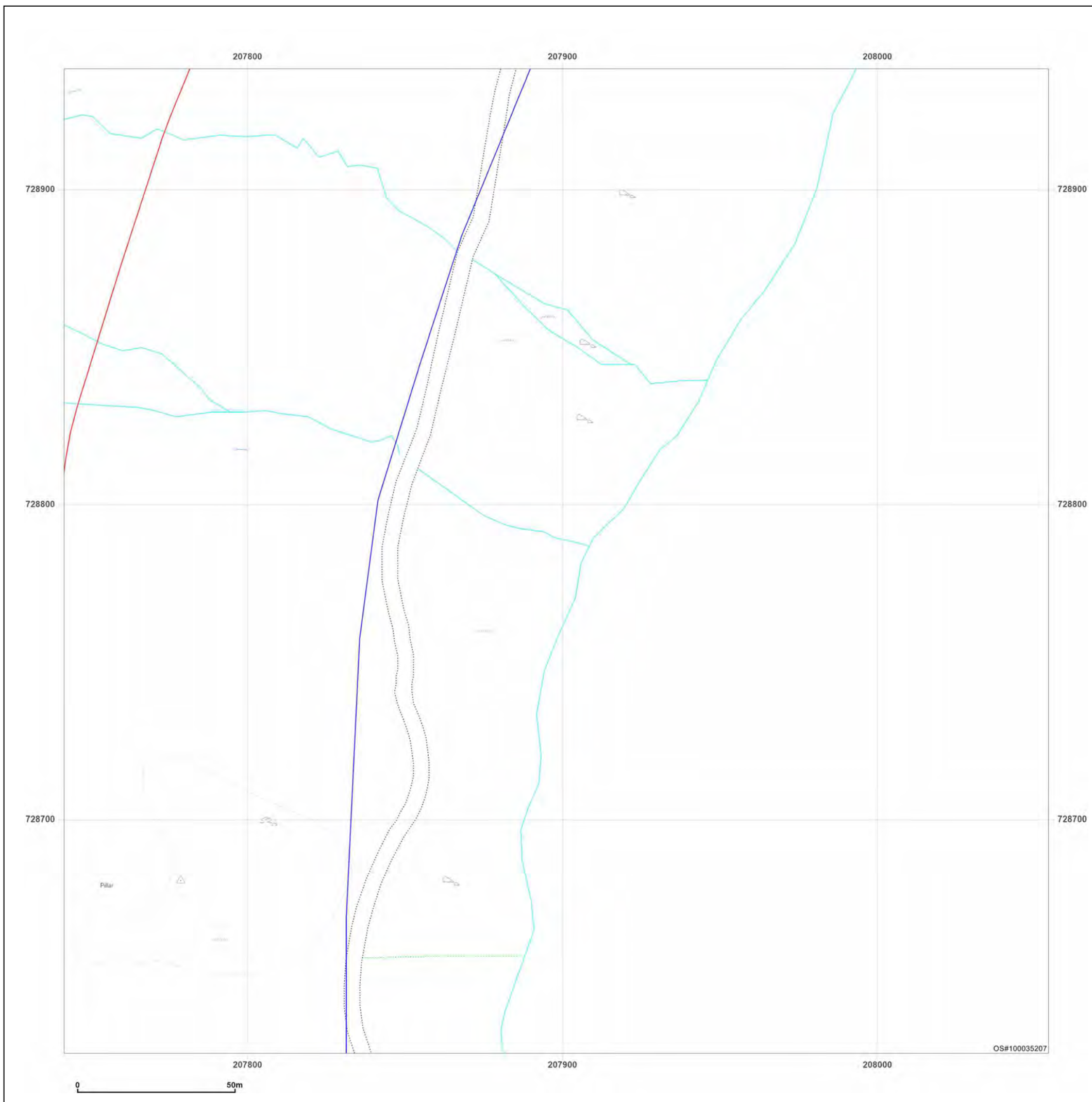


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#### Site Details:

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**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_2\_10  
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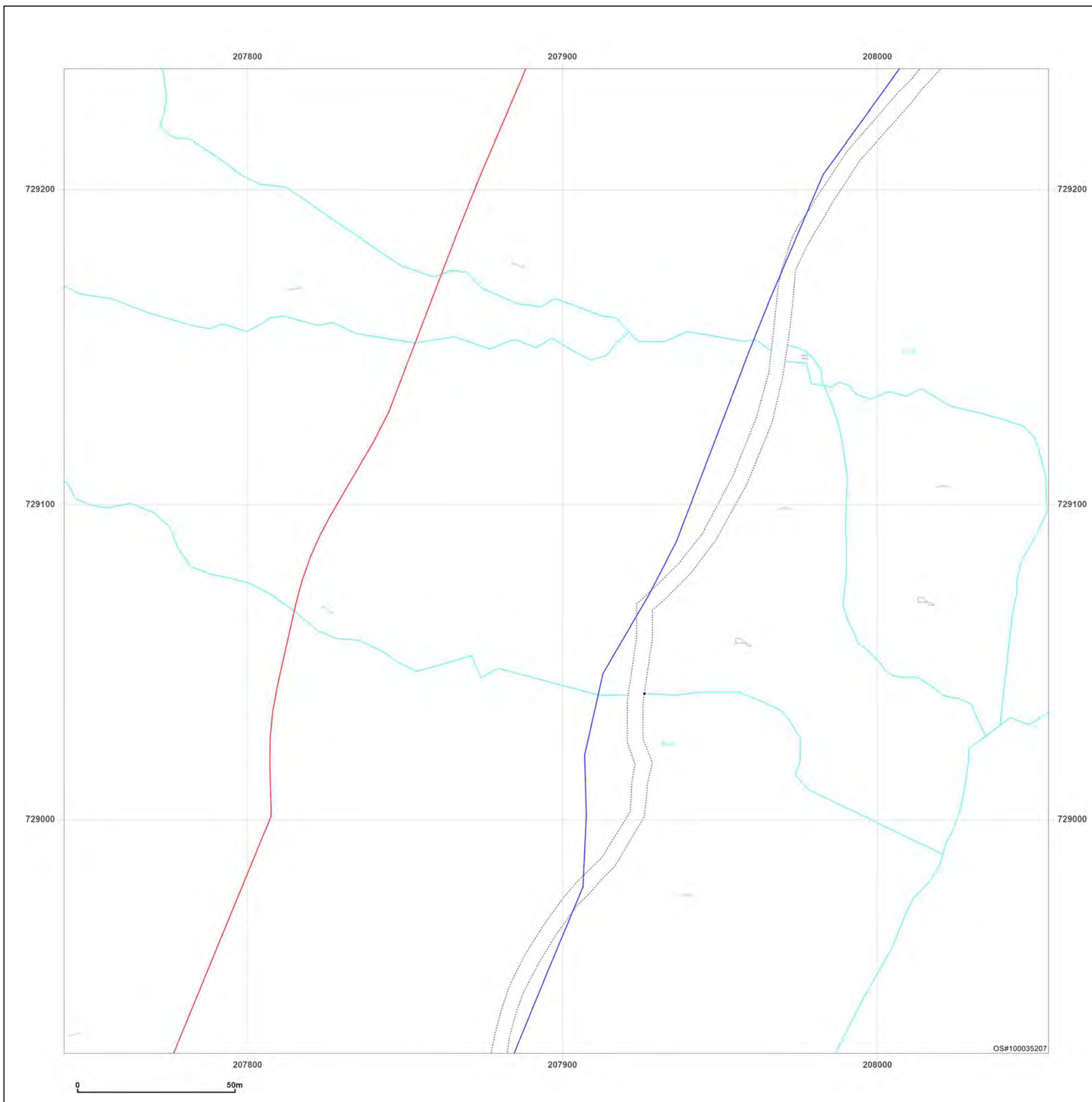


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#### Site Details:

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**Report Ref:** GSIP-2022-12632-9902\_Landline\_2\_11  
**Grid Ref:** 207898, 729382

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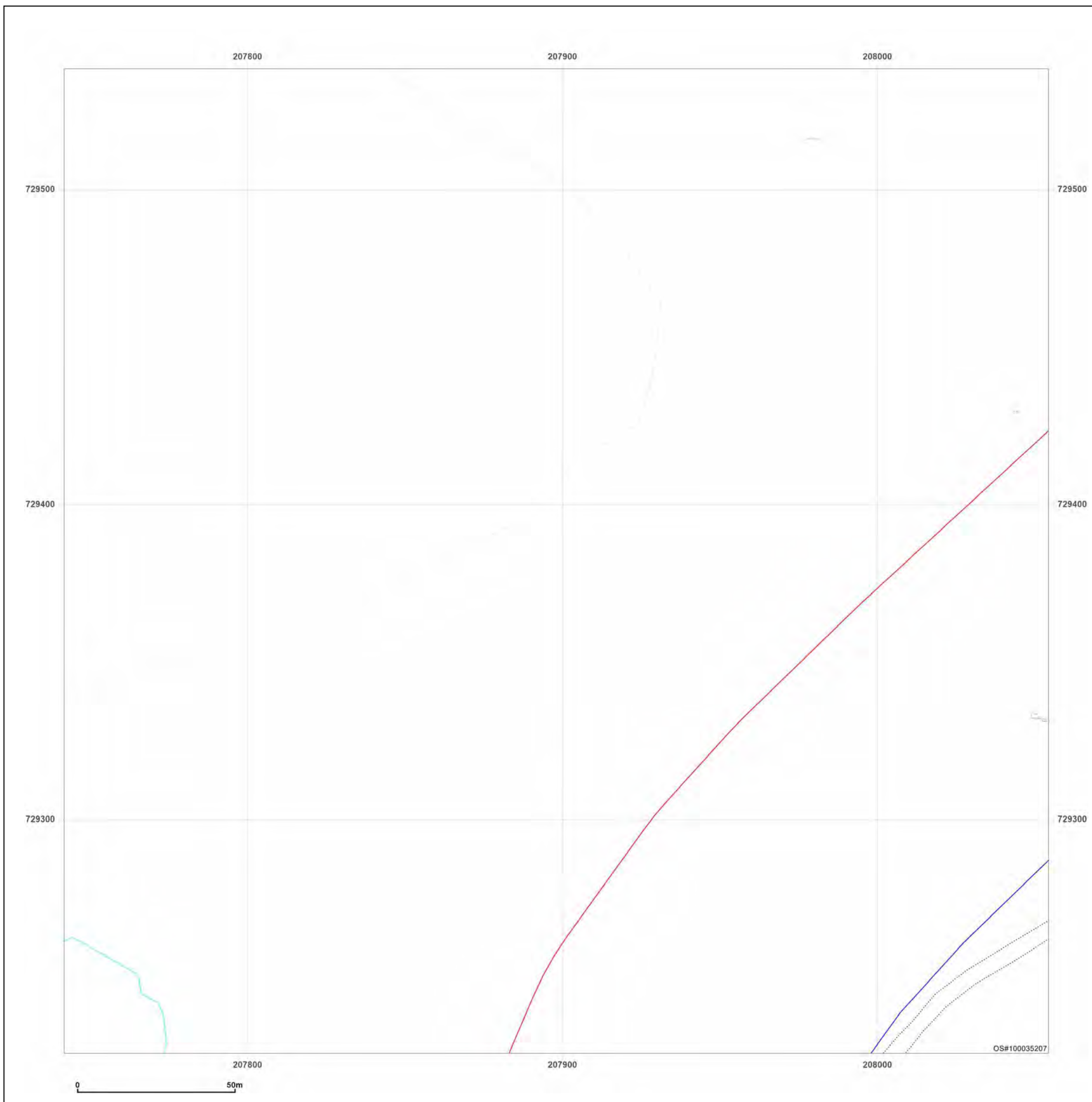


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_3\_1  
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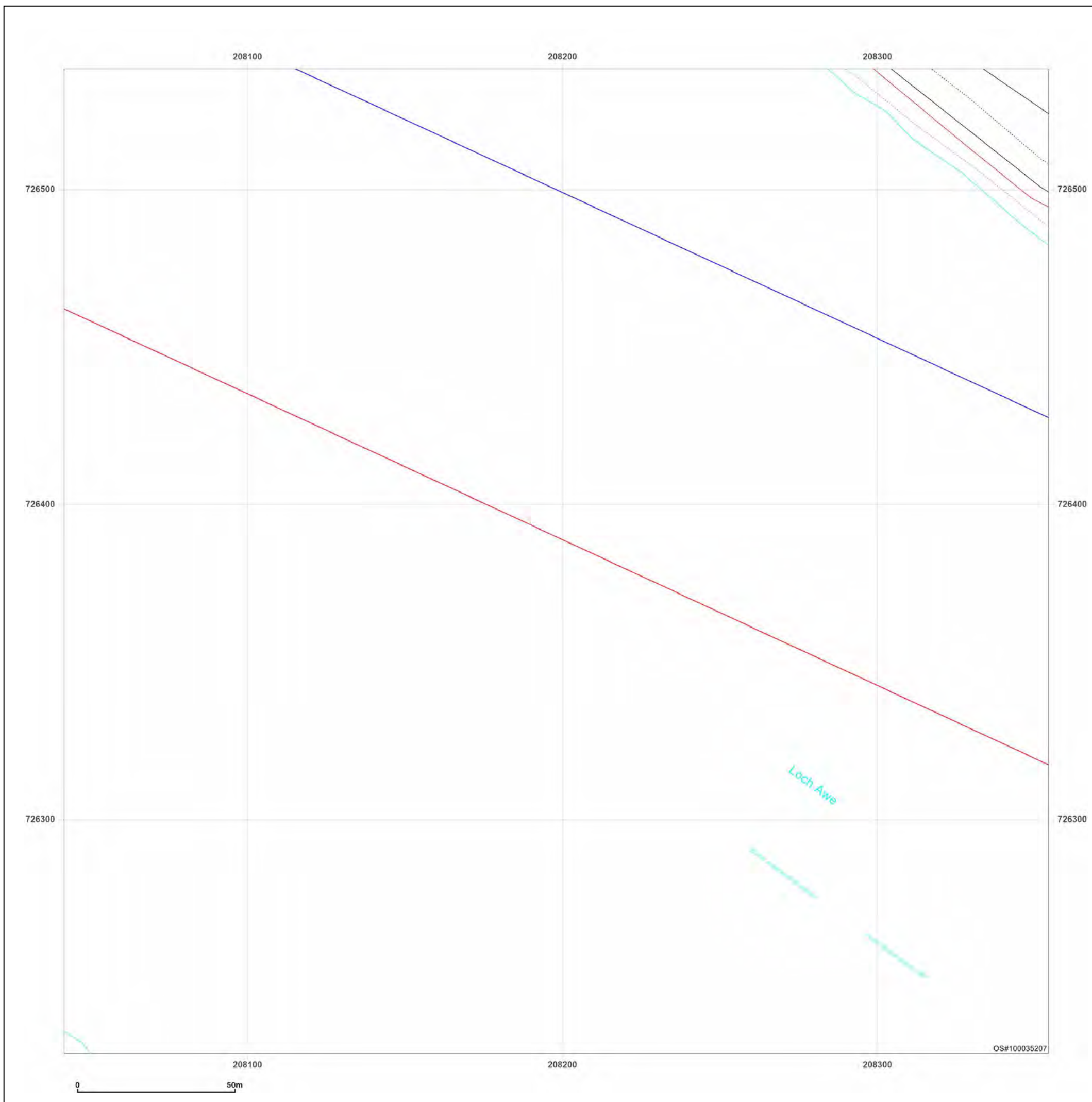


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_3\_2  
**Grid Ref:** 208198, 726682

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

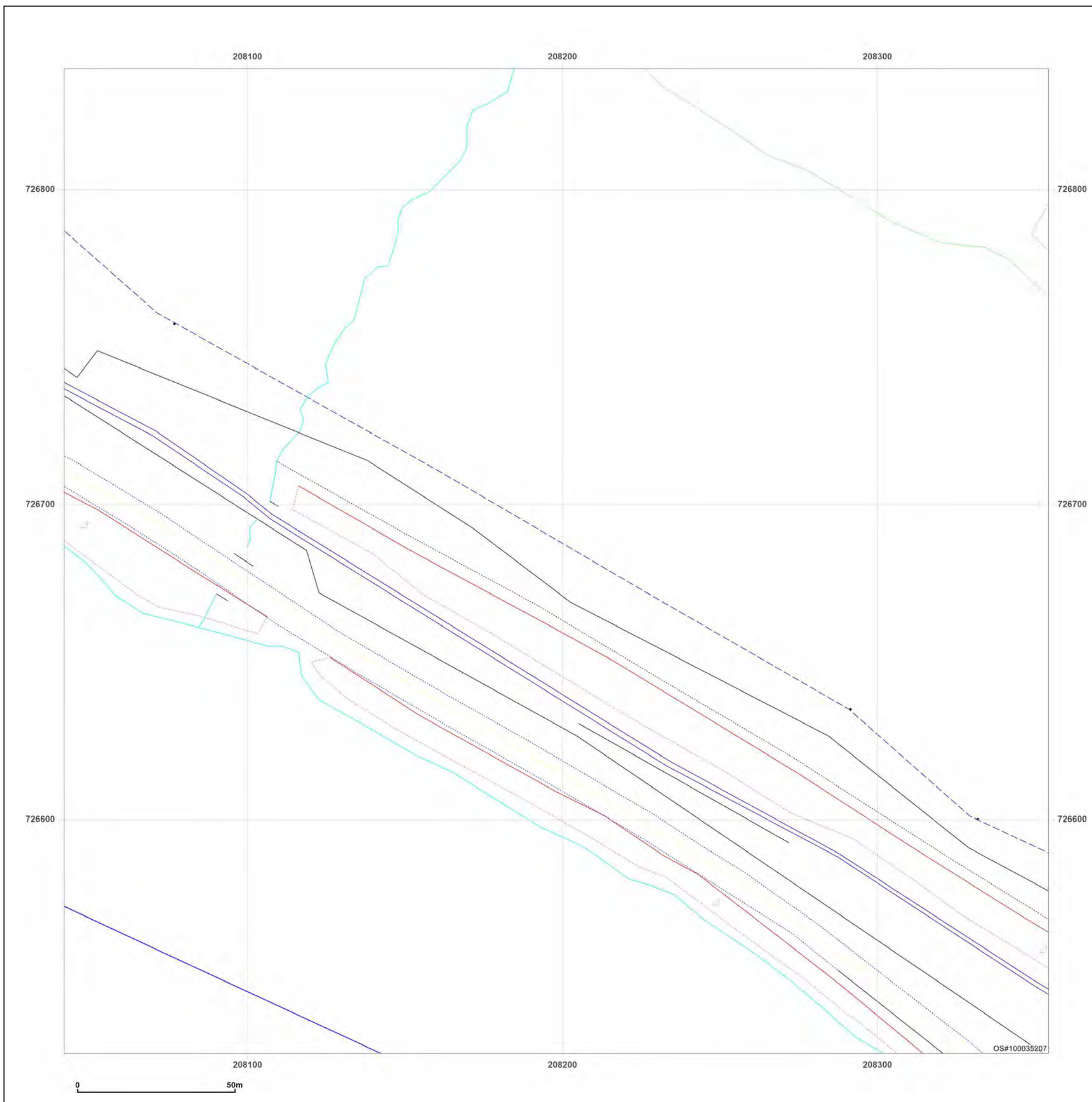


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_3\_3  
**Grid Ref:** 208198, 726982

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

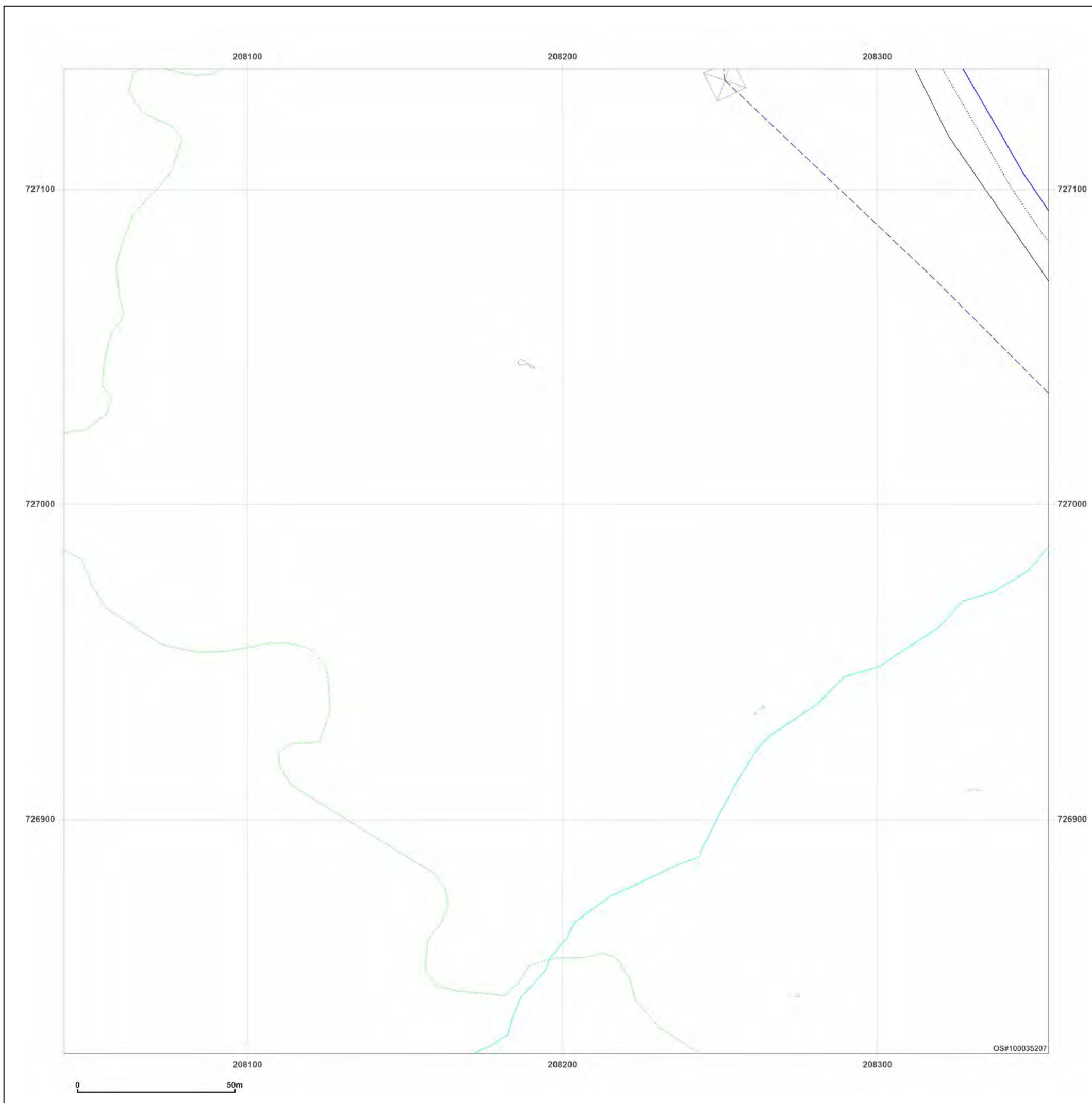


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_3\_4  
**Grid Ref:** 208198, 727282

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

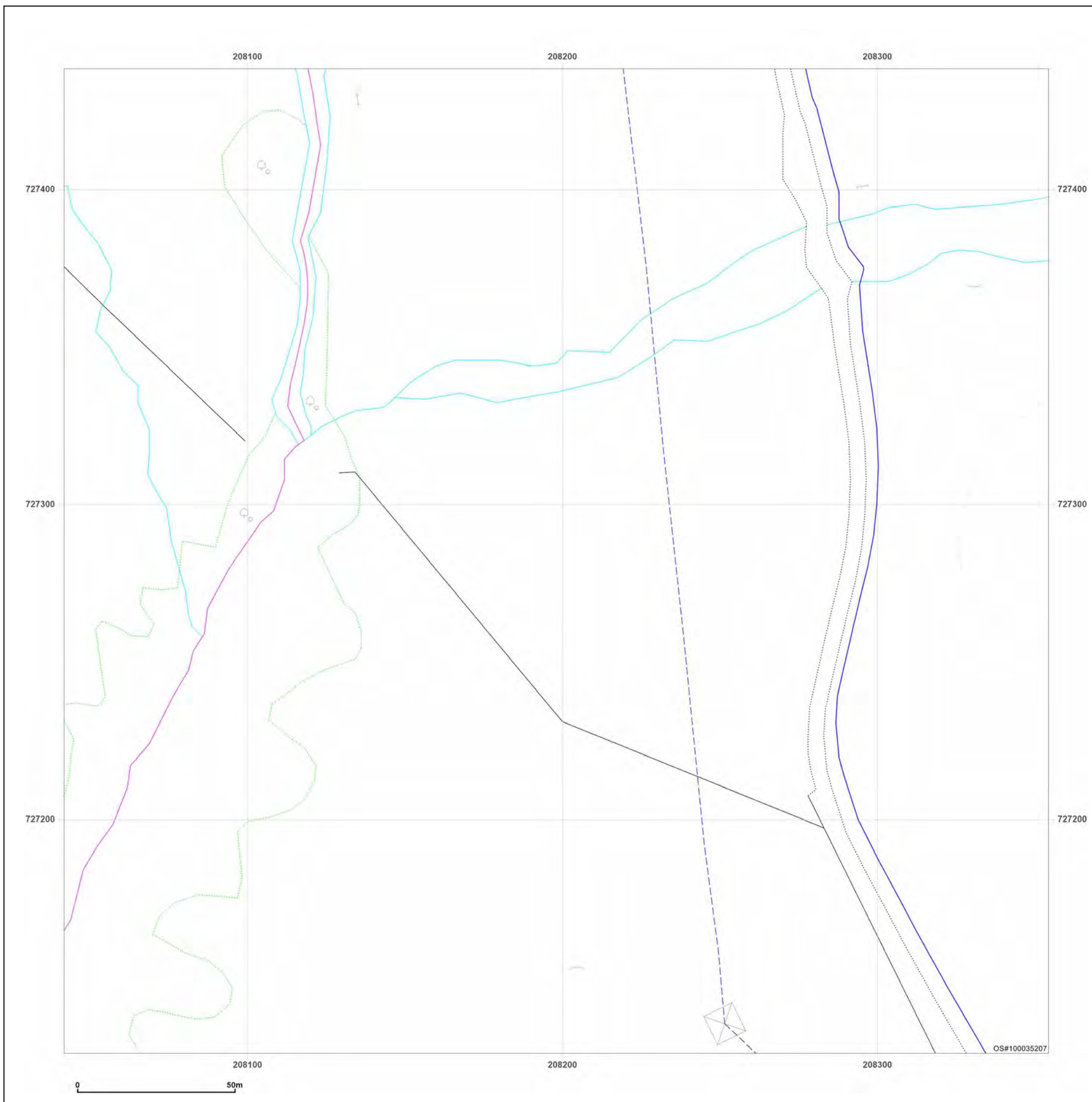


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_3\_5  
**Grid Ref:** 208198, 727582

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

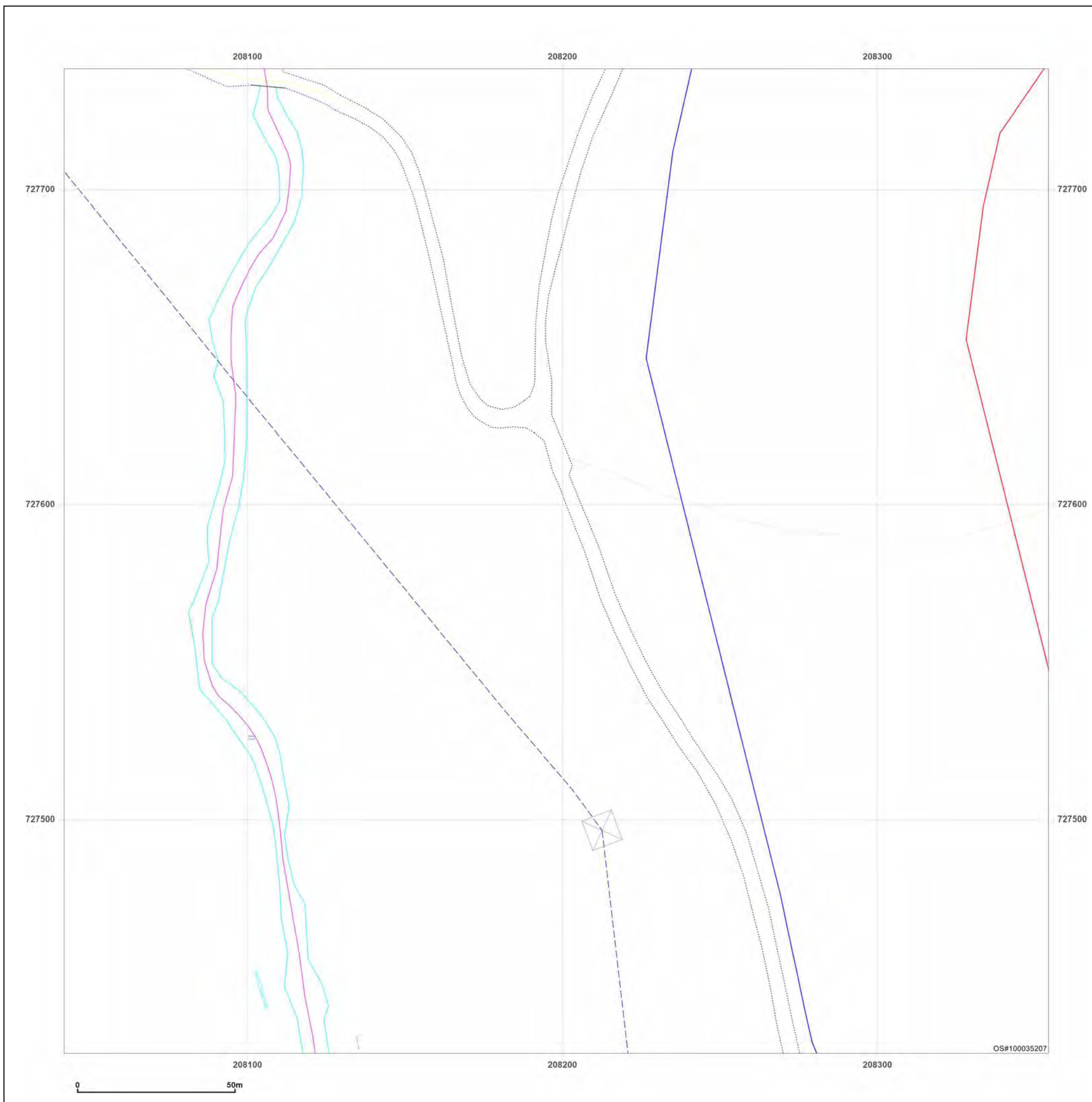


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_3\_6  
**Grid Ref:** 208198, 727882

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

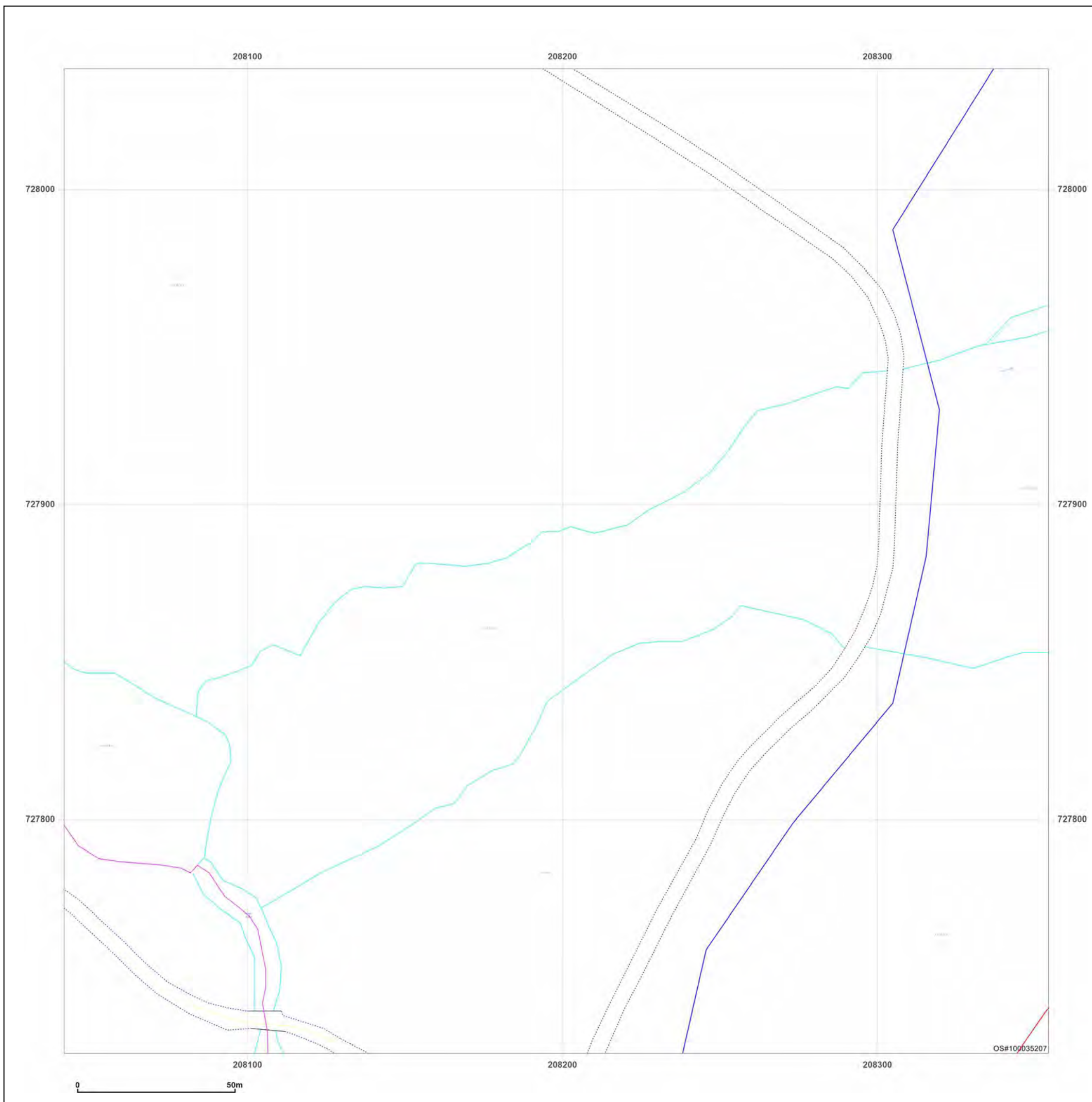


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_3\_7  
**Grid Ref:** 208198, 728182

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

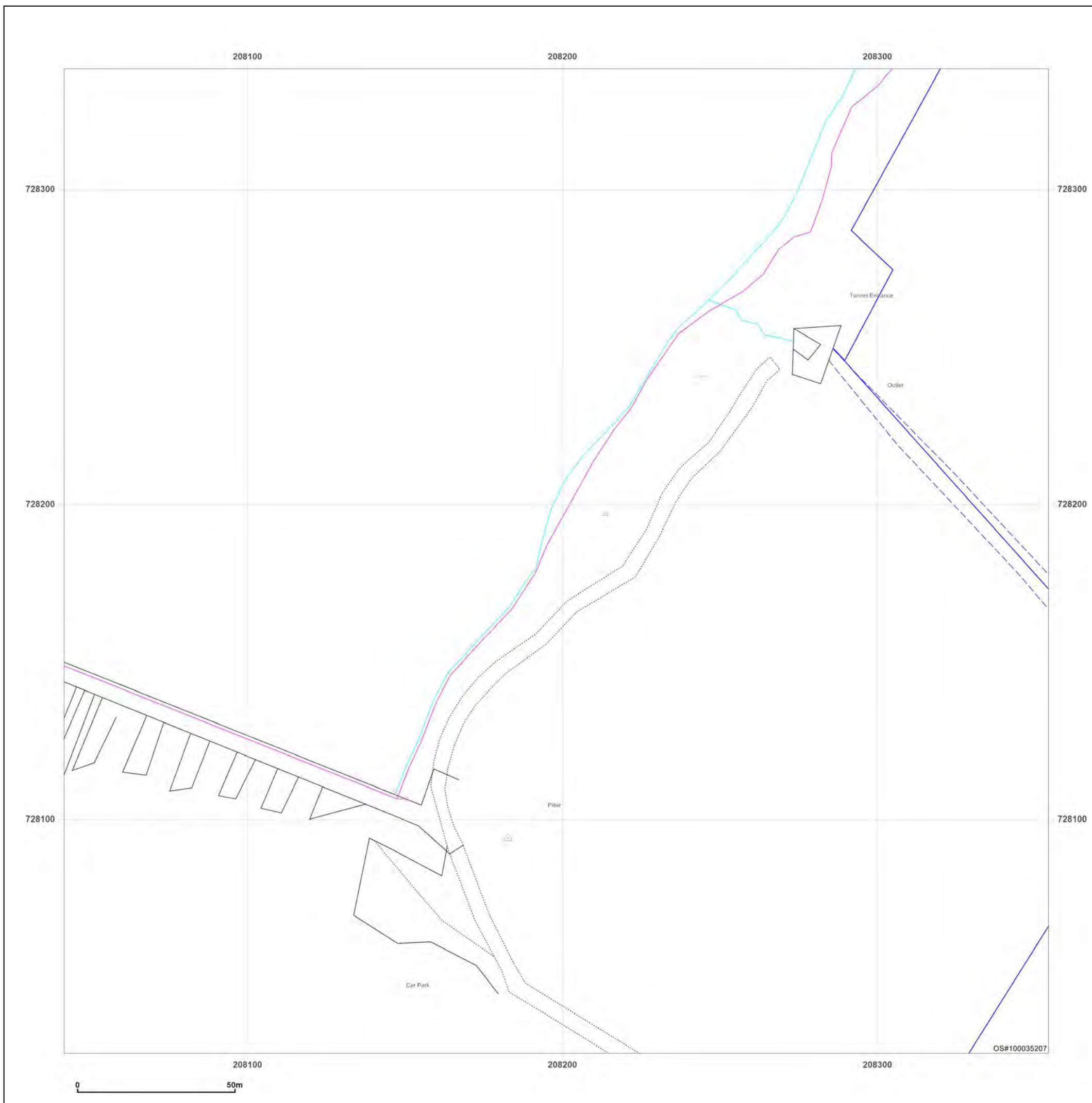


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_3\_8  
**Grid Ref:** 208198, 728482

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

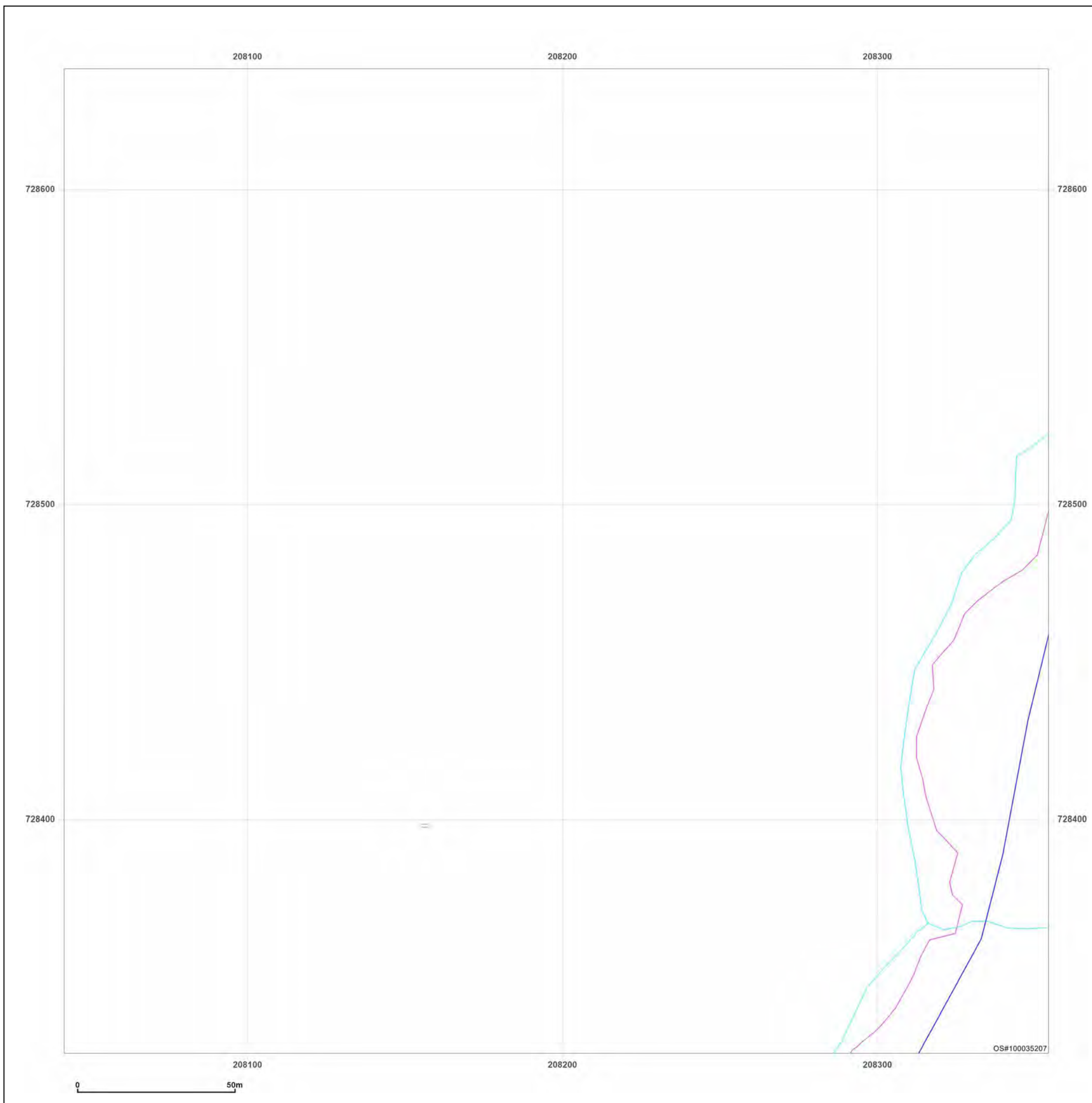


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_3\_9  
**Grid Ref:** 208198, 728782

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

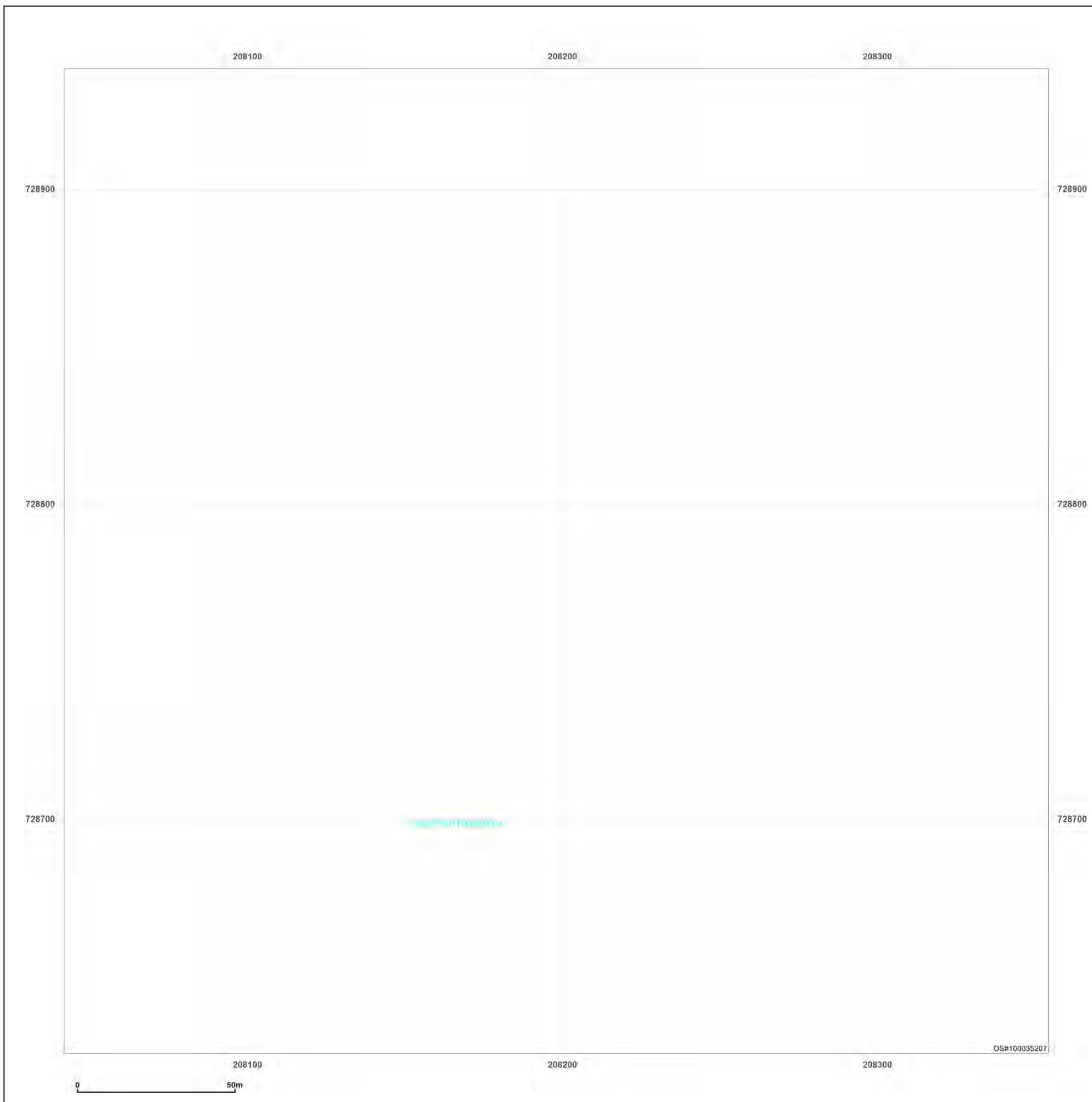


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_3\_10  
**Grid Ref:** 208198, 729082

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

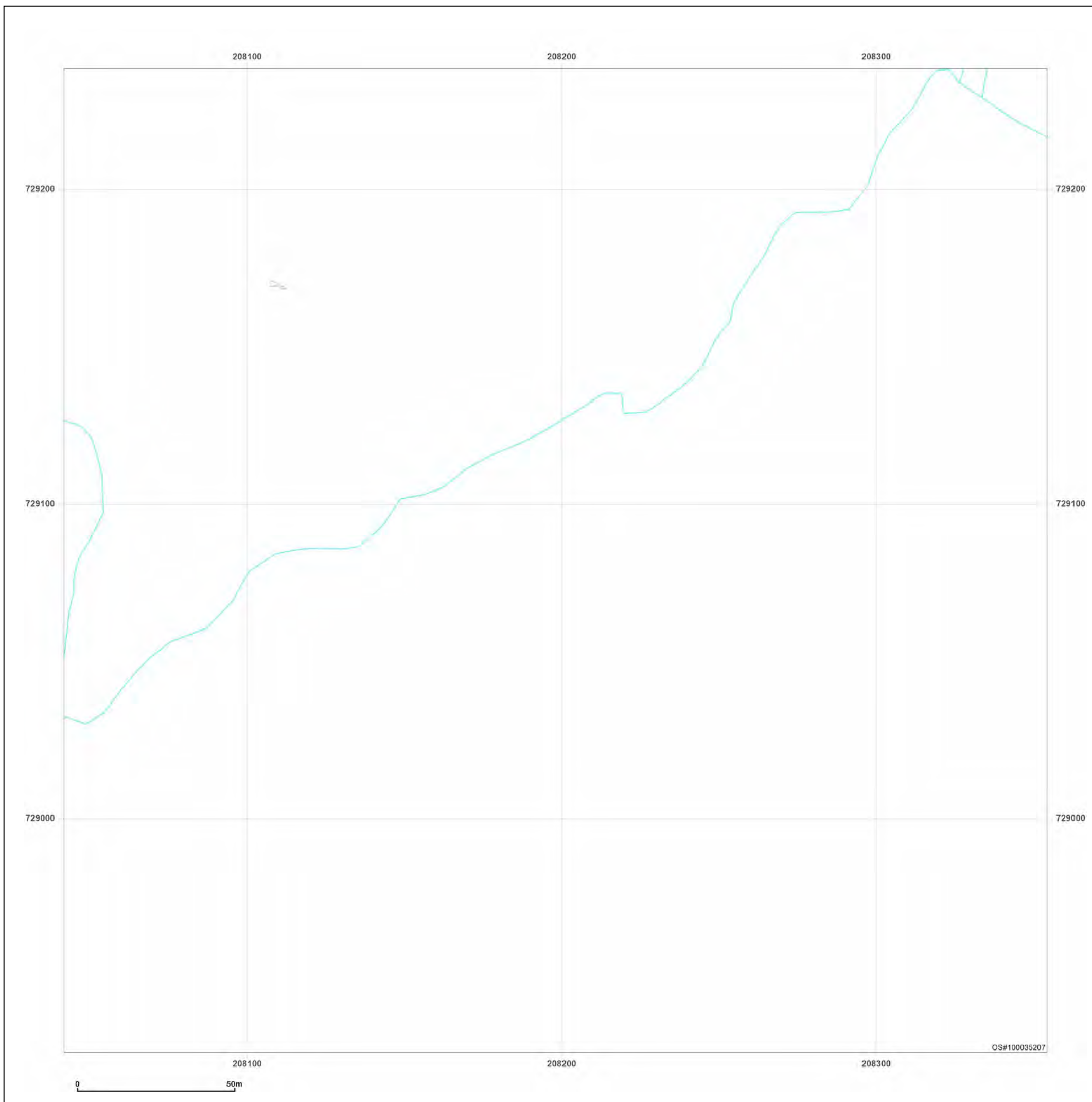


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_3\_11  
**Grid Ref:** 208198, 729382

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

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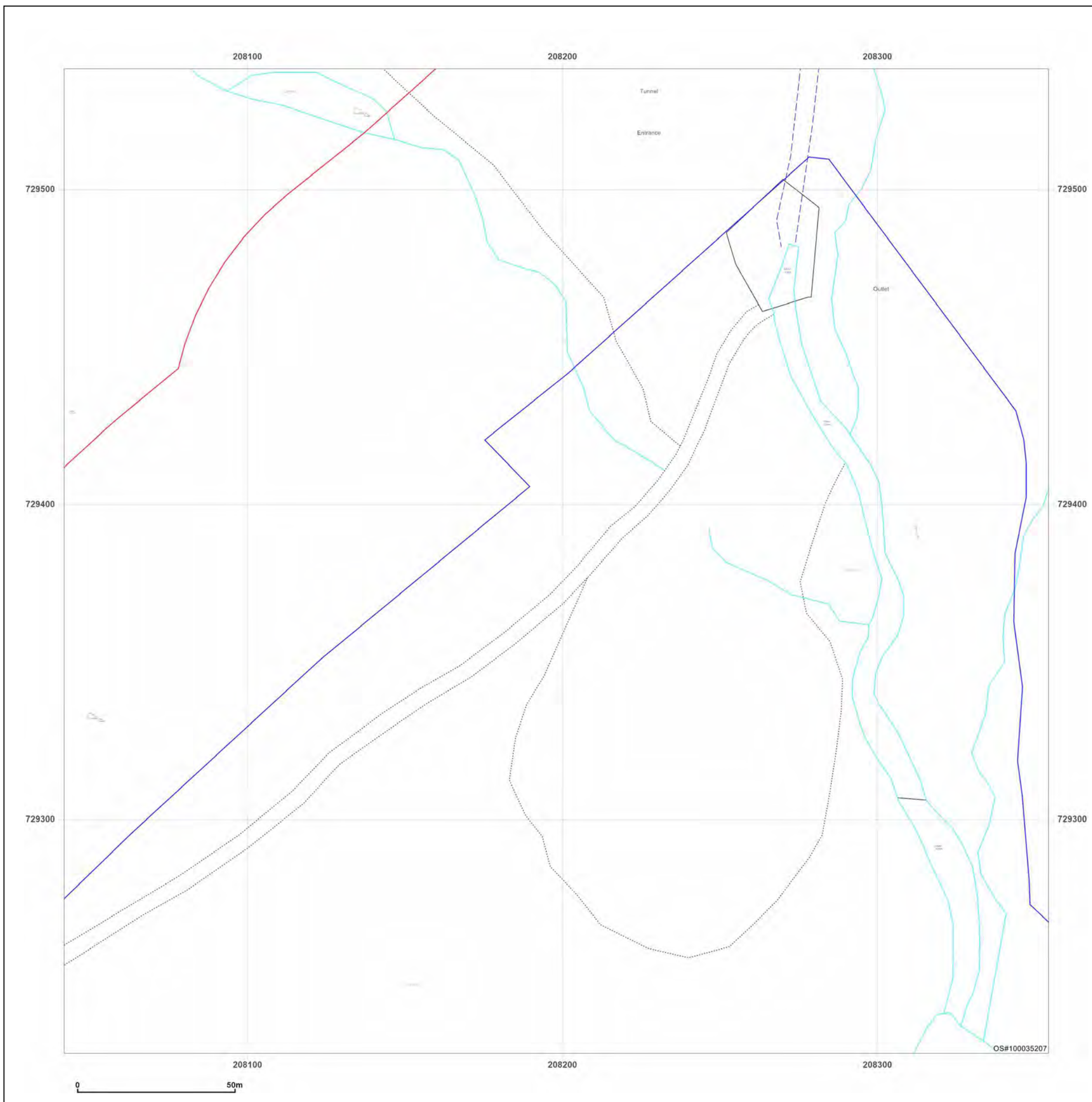


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_4\_1  
**Grid Ref:** 208498, 726382

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

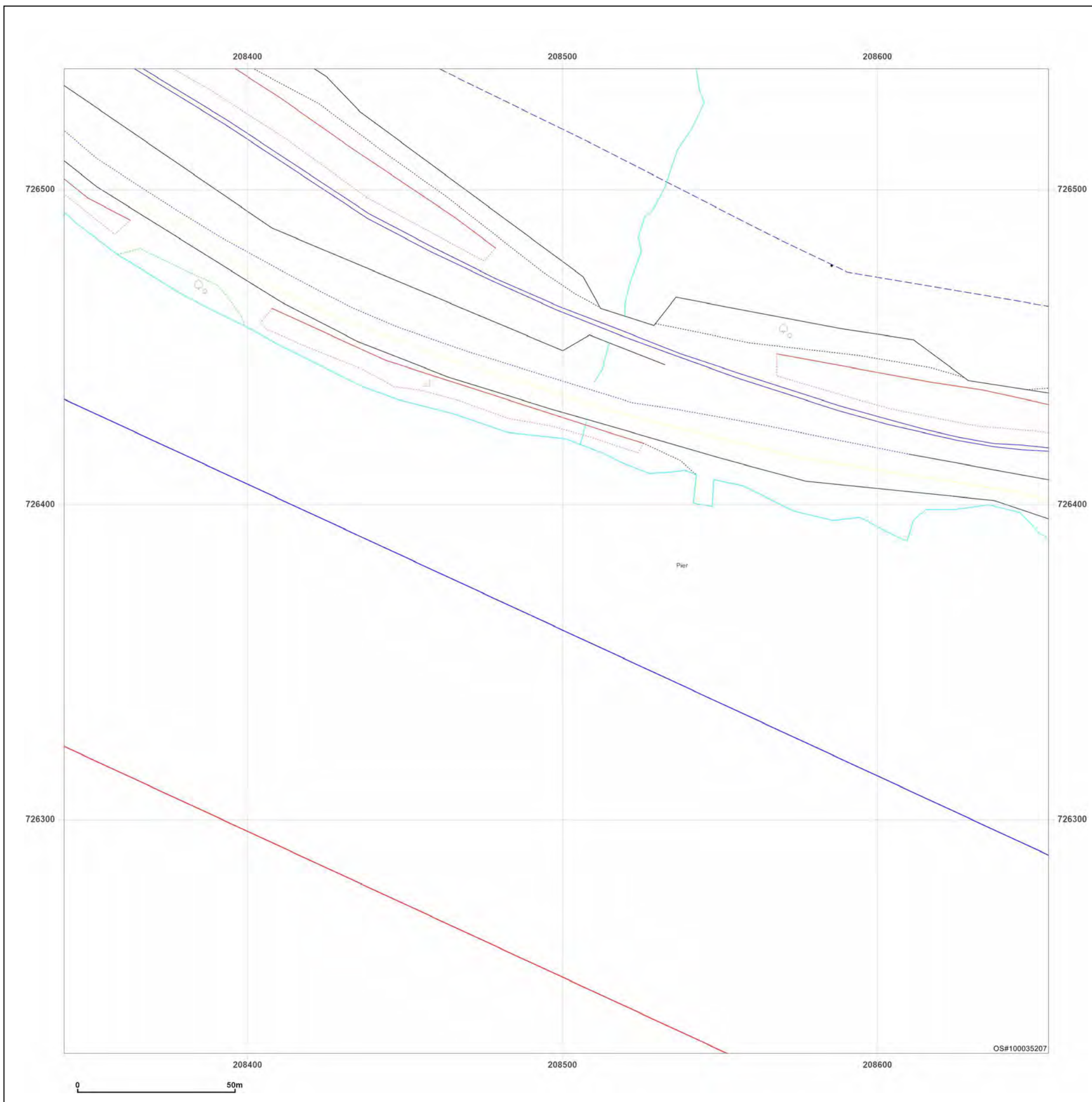


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Site Details:

Cruachan 2 West

Client Ref: Cruachan 2 West  
Report Ref: GSIP-2022-12632-9902\_Landline\_4\_2  
Grid Ref: 208498, 726682

Map Name: LandLine

Map date: 2003

Scale: 1:1,250

Printed at: 1:1,250

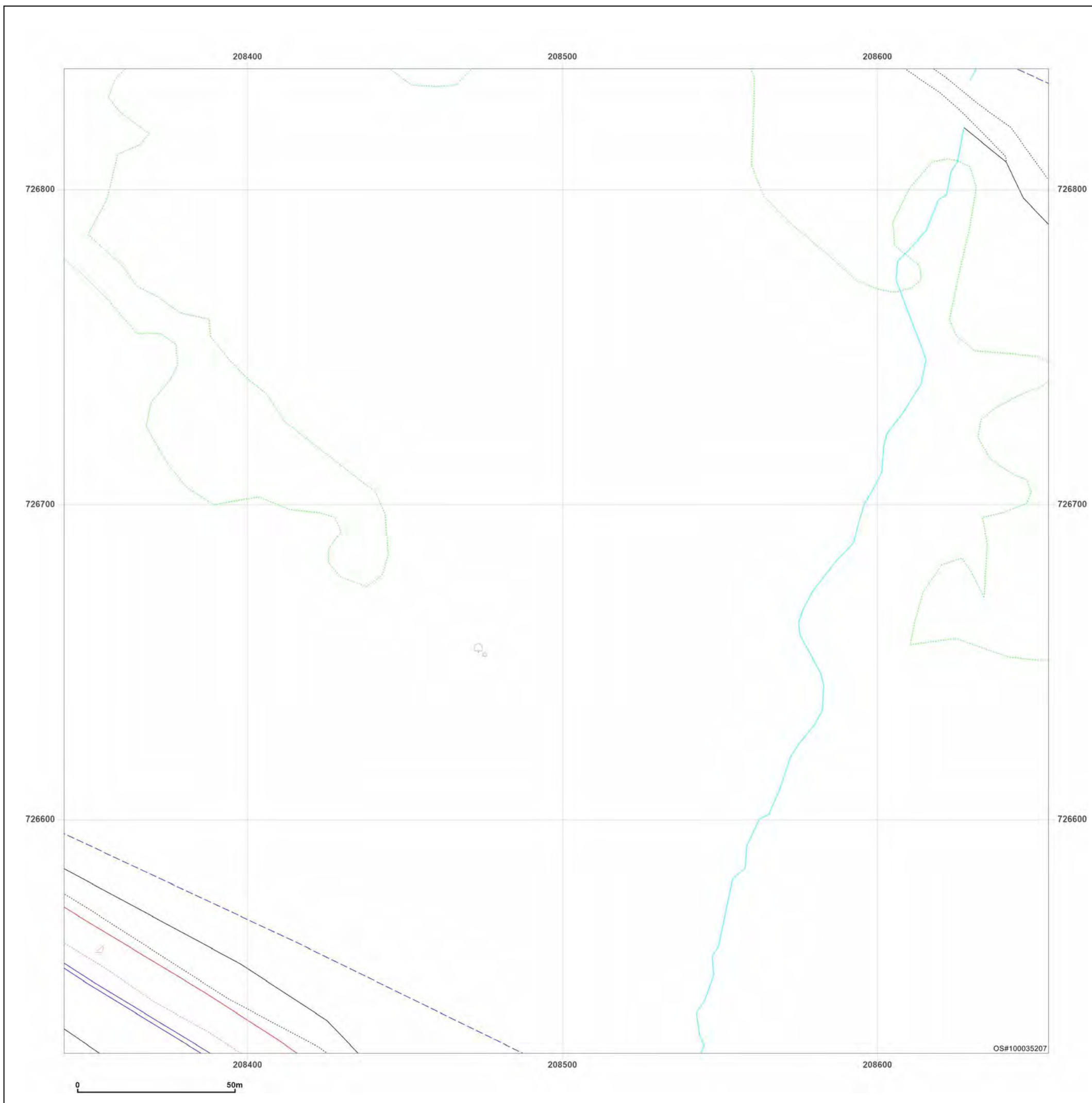


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_4\_3  
**Grid Ref:** 208498, 726982

**Map Name:** LandLine

**Map date:** 2003

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**Printed at:** 1:1,250

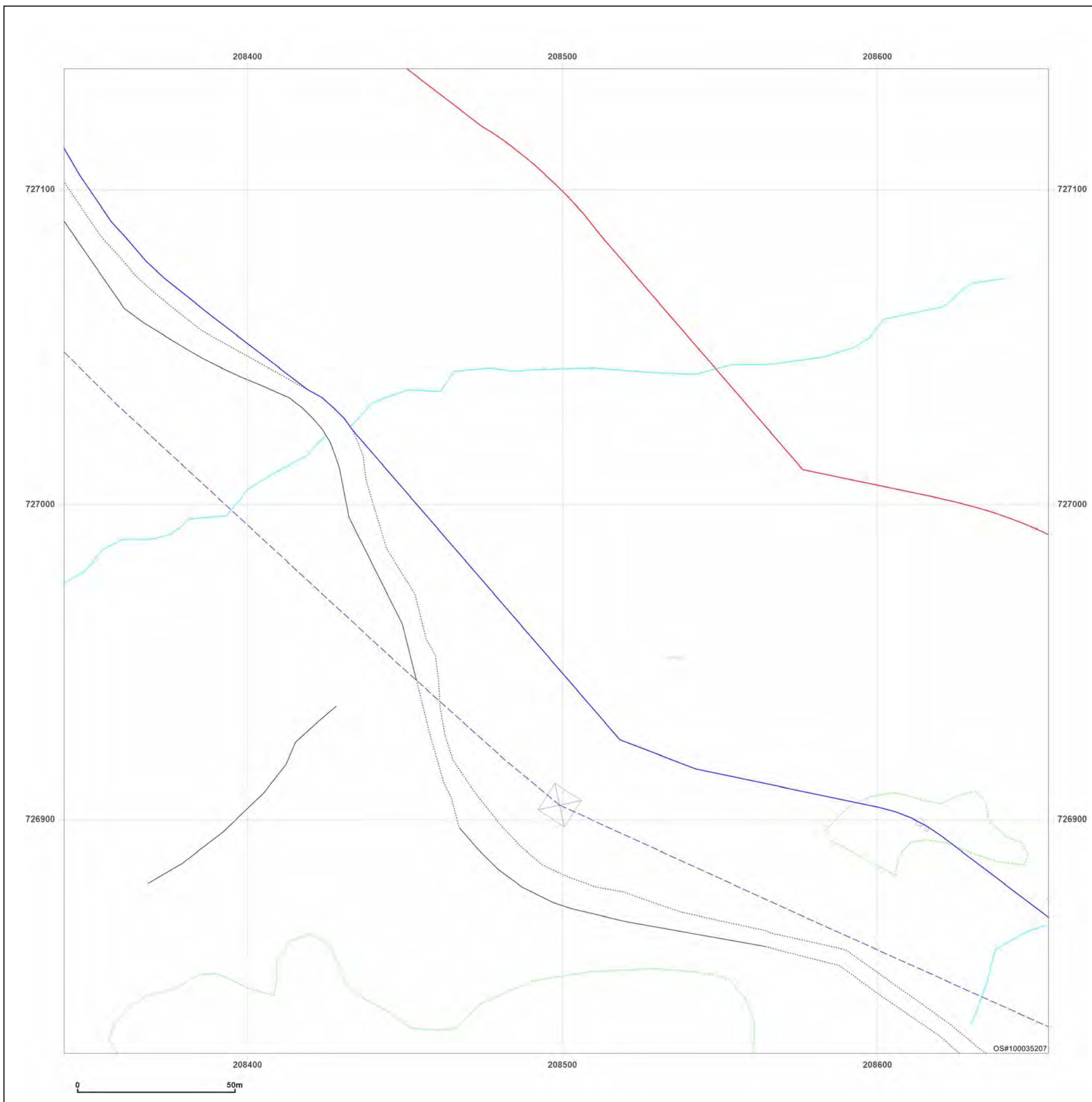


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_4\_7  
**Grid Ref:** 208498, 728182

**Map Name:** LandLine

**Map date:** 2003

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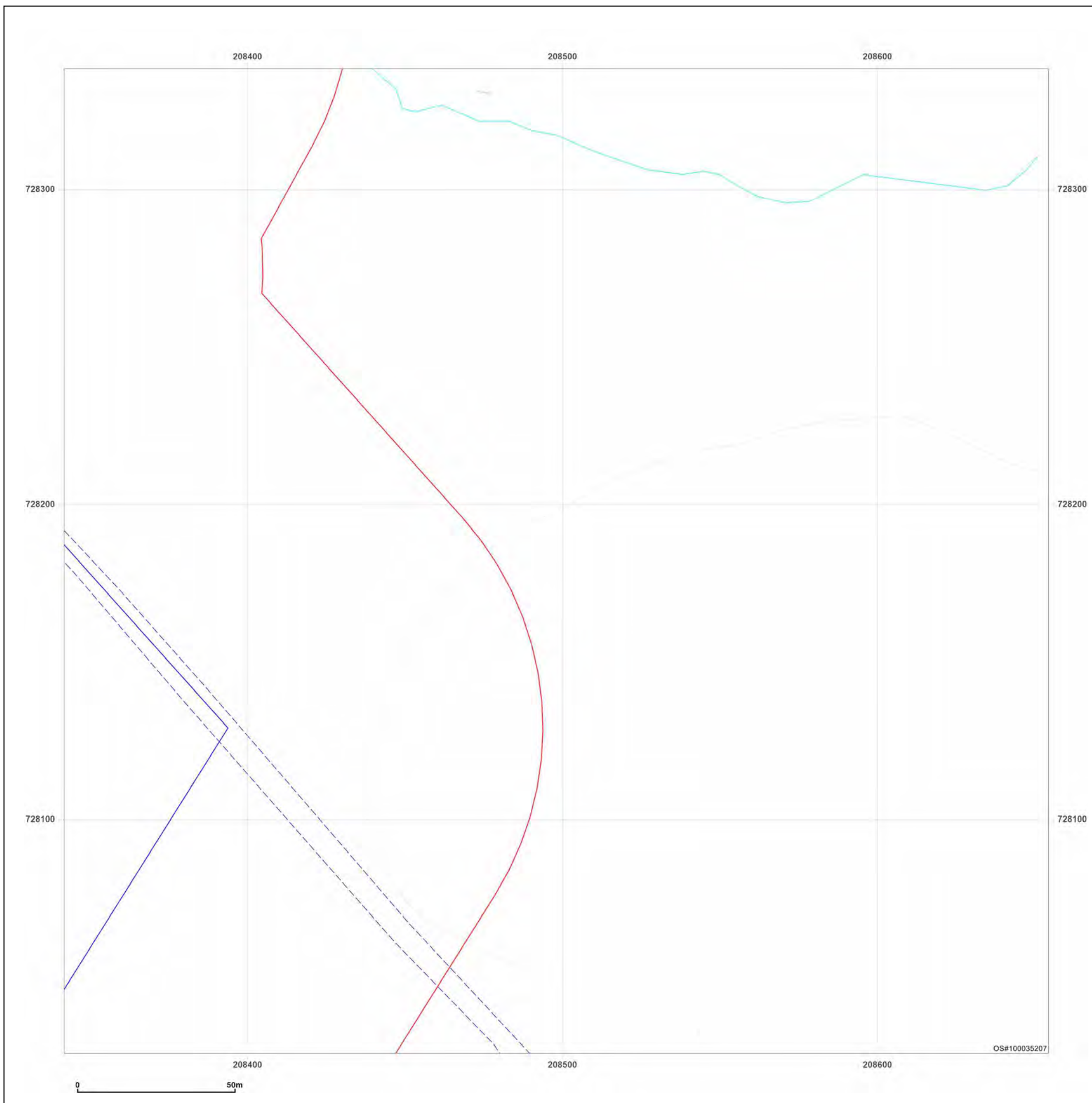


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_4\_8  
**Grid Ref:** 208498, 728482

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

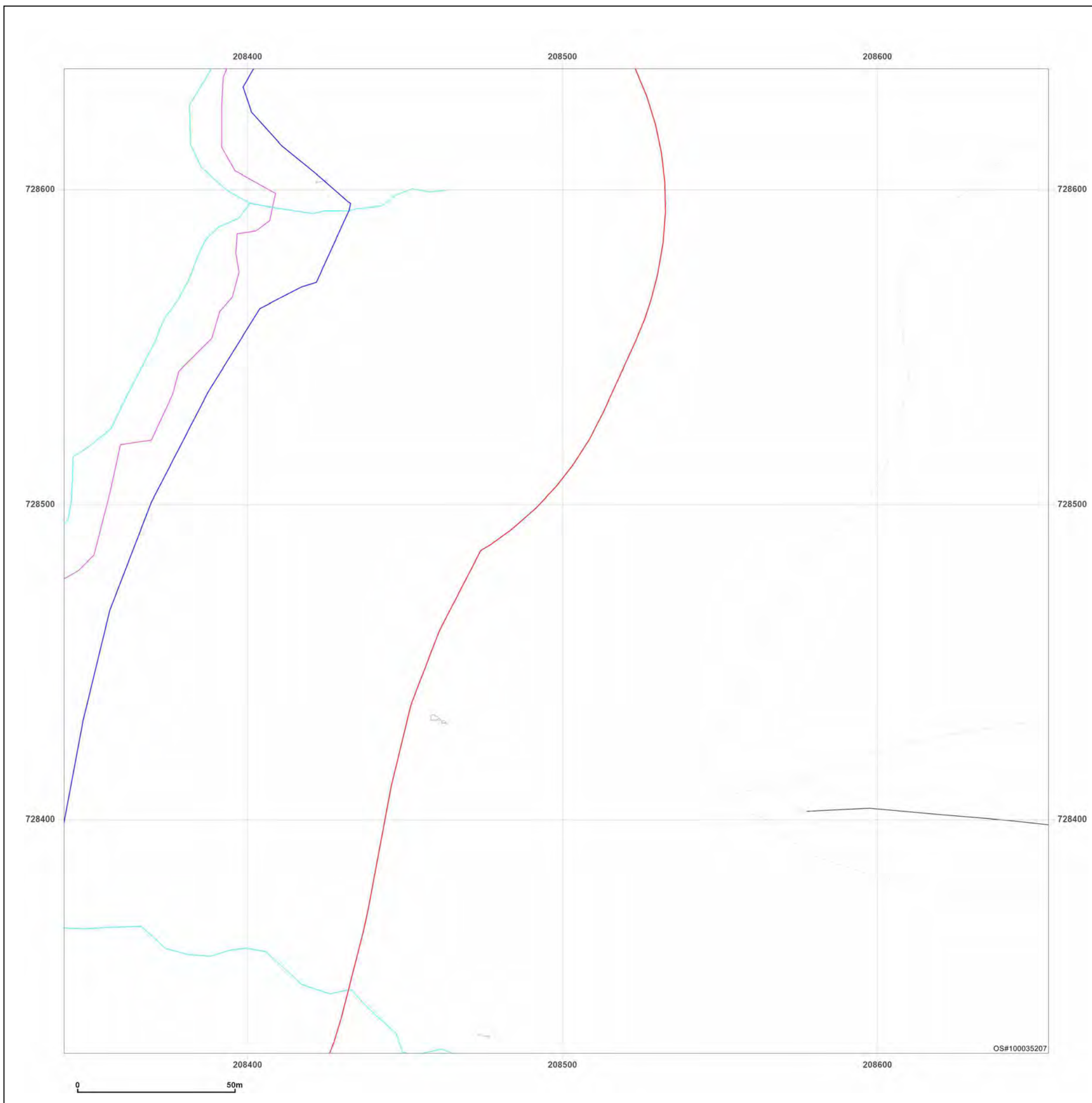


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_4\_9  
**Grid Ref:** 208498, 728782

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

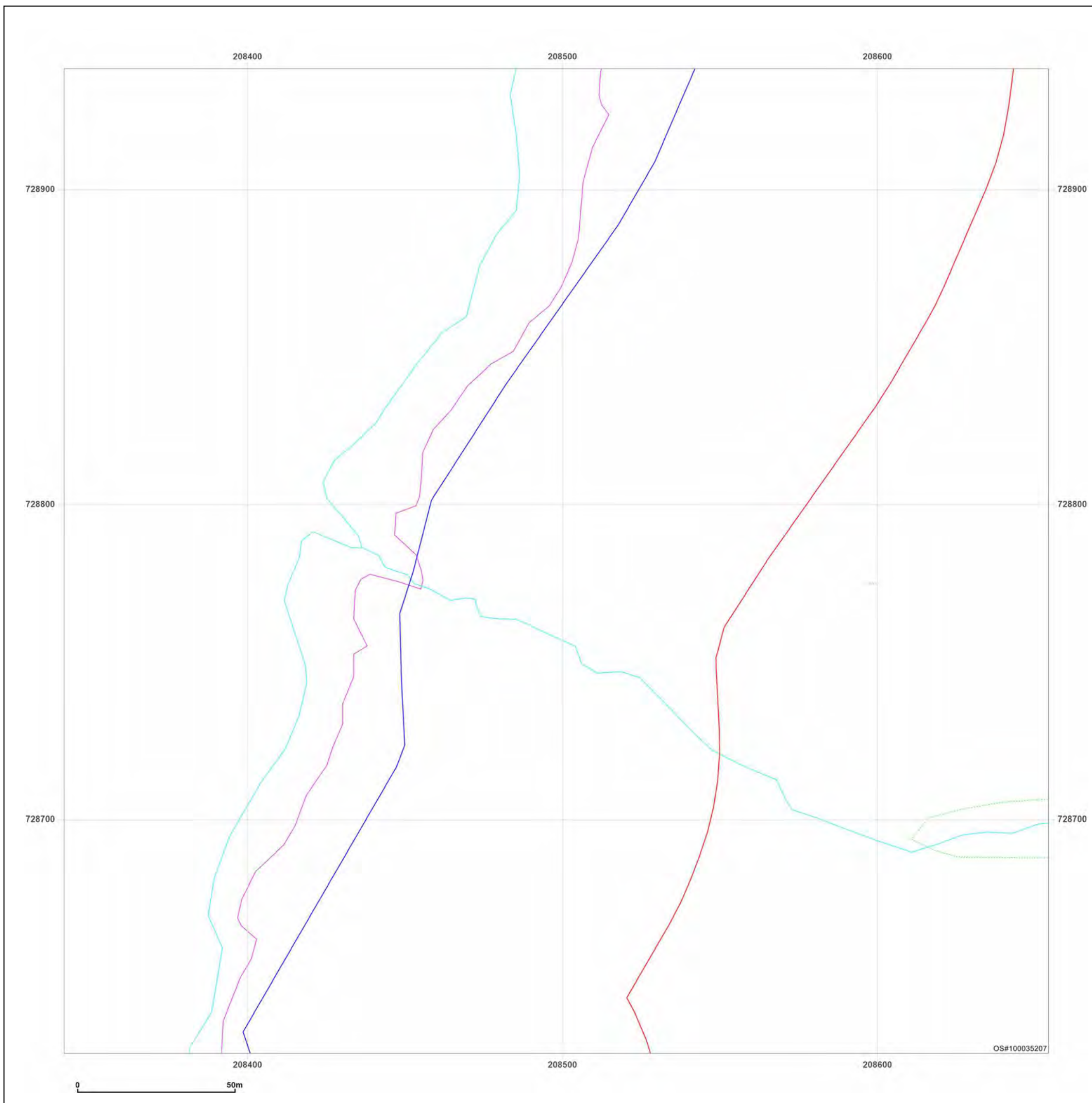


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_4\_10  
**Grid Ref:** 208498, 729082

**Map Name:** LandLine

**Map date:** 2003

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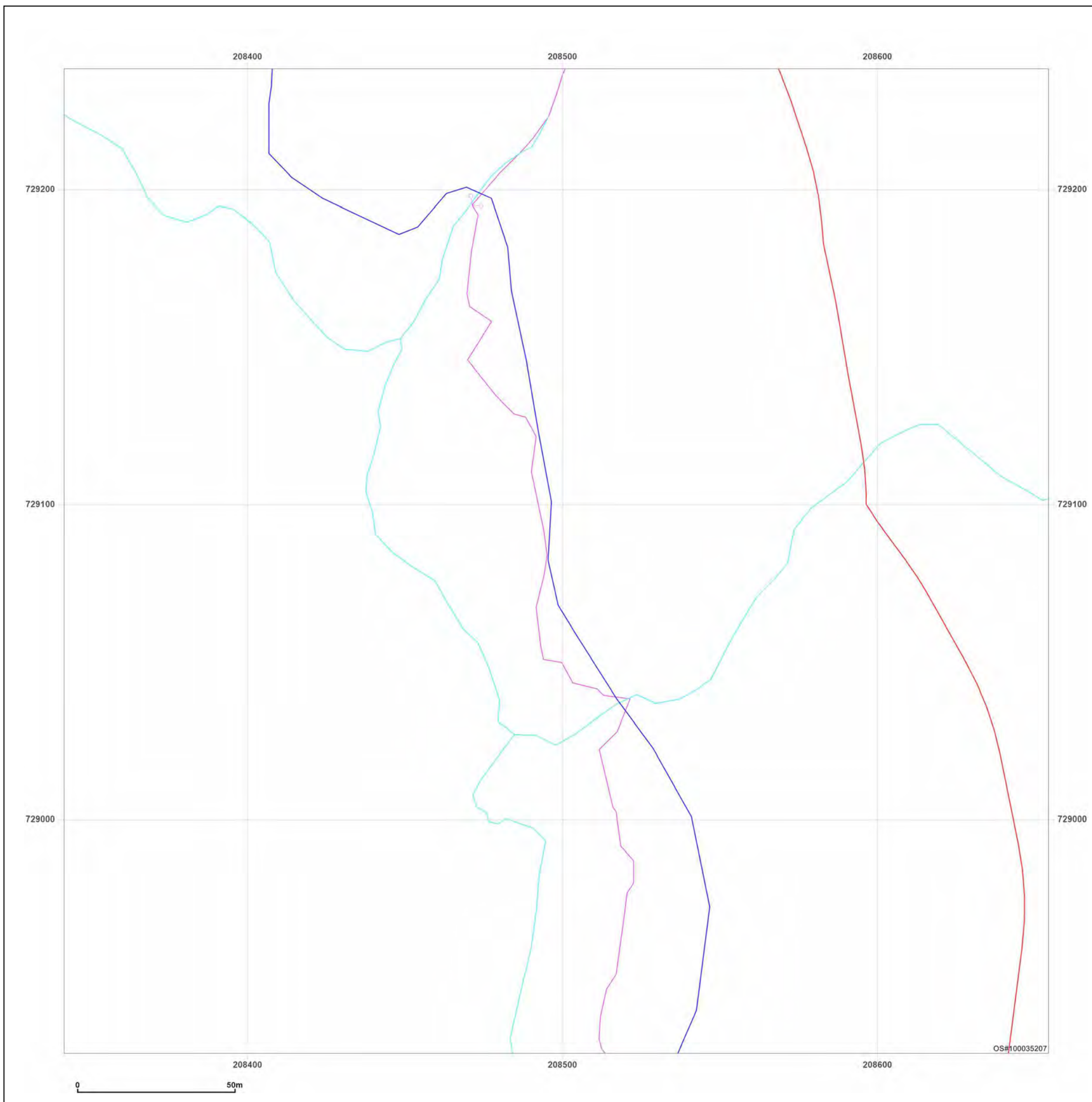


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Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_4\_11  
**Grid Ref:** 208498, 729382

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

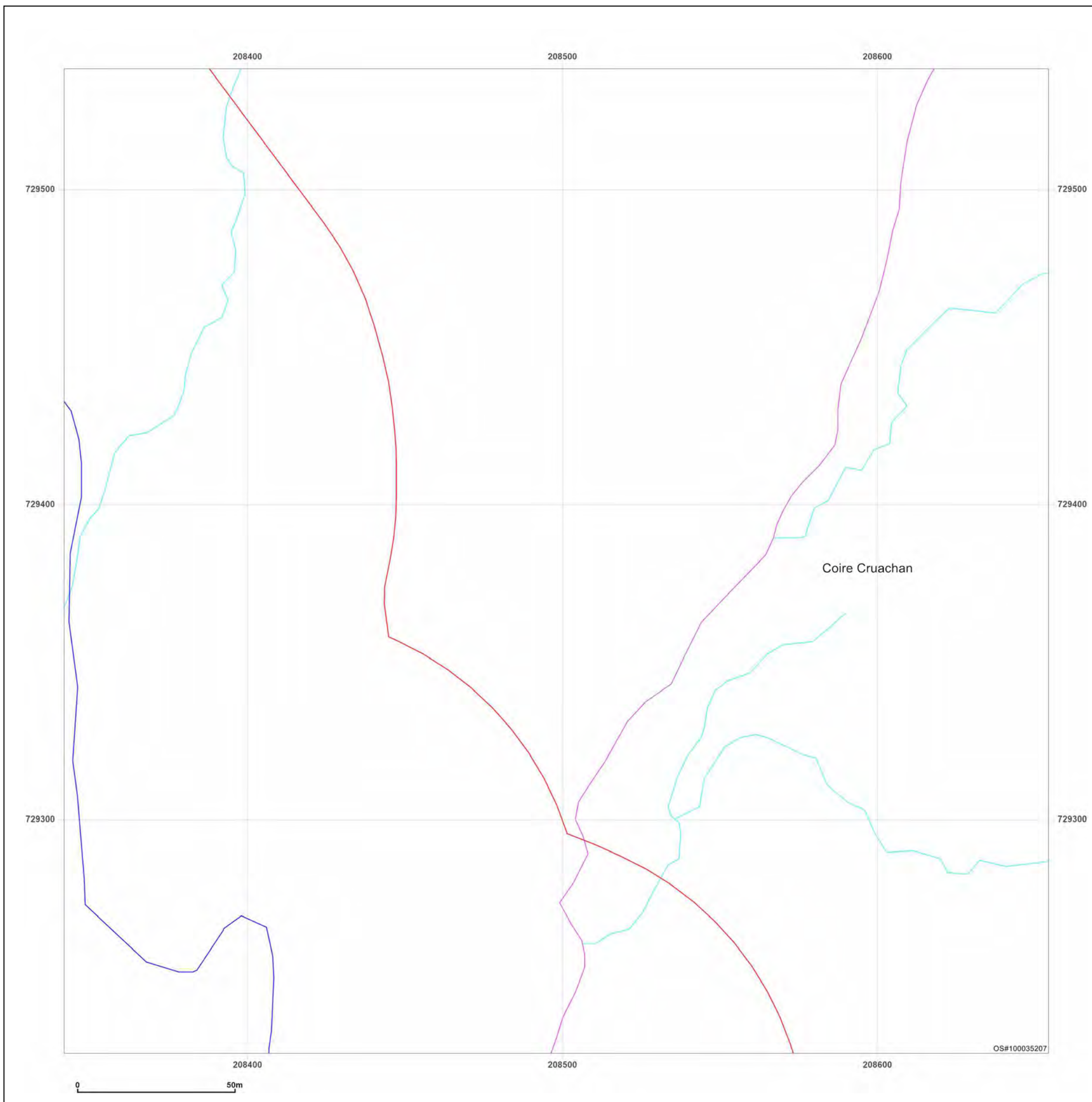


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_5\_1  
**Grid Ref:** 208798, 726382

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

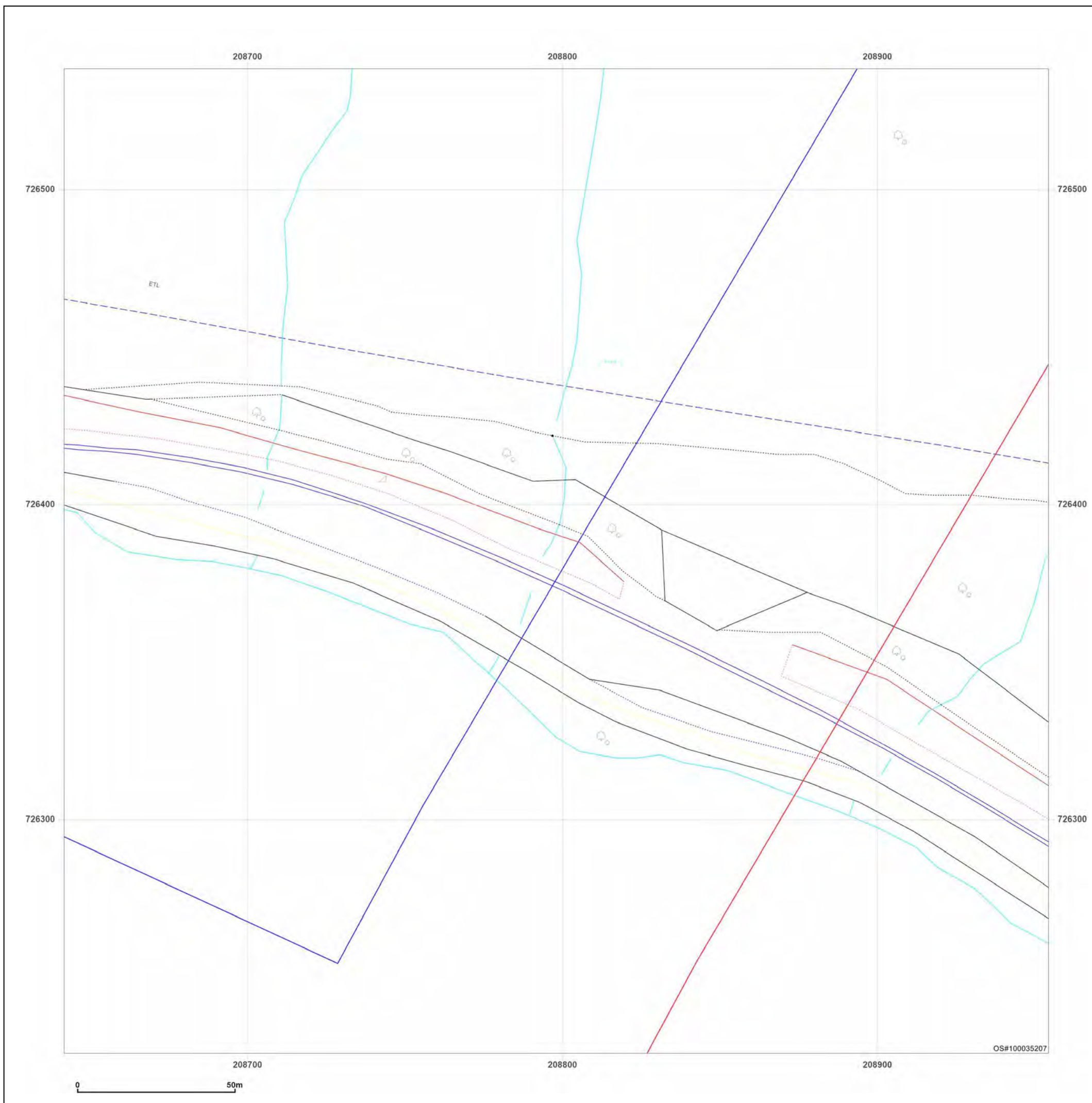


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_5\_3  
**Grid Ref:** 208798, 726982

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

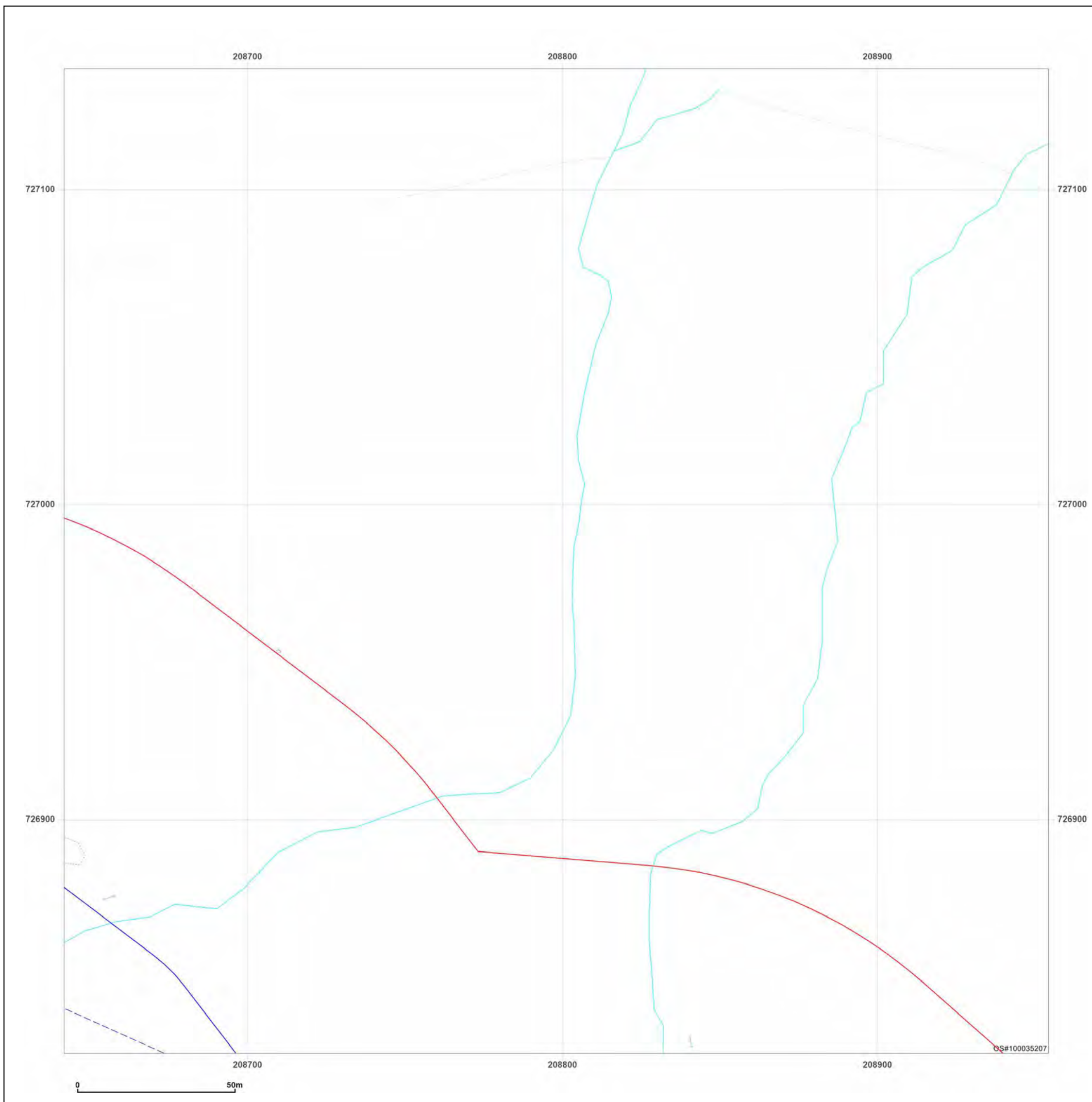


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_6\_1  
**Grid Ref:** 209098, 726382

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

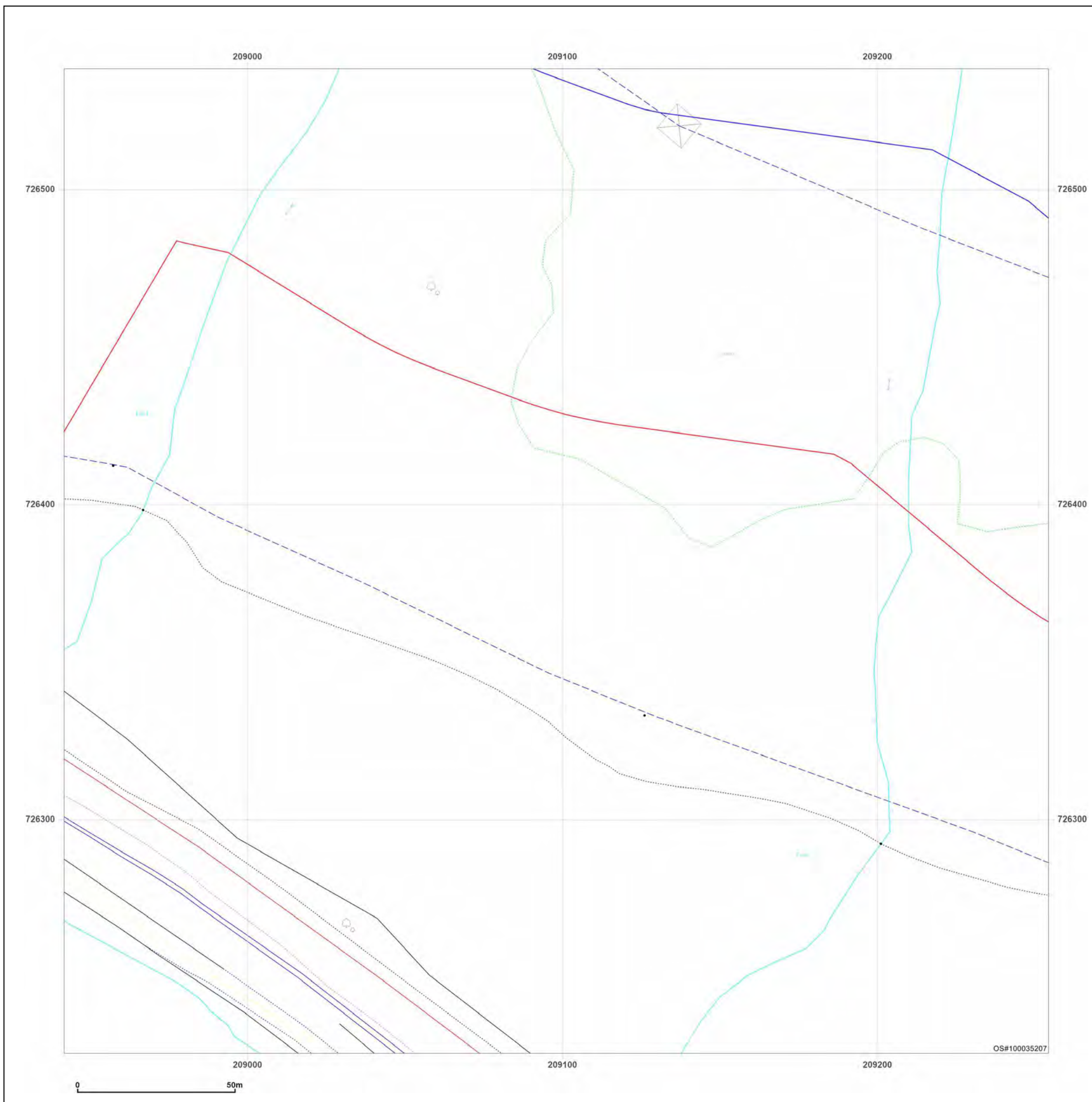


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_6\_2  
**Grid Ref:** 209098, 726682

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

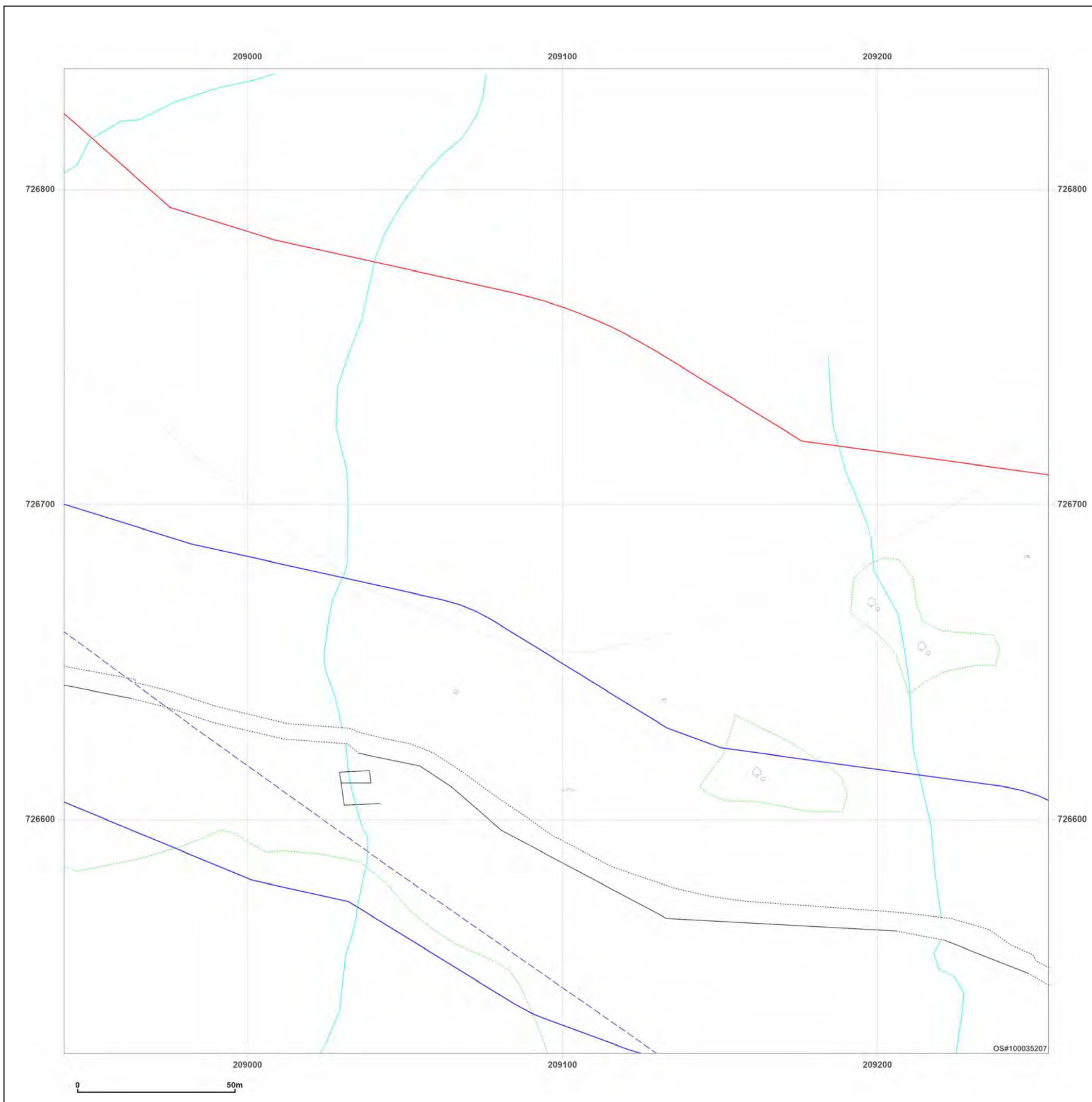


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_7\_1  
**Grid Ref:** 209398, 726382

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

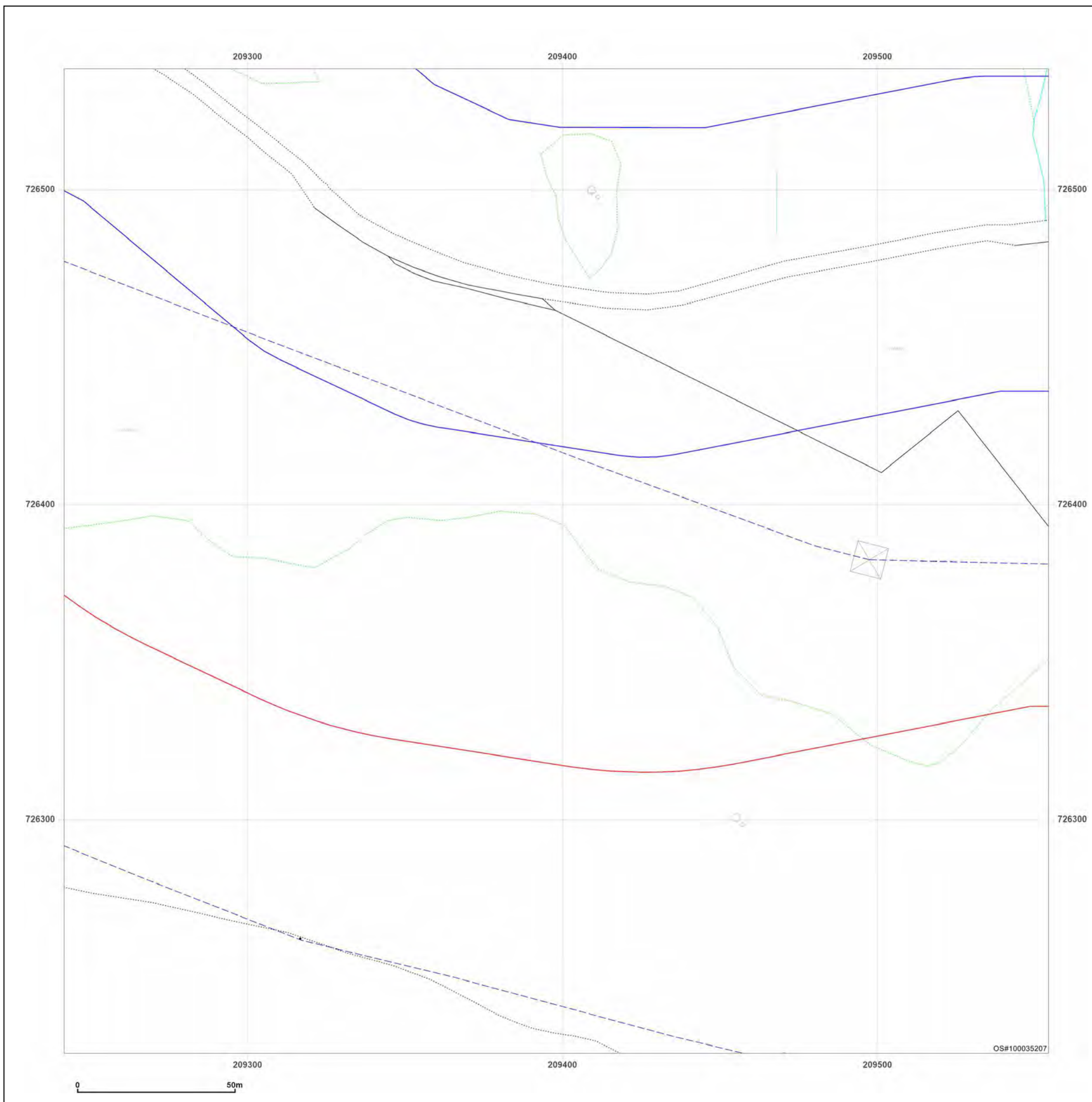


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_7\_2  
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**Map Name:** LandLine

**Map date:** 2003

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**Printed at:** 1:1,250

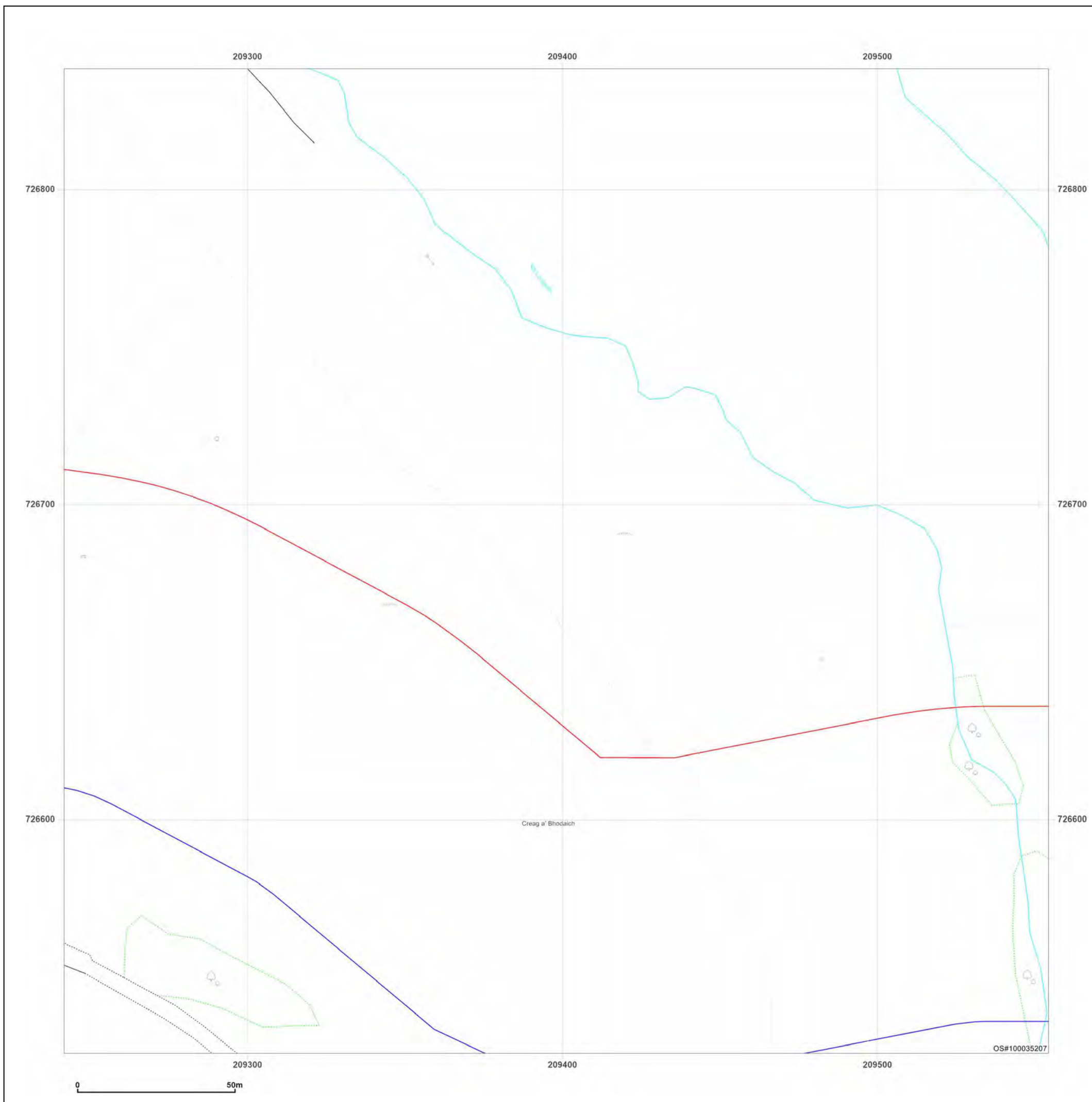


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_8\_1  
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**Map Name:** LandLine

**Map date:** 2003

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**Printed at:** 1:1,250

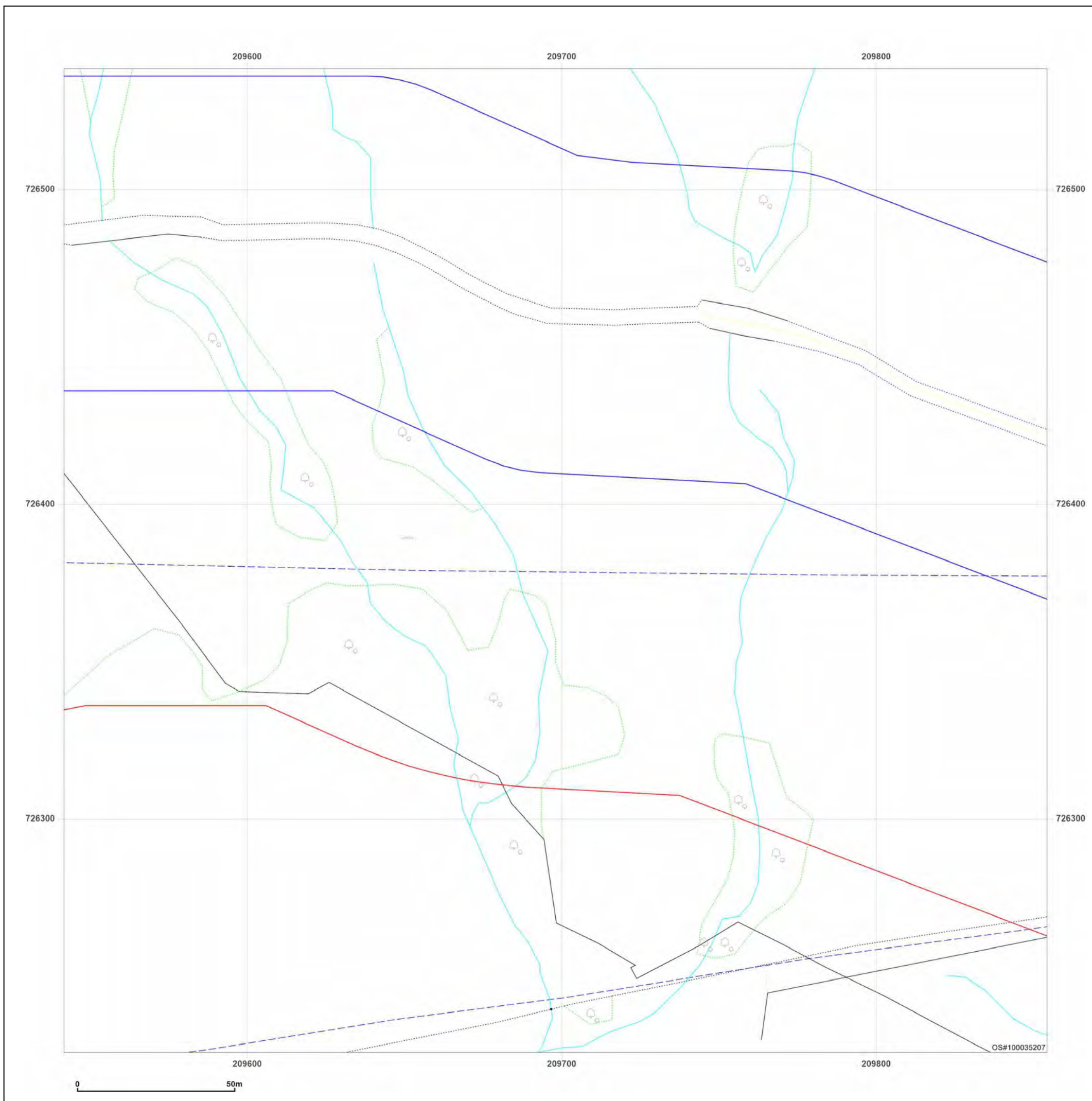


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[www.groundsure.com/sites/default/files/groundsure\\_legend.pdf](http://www.groundsure.com/sites/default/files/groundsure_legend.pdf)



#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_8\_2  
**Grid Ref:** 209698, 726682

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

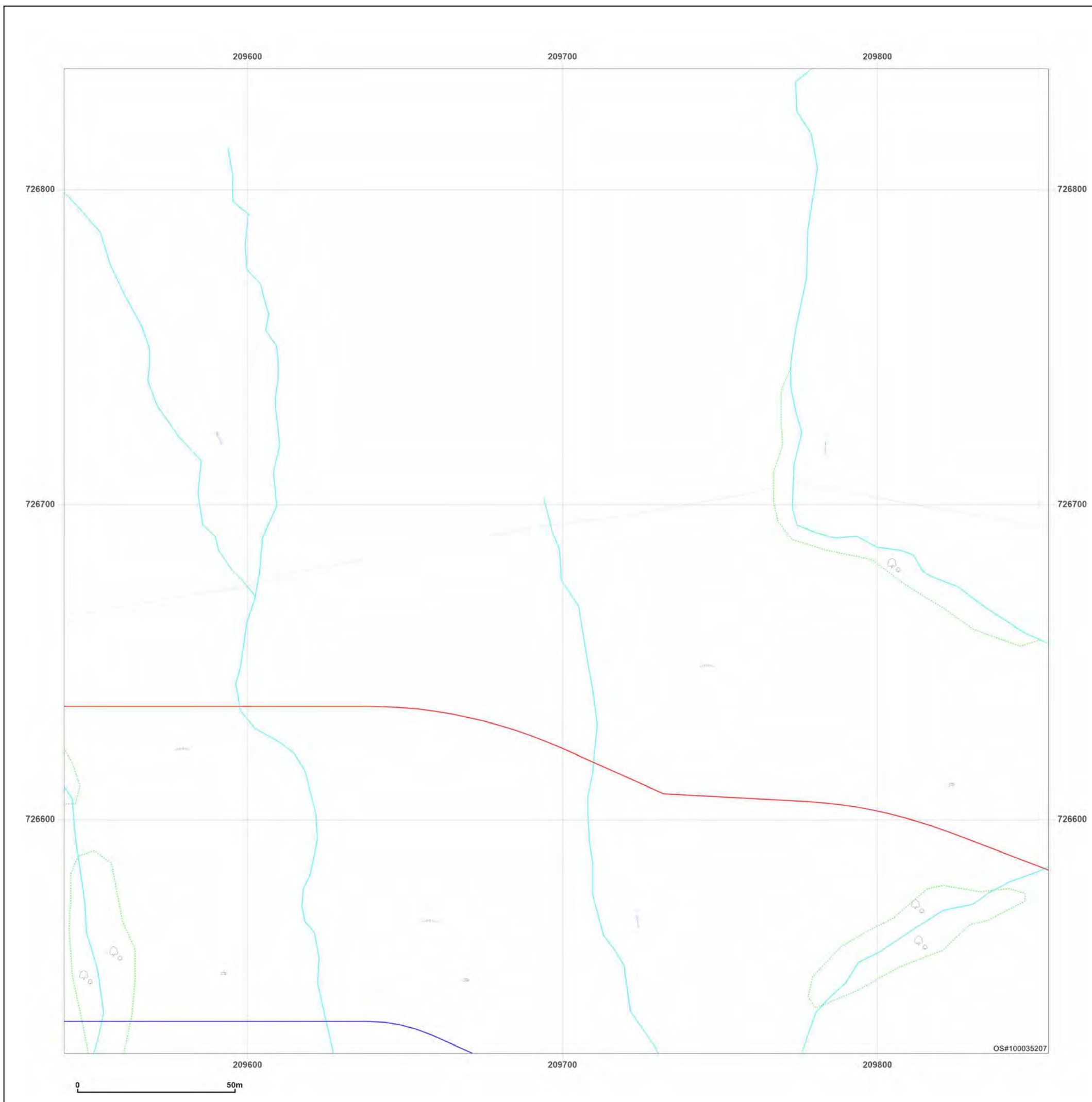


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_10\_1  
**Grid Ref:** 210298, 726382

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

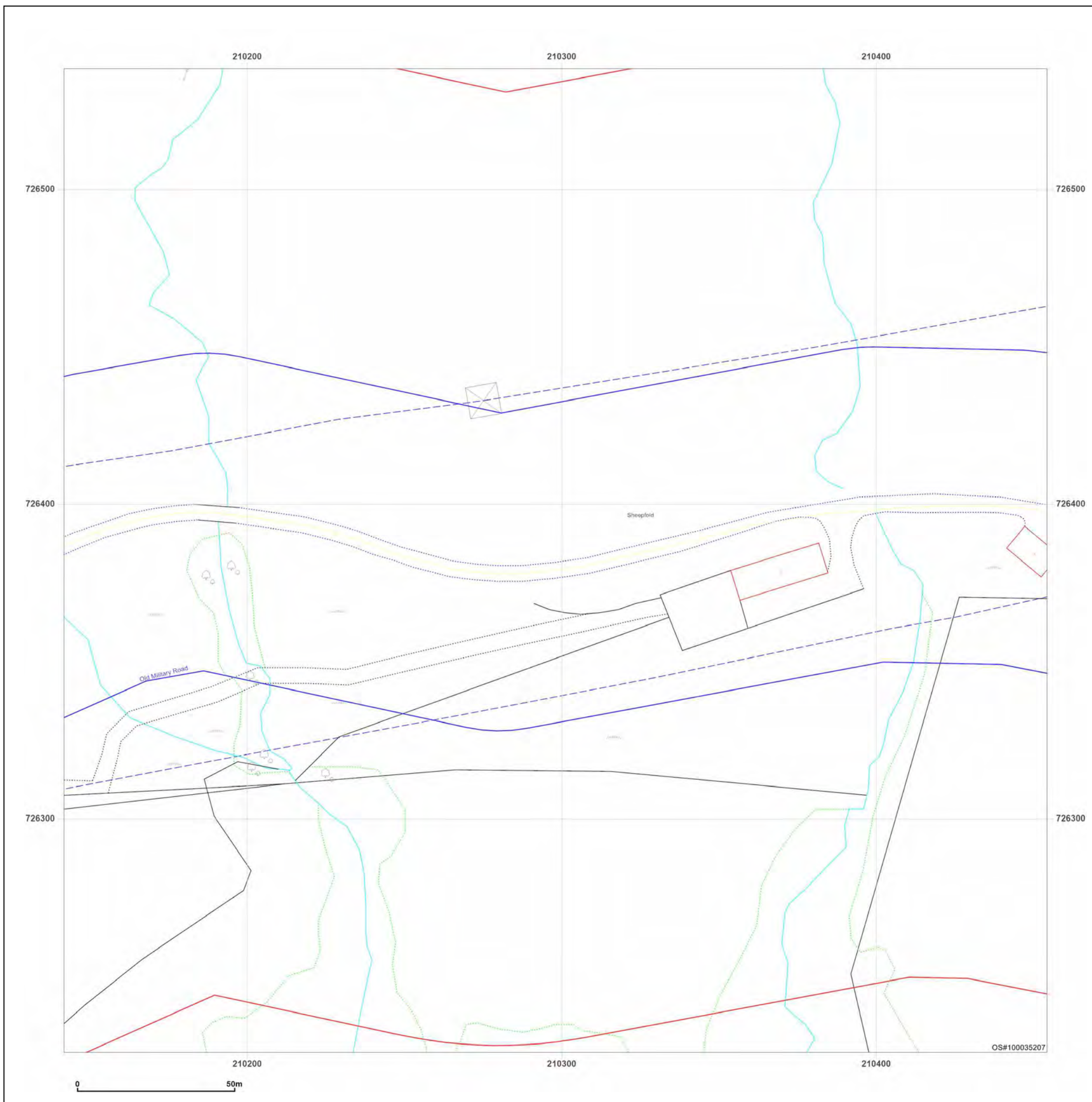


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_11\_1  
**Grid Ref:** 210598, 726382

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

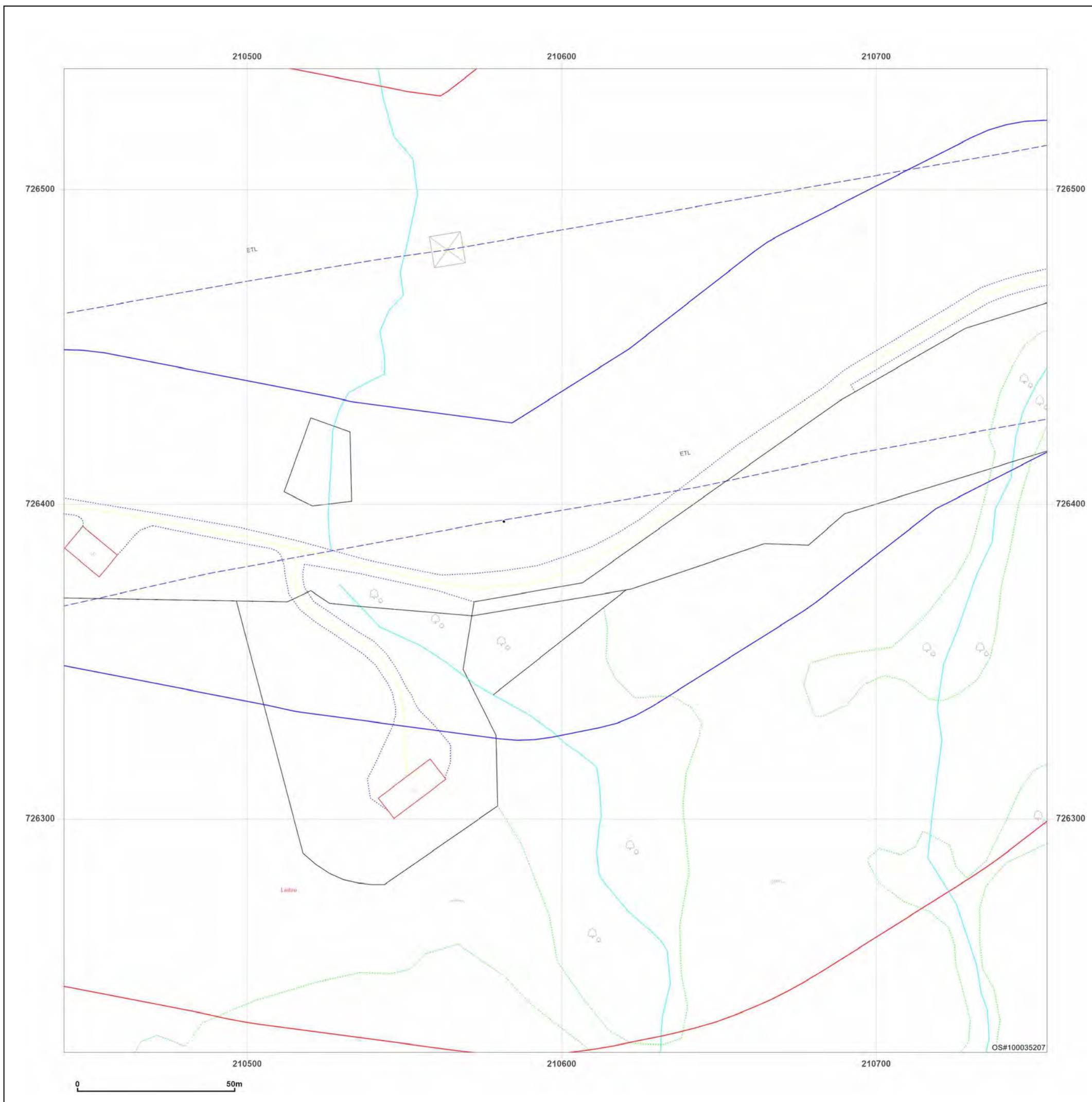


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_12\_1  
**Grid Ref:** 210898, 726382

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

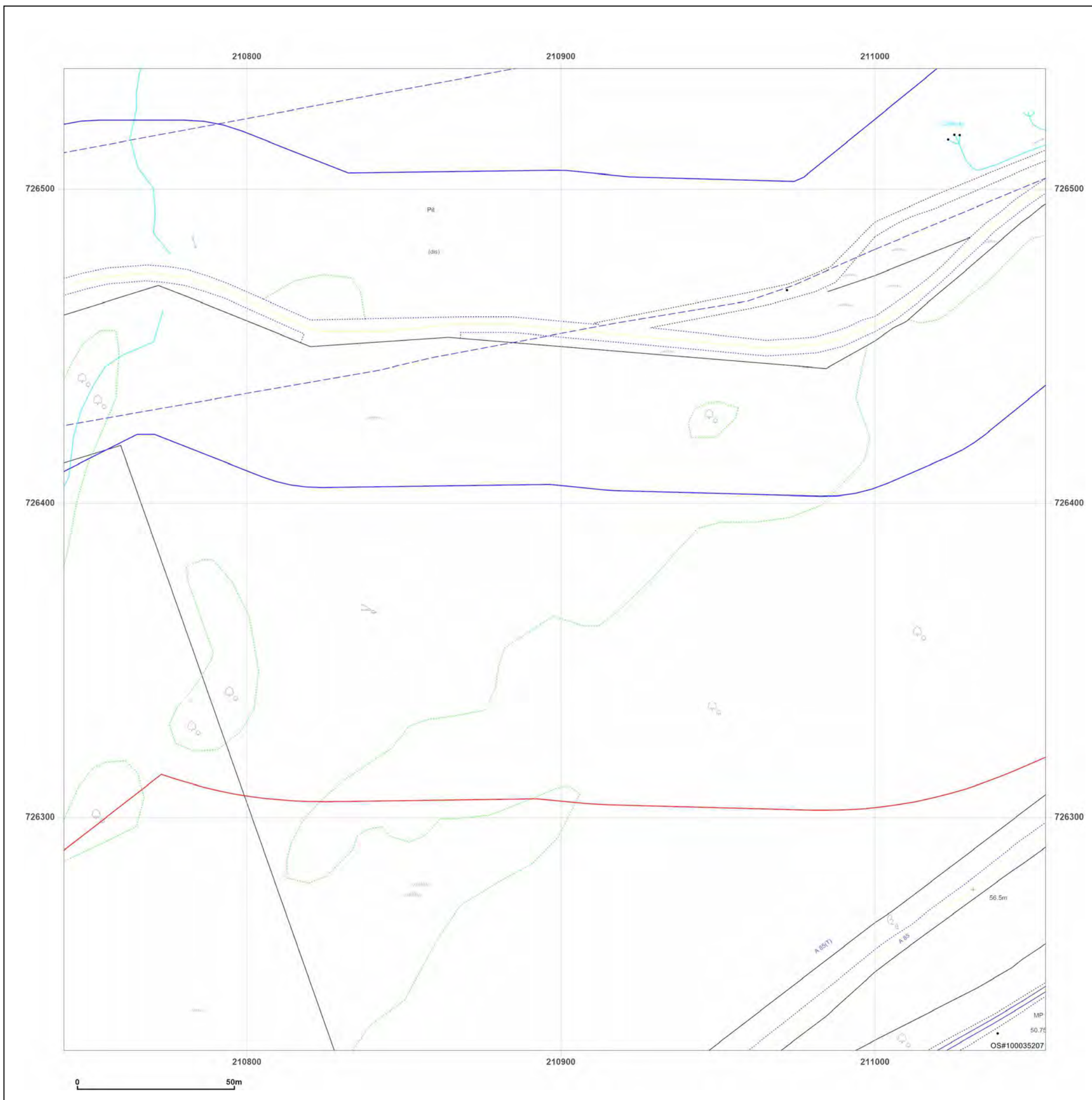


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_12\_2  
**Grid Ref:** 210898, 726682

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250

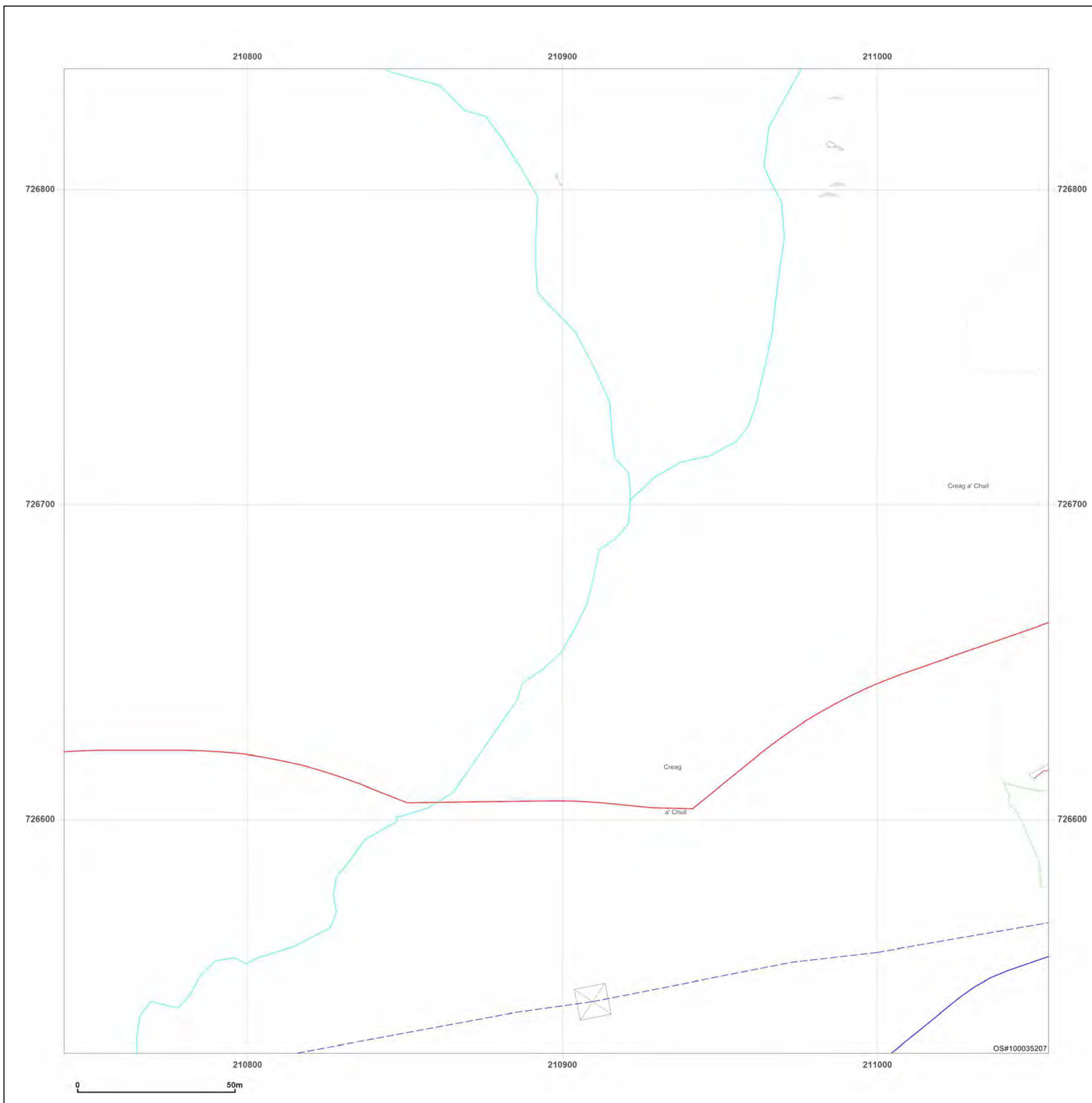


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_13\_1  
**Grid Ref:** 211198, 726382

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

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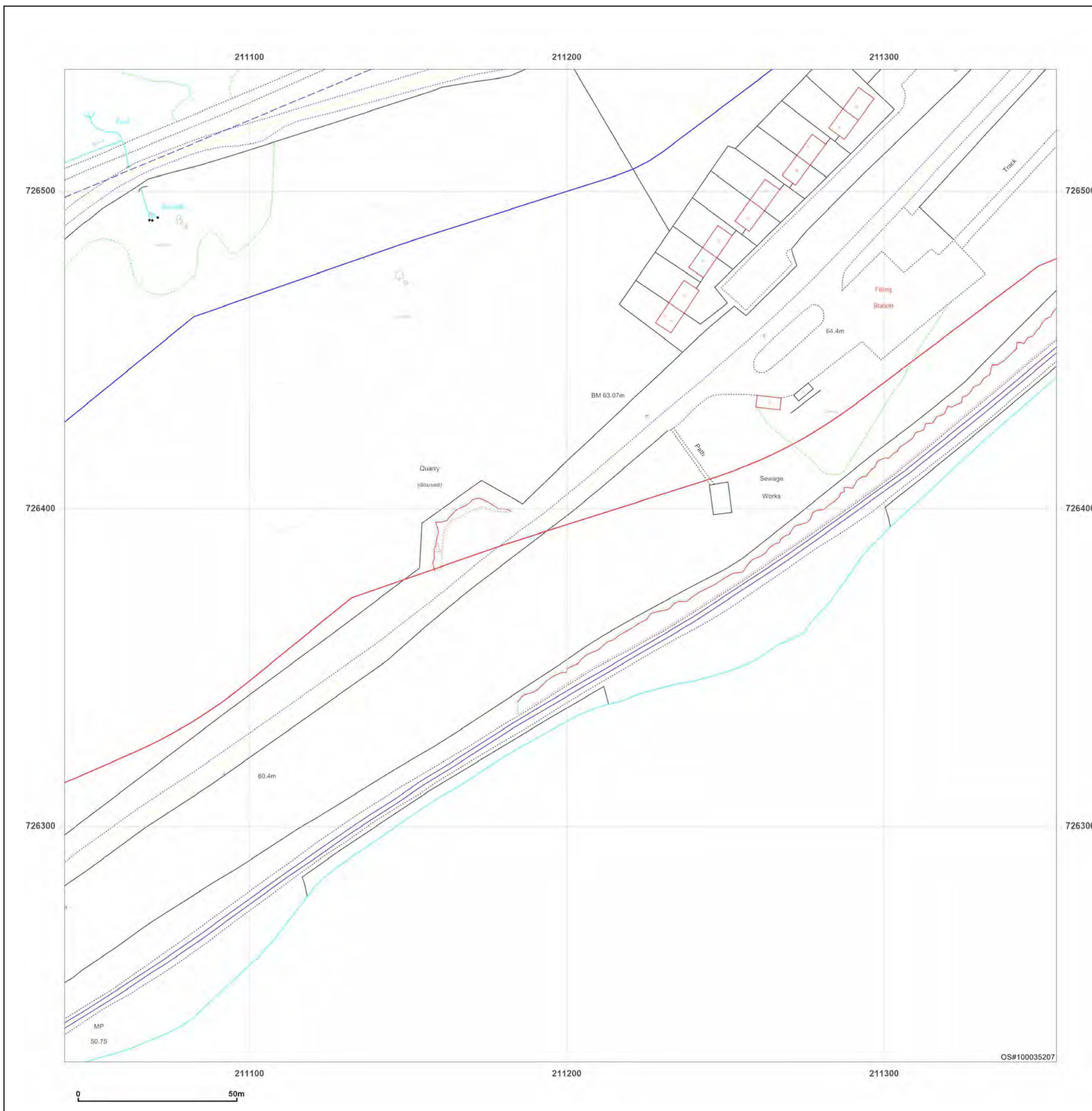


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_13\_2  
**Grid Ref:** 211198, 726682

**Map Name:** LandLine

**Map date:** 2003

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**Printed at:** 1:1,250

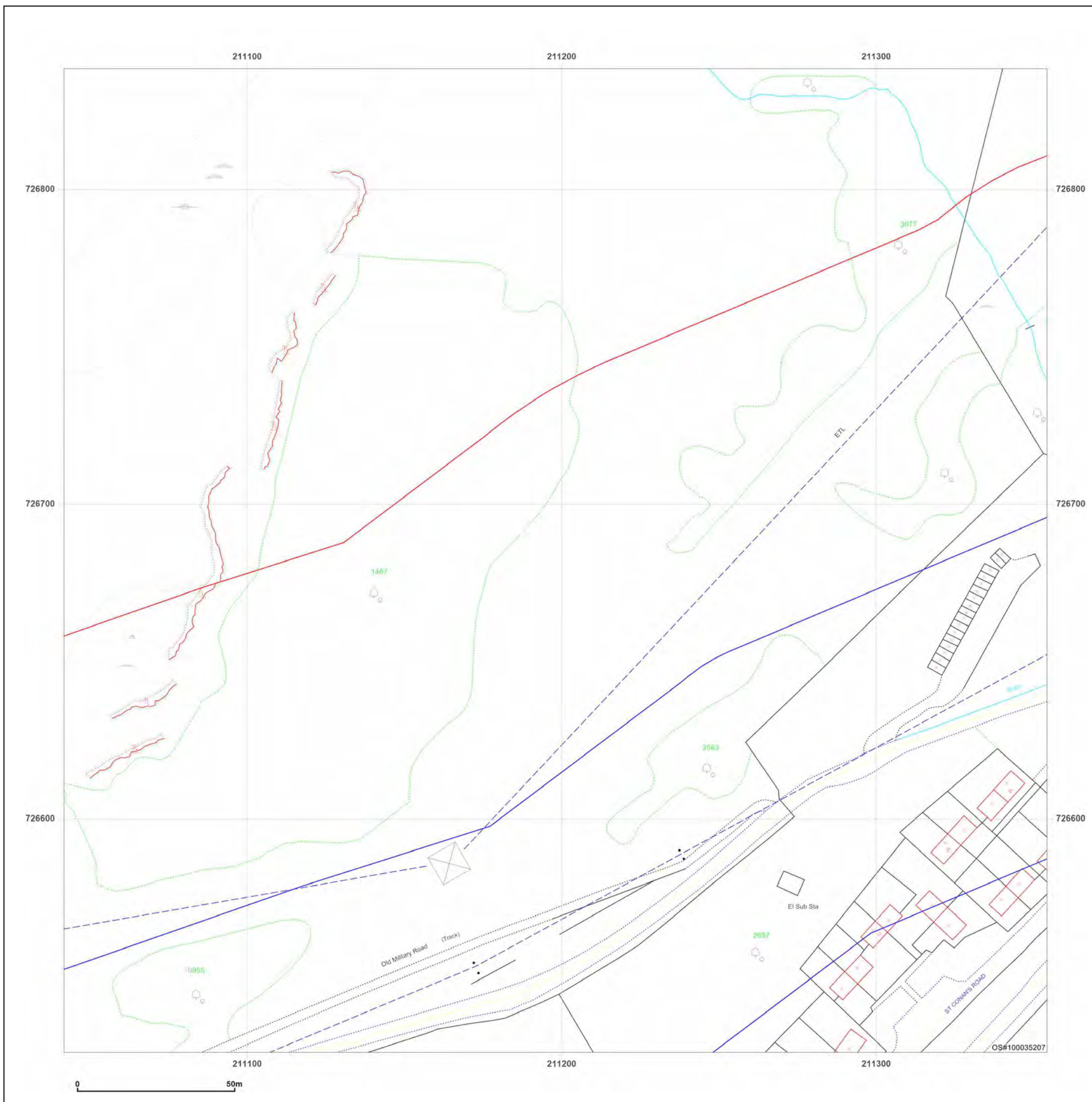


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#### Site Details:

Cruachan 2 West

**Client Ref:** Cruachan 2 West  
**Report Ref:** GSIP-2022-12632-9902\_Landline\_14\_2  
**Grid Ref:** 211498, 726682

**Map Name:** LandLine

**Map date:** 2003

**Scale:** 1:1,250

**Printed at:** 1:1,250



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# Appendix D Regulatory Correspondence



**From:** [Carson, Anthony](#)  
**To:** [Mitchell, Rhona](#)  
**Subject:** 06.04.2022 - AC SK - 22/01074/CONCIV - Information Request for Cruachan 2 Power Station [OFFICIAL]  
**Date:** 14 April 2022 16:07:39  
**Attachments:** [image001.png](#)  
[image002.png](#)  
[draft response back up.docx](#)

---

**Classification: OFFICIAL**

Good afternoon Rhona

Please find attached response to your information request

Regards

Anthony

Anthony Carson

Environmental Health Officer – Environmental Protection

Development and Economic Growth  
Argyll & Bute Council  
Helensburgh & Lomond Civic Centre  
Helensburgh  
G84 7PG

Telephone: 01436 658995

Email: [Anthony.Carson@argyll-bute.gov.uk](mailto:Anthony.Carson@argyll-bute.gov.uk)



---

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In such case, you should destroy this message and kindly notify the sender by reply email. Opinions, conclusions and other information in this message that do not relate to the official business of Argyll and Bute Council or LiveArgyll shall be understood as neither given nor endorsed by them.

All communications sent to or from Argyll and Bute Council or LiveArgyll may be subject to recording and/or monitoring in accordance with relevant legislation.

## Environmental Information Request

Date Received 06/04/2022

<b>Request made by</b>	Rhona Mitchell	Stantec
<b>Purpose</b>	Desk Study	REF 22/01074/CONCIV
<b>Location</b>	Cruachan 2 Power Station	Loch Awe

### Consultation

Request	Response
Please can you carry out a search of your records for any environmental information relating to the site and the area surrounding the site (approximately 500m buffer).	
<ul style="list-style-type: none"> <li>Land contamination (including ground investigated or designated under Part IIA);</li> </ul>	No Part IIA designated contaminated land
<ul style="list-style-type: none"> <li>Any known contamination issues relating to the site and surrounding area (i.e. within 500m)</li> </ul>	No Service records*
<ul style="list-style-type: none"> <li>Water abstractions;</li> </ul>	Please see below for PWS information
<ul style="list-style-type: none"> <li>Information available relating to existing and historical above and below ground storage tanks;</li> </ul>	None (this does not include information which may be kept by the Council for petroleum licensing purposes – there is a charge for such enquiries)
<ul style="list-style-type: none"> <li>Landfill sites (licensed or otherwise) including any monitoring records;</li> </ul>	No Service records*
<ul style="list-style-type: none"> <li>Ground gas emissions and/ or protection measures;</li> </ul>	No Service records*
<ul style="list-style-type: none"> <li>Any Part B environmental permits;</li> </ul>	Regulated by the Scottish Environment Protection Agency (SEPA)
<ul style="list-style-type: none"> <li>Prosecutions relating to authorised processes;</li> </ul>	As above
<ul style="list-style-type: none"> <li>Enforcement (e.g. remediation) and prohibition notices;</li> </ul>	As above
<ul style="list-style-type: none"> <li>Any historical ground investigation, geoenvironmental studies and remediation reports.</li> </ul>	No Service records*

\*Accessible Service records have been viewed in this regard. Due to the extensive enquiry site area, service request and planning consultation records have not been reviewed. Should such reviews be requested there would be significant resource implications which would require to be charged.

# Private water supply information

SITEREF	SOURCENAME	EASTINGS	NORTHINGS	CLASS
AABOL0001	Cruachan Power Station	207900	726800	A1
AABOL0010	Cruachan Construction Site	207900	726800	A1
AABOL0011	Lochawe Village Supply	211411	727022	B
AABOL0699	Railway Cottages	207900	726900	B

In addition these properties are outwith the Scottish Water zone area and therefore likely to be on a PWS, even if not served by one of the known supplies above:

## ADDRESS

1 Railway Cottage Falls Of Cruachan Lochawe Dalmally Argyll And Bute PA33 1AW

2 Railway Cottage Falls Of Cruachan Lochawe Dalmally Argyll And Bute PA33 1AW

Tigh Cherracher Lochawe Argyll And Bute

1 Tigh Cherracher Lochawe Dalmally Argyll And Bute PA33 1AW

2 Tigh Cherracher Lochawe Dalmally Argyll And Bute PA33 1AW

Dam Road Cottage Lochawe Dalmally Argyll And Bute PA33 1AW

Leitir Lochawe Dalmally Argyll And Bute PA33 1AW

Letterwood Croft Lochawe Dalmally Argyll And Bute PA33 1AW

Cruachan Construction Site Private Water Supply Lochawe Argyll And Bute

Cruachan Power Station Visitors Centre Lochawe Dalmally Argyll And Bute PA33 1AN

Admin Block Cruachan Power Station Lochawe Argyll And Bute

Cruachan Construction Site Cruachan Power Station Lochawe Argyll And Bute

The Cavern Cruachan Power Station Lochawe Argyll And Bute

Cruachan Power Station Lochawe Dalmally Argyll And Bute PA33 1AN



**From:** [Mitchell, Rhona](#)  
**To:** [foi@sepa.org.uk](mailto:foi@sepa.org.uk)  
**Subject:** Information Request for Cruachan 2 Power Station  
**Date:** 05 April 2022 15:53:00  
**Attachments:** [image001.png](#)  
[image002.png](#)  
[image003.png](#)  
[image004.png](#)  
[image005.jpg](#)  
[image006.png](#)  
[332010112\\_SiteLocation\\_202202.pdf](#)

---

Good afternoon,

Stantec is currently carrying out a Ground Conditions Assessment (desk study) on behalf of Drax for the proposed 'Cruachan 2' 600 megawatts (MW) generating station pumped storage development on the northern banks of Loch Awe. Cruachan 2 ('the Proposed Development') will provide a new underground power station and associated infrastructure to increase generating capacity at the existing Cruachan pumped storage facility from 440MW to 1,040 MW.

Attached is the site location plan which shows two red line boundaries (RLB). The smaller RLB in the east is for the proposed construction laydown area whilst the larger RLB is for the proposed generating station including the access track which required upgrading.

Please can you carry out a search of your records for any environmental information relating to the site and the area surrounding the site (approximately 500m buffer).

We are particularly interested in any issues concerning:

- Waste/landfill sites (licensed or otherwise) including any monitoring records;
- Any known contamination issues relating to the site and surrounding area (i.e. within 500m)
- Water abstractions
- Radioactive substances activities (RSAs)
- Pollution Prevention and Control (PPC) permits
- Prosecutions relating to authorised processes;
- Explosive sites including Control of Major Accident Hazards (COMAH) or other hazardous substances
- Enforcement (e.g. remediation) and prohibition notices;
- Any other information relating to the environmental susceptibility of the site
- Any historical ground investigation, geoenvironmental studies and remediation reports.

We would be grateful if you could provide a plan(s) of the location of any potentially contaminative current/past site uses and other features as above.

If there are any queries relating to the above then please do not hesitate to contact me on the details below.

Kind regards,

Rhona

**Rhona Mitchell**

BSc (Hons) MSc MEnvSc PIEMA  
Senior Environmental Consultant

[Edinburgh \(Charlotte Lane\)](#)

DD: +44 (0)131 297 7029

M: +44 (0)7801 998 796



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Kind regards,

Rhona

**Rhona Mitchell**

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Senior Environmental Consultant

[Edinburgh \(Charlotte Lane\)](#)

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## Mitchell, Rhona

---

**From:** Access to Information Enquiries <foi@sepa.org.uk>  
**Sent:** 06 May 2022 11:00  
**To:** Mitchell, Rhona  
**Subject:** FW: F0194079 SEPA Access to Information Update

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

OFFICIAL



Dear Rhona

### REQUEST FOR INFORMATION - UPDATE

Thank you for your request, received by SEPA on **5 April 2022**.

I am writing to apologise that we have been unable to issue you with a response to your request within the statutory deadline 5 May 2022.

We have not met the level of service I would expect us to provide when responding to requests for information. Please accept my unreserved apology, on behalf of the agency, for the delays in handling your request.

### Service Status

We remain extremely limited in our ability to respond to Access to Information enquiries as a result of the Cyber-Attack on 24 December 2020 and the impact of COVID-19.

We will provide advice and assistance to you as best we are able but may not be able to provide the information you are looking for at this time.

Please continue to check the status of our Access to Information service on our website using the link below. This will be updated weekly. You can also access further information about SEPA's approach to the delivery of services and the cyber-attack.

- [Check the service status](#)
- [Information about the cyber-attack](#)

In the meantime, if you wish to seek a formal review of our failure to provide a full response by the statutory deadline, you can request a formal review from SEPA at: [foi@sepa.org.uk](mailto:foi@sepa.org.uk)

If you are still not satisfied, you can appeal to the Scottish Information Commissioner.

[www.itspublicknowledge.info/appeal](http://www.itspublicknowledge.info/appeal)



Your unique reference number is F0194079. Please quote this in any future contact with us about your request.

If you have any queries in the meantime, please contact me.

Yours sincerely,

Alison Ewing

SEPA Access to Information team

Email: [foi@sepa.org.uk](mailto:foi@sepa.org.uk)

---

**From:** Access to Information Enquiries <[foi@sepa.org.uk](mailto:foi@sepa.org.uk)>

**Sent:** 06 April 2022 12:03

**To:** Mitchell, Rhona <[rhona.mitchell@stantec.com](mailto:rhona.mitchell@stantec.com)>

**Subject:** F0194079 Request Acknowledgement

OFFICIAL

Dear Rhona

#### REQUEST ACKNOWLEDGEMENT

The sophisticated criminal cyberattack on Christmas Eve 2020 has had a major impact on the way SEPA works. We are working through all the services that we provide to understand what we need to do in the short and longer term to restore services. We are approaching this work with a sense of urgency.


#### What we are able to do now

Following the cyber attack, our information and email systems remain impacted and in some instances offline. Our offices remain closed due to COVID 19 restrictions so we continue to be unable to provide copies of our hard copy information.

As a result, we are limited in our ability to respond to Access to Information enquiries. We will provide advice and assistance to you as best we are able but may not be able to provide the information you are looking for at this time.

We continue to keep the Scottish Information Commissioner updated about our service status.

#### What you can do now

If you haven't already done so, you may wish to check the [SEPA website](#) or search our [Disclosure Log](#) for information we've already published that may be relevant to the subject of your request. You can search our Disclosure Log by entering a key search word in the Title box and clicking on the filter icon .

You can also check [Scotland's Environment website](#). This website brings together environmental information and data in one place so that is easy to search, discover, analyse and interpret.

Please continue to check the status of our Access to Information service on our website using the link below. This will be updated weekly. You can also access further information about SEPA's approach to the delivery of services and the cyber attack.

- [Check the service status](#)
- [Information about the cyber-attack](#)

If you need to contact us, you can do this via [foi@sepa.org.uk](mailto:foi@sepa.org.uk). Please note there may be a delay in our response.

### What to do if you are not happy with how your request has been handled

If you are not happy with our response to your request or have failed to receive a response within 20 working days, you have the right to ask for a Formal Review from SEPA.

Guidance on your rights and how to ask for a review is on the Scottish Information Commissioner's website; <http://itspublicknowledge.info/YourRights/Askingforareview.aspx>

If you are unsatisfied with our Formal Review response or have failed to receive a response, you can then appeal to the Scottish Information Commissioner via the links below. [www.itspublicknowledge.info/appeal](http://www.itspublicknowledge.info/appeal)  
<http://www.itspublicknowledge.info/home/ContactUs/ContactUs.aspx>

Should you wish to appeal against the Scottish Information Commissioner's decision, you have the right to appeal to the Court of Session on a point of law only. Any such appeal must be made within 42 days after the date of intimation of the decision.

Thanks

Alison Ewing

---

**From:** Mitchell, Rhona <[rhona.mitchell@stantec.com](mailto:rhona.mitchell@stantec.com)>  
**Sent:** 05 April 2022 15:54  
**To:** Access to Information Enquiries <[foi@sepa.org.uk](mailto:foi@sepa.org.uk)>  
**Subject:** Information Request for Cruachan 2 Power Station

CAUTION: This email originated from outside the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Good afternoon,

Stantec is currently carrying out a Ground Conditions Assessment (desk study) on behalf of Drax for the proposed 'Cruachan 2' 600 megawatts (MW) generating station pumped storage development on the northern banks of Loch Awe. Cruachan 2 ('the Proposed Development') will provide a new underground power station and associated infrastructure to increase generating capacity at the existing Cruachan pumped storage facility from 440MW to 1,040 MW.

Attached is the site location plan which shows two red line boundaries (RLB). The smaller RLB in the east is for the proposed construction laydown area whilst the larger RLB is for the proposed generating station including the access track which required upgrading.

Please can you carry out a search of your records for any environmental information relating to the site and the area surrounding the site (approximately 500m buffer).

We are particularly interested in any issues concerning:

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- Any known contamination issues relating to the site and surrounding area (i.e. within 500m)
- Water abstractions
- Radioactive substances activities (RSAs)

- Pollution Prevention and Control (PPC) permits
- Prosecutions relating to authorised processes;
- Explosive sites including Control of Major Accident Hazards (COMAH) or other hazardous substances
- Enforcement (e.g. remediation) and prohibition notices;
- Any other information relating to the environmental susceptibility of the site
- Any historical ground investigation, geoenvironmental studies and remediation reports.

We would be grateful if you could provide a plan(s) of the location of any potentially contaminative current/past site uses and other features as above.

If there are any queries relating to the above then please do not hesitate to contact me on the details below.

Kind regards,

Rhona

Rhona Mitchell  
BSc (Hons) MSc MEnvSc PIEMA  
Senior Environmental Consultant

[Edinburgh \(Charlotte Lane\)](#)

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Kind regards,

Rhona

Rhona Mitchell  
BSc (Hons) MSc MEnvSc PIEMA  
Senior Environmental Consultant

[Edinburgh \(Charlotte Lane\)](#)

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# Appendix E Risk Estimation Tables

Receptor	Receptor Sensitivity ('0' if not present)	Pathway	Present (Y=1, N=0)	EPH & Solvents	PAHs	Inorganics and Metals	Asbestos	Biocides	Permanent Gases	Consequence	Probability/Likelihood	Estimated Risk
Human Health - On-Site	0	Ingestion of fruit or vegetable leaf or roots	0	✓	✓	✓	x	✓	x	N/A	N/A	N/A
		Ingestion of contaminated drinking water	0	✓	✓	x	x	✓	x	N/A	N/A	N/A
		Ingestion of water / sediments when swimming	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
		Ingestion of soil/dust indoors	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
		Ingestion of soil/dust outdoors	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
		Inhalation of particles (dust / soil) indoor and outdoor	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
		Inhalation of vapours/gases – outdoor	0	✓	x	x	x	x	✓	N/A	N/A	N/A
		Inhalation of vapours/gases - indoor	0	✓	x	x	x	x	✓	N/A	N/A	N/A
		Dermal absorption via direct contact with soil	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
Human Health Off-Site	4	Dermal absorption via waters (swimming / showering)	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
		Ingestion of fruit or vegetable leaf or roots	1	✓	✓	✓	x	✓	x	Mild	Low	Low
		Ingestion of contaminated drinking water	1	✓	✓	x	x	✓	x	Mild	Low	Low
		Ingestion of water / sediments when swimming	0	✓	✓	x	x	✓	x	N/A	N/A	N/A
		Ingestion of soil/dust indoors	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
		Ingestion of soil/dust outdoors	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
		Inhalation of particles (dust / soil) indoor and outdoor	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
		Inhalation of vapours – outdoor	1	✓	x	x	x	x	✓	Mild	Unlikely	Very Low
		Inhalation of vapours - indoor	1	✓	x	x	x	x	✓	Mild	Unlikely	Very Low
Groundwater (Shallow)	0	Dermal absorption via direct contact with soil	1	✓	✓	✓	✓	✓	x	Mild	Low	Low
		Dermal absorption via waters (swimming / showering)	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
Groundwater (Deep)	4	Leaching	0	✓	✓	✓	x	✓	x	N/A	N/A	N/A
		Migration via natural or anthropogenic	1	✓	✓	✓	x	✓	x	Mild	Low	Low
Surface Water	4	Leaching	0	✓	✓	✓	x	✓	x	N/A	N/A	N/A
		Migration via natural or anthropogenic	1	✓	✓	✓	x	✓	x	Mild	Low	Low
		Direct runoff or discharges from pipes	1	✓	✓	✓	✓	✓	x	Mild	Likely	Moderate
Property - Buildings On-site	0	Indirect via recharge from groundwater (hydraulic flow)	1	✓	✓	✓	✓	✓	x	Mild	Low	Low
		Deposition of wind blown dust	1	✓	✓	✓	✓	✓	x	Mild	Low	Low
		Direct contact	0	✓	✓	✓	x	x	x	N/A	N/A	N/A
Property - Buildings Off-site	1	Explosion due to gas migration via natural / anthropogenic	0	✓	x	x	x	x	✓	N/A	N/A	N/A
		Direct contact	1	✓	✓	✓	x	x	x	N/A	Unlikely	N/A
Ecological/ Geodiversity Systems	0	Explosion due to gas migration via natural / anthropogenic	1	✓	x	x	x	x	✓	N/A	Unlikely	N/A
		Direct deposition of particles / dust - wind blown or flood	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
		Indirect - through watering	0	✓	✓	✓	x	✓	x	N/A	N/A	N/A
		Inhalation of gases/vapours or particulates/dust by animals	0	✓	✓	✓	✓	✓	✓	N/A	N/A	N/A
Property - Animal/Crop - On-site	1	Ingestion of of vegetation / water / soil by animals	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
		Direct (including deposition via wind or flood)	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Indirect (through watering)	0	✓	✓	✓	x	✓	x	N/A	N/A	N/A
		Inhalation of gas / vapour / particulates / dust by animals	1	✓	✓	✓	✓	✓	✓	Minor	Low	Very Low
Property - Animal/Crop - Off-site	1	Ingestion of vegetation / water / soil by animals	1	✓	✓	✓	✓	✓	x	Minor	Low	Very Low
		Direct (including deposition via wind or flood)	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Indirect (through watering)	0	✓	✓	✓	x	✓	x	N/A	N/A	N/A
		Inhalation of gas / vapour / particulates / dust by animals	1	✓	✓	✓	✓	✓	✓	Minor	Low	Very Low
Property - Animal/Crop - Off-site	1	Ingestion of vegetation / water / soil by animals	1	✓	✓	✓	✓	✓	x	Minor	Low	Very Low
		Direct (including deposition via wind or flood)	1	✓	✓	✓	✓	✓	x	Minor	Low	Very Low

Risk estimation establishes the magnitude and probability of the possible consequences (what degree of harm might result and how likely).  
The criteria for classifying probability and consequence are set out in Tables 4 and 5 of the Stantec methodology.  
Green text highlights one or more elements of the Pollutant Linkage are missing and therefore eliminated



EPH = Extractable hydrocarbons  
PAHs = Poly Aromatic Hydrocarbons  
Note For Metals there is an Inhalation pathway if Mercury is present  
Note for PAHs there are Inhalation and/or Solubility pathways for some  
eg Naphthalene

	<b>Client</b> 	CRUACHAN EXPANSION PROJECT, ARGYLL AND BUTE - EAST AREA			Date	15/04/2022
		TABLE SUMMARISING POLLUTANT LINKAGES AND RISK ESTIMATION			A3 Scale	NTS
					Drawn By	RM
					Checked By	GS
Caversham Bridge House, Waterman Place, Reading, RG1 8DN Tel 0118 950 0761 Fax 0118 959 7499	HAZARD CLASSIFICATION	2	THE POTENTIAL CONTAMINANTS OF CONCERN ARE: ASBESTOS, METALS, INORGANICS, PAHs, FUELS/HYDROCARBONS, VOCs/SVOCs, CHLORINATED ALIPHATIC/AROMATIC HYDROCARBONS, PCBs, POSSIBLE GROUND GASES			

Receptor	Receptor Sensitivity ('0' if not present)	Pathway	Present (Y=1, N=0)	EPH & Solvents	PAHs	Inorganics and Metals	Asbestos	Biocides	Permanent Gases	Consequence	Probability/Likelihood	Estimated Risk
Human Health - On-Site	4	Ingestion of fruit or vegetable leaf or roots	0	✓	✓	✓	x	✓	x	N/A	N/A	N/A
		Ingestion of contaminated drinking water	0	✓	✓	x	x	✓	x	N/A	N/A	N/A
		Ingestion of water / sediments when swimming	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
		Ingestion of soil/dust indoors	1	✓	✓	✓	✓	✓	x	Mild	Low	Low
		Ingestion of soil/dust outdoors	1	✓	✓	✓	✓	✓	x	Mild	Low	Low
		Inhalation of particles (dust / soil) indoor and outdoor	1	✓	✓	✓	✓	✓	x	Mild	Low	Low
		Inhalation of vapours/gases – outdoor	1	✓	x	x	x	x	✓	Mild	Low	Low
		Inhalation of vapours/gases - indoor	1	✓	x	x	x	x	✓	Mild	Low	Low
		Dermal absorption via direct contact with soil	1	✓	✓	✓	✓	✓	x	Mild	Low	Low
Human Health Off-Site	4	Dermal absorption via waters (swimming / showering)	0	✓	✓	✓	✓	✓	x	N/A	N/A	N/A
		Ingestion of fruit or vegetable leaf or roots	1	✓	✓	✓	x	✓	x	Mild	Low	Low
		Ingestion of contaminated drinking water	1	✓	✓	x	x	✓	x	Mild	Low	Low
		Ingestion of water / sediments when swimming	0	✓	✓	x	x	✓	x	N/A	N/A	N/A
		Ingestion of soil/dust indoors	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
		Ingestion of soil/dust outdoors	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
		Inhalation of particles (dust / soil) indoor and outdoor	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
		Inhalation of vapours – outdoor	1	✓	x	x	x	x	✓	Mild	Unlikely	Very Low
		Inhalation of vapours - indoor	1	✓	x	x	x	x	✓	Mild	Unlikely	Very Low
Groundwater (Shallow)	0	Dermal absorption via direct contact with soil	1	✓	✓	✓	✓	✓	x	Mild	Low	Low
		Dermal absorption via waters (swimming / showering)	1	✓	✓	✓	✓	✓	x	Mild	Unlikely	Very Low
Groundwater (Deep)	4	Leaching	0	✓	✓	✓	x	✓	x	N/A	N/A	N/A
		Migration via natural or anthropogenic	0	✓	✓	✓	x	✓	x	N/A	N/A	N/A
Surface Water	4	Leaching	0	✓	✓	✓	x	✓	x	N/A	N/A	N/A
		Migration via natural or anthropogenic	1	✓	✓	✓	x	✓	x	Mild	Low	Low
		Direct runoff or discharges from pipes	1	✓	✓	✓	✓	✓	x	Mild	Likely	Moderate
Property - Buildings On-site	3	Indirect via recharge from groundwater (hydraulic flow)	1	✓	✓	✓	✓	✓	x	Mild	Low	Low
		Deposition of wind blown dust	1	✓	✓	✓	✓	✓	x	Mild	Low	Low
		Direct contact	1	✓	✓	✓	x	x	x	Mild	Unlikely	Very Low
Property - Buildings Off-site	1	Explosion due to gas migration via natural / anthropogenic	1	✓	x	x	x	x	✓	Mild	Unlikely	Very Low
		Direct contact	1	✓	✓	✓	x	x	x	Mild	Unlikely	Very Low
Ecological/ Geodiversity Systems	4	Explosion due to gas migration via natural / anthropogenic	1	✓	x	x	x	x	✓	Mild	Unlikely	Very Low
		Direct deposition of particles / dust - wind blown or flood	1	✓	✓	✓	✓	✓	x	Mild	Likely	Moderate
		Indirect - through watering	1	✓	✓	✓	x	✓	x	Mild	Low	Low
		Inhalation of gases/vapours or particulates/dust by animals	1	✓	✓	✓	✓	✓	✓	Mild	Low	Low
Property - Animal/Crop - On-site	1	Ingestion of of vegetation / water / soil by animals	1	✓	✓	✓	✓	✓	x	Mild	Likely	Moderate
		Direct (including deposition via wind or flood)	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Indirect (through watering)	0	✓	✓	✓	x	✓	x	N/A	N/A	N/A
		Inhalation of gas / vapour / particulates / dust by animals	1	✓	✓	✓	✓	✓	✓	Minor	Low	Very Low
Property - Animal/Crop - Off-site	1	Ingestion of vegetation / water / soil by animals	1	✓	✓	✓	✓	✓	x	Minor	Low	Very Low
		Direct (including deposition via wind or flood)	1	✓	✓	✓	✓	✓	x	Minor	Unlikely	Very Low
		Indirect (through watering)	0	✓	✓	✓	x	✓	x	N/A	N/A	N/A
		Inhalation of gas / vapour / particulates / dust by animals	1	✓	✓	✓	✓	✓	✓	Minor	Low	Very Low
		Ingestion of vegetation / water / soil by animals	1	✓	✓	✓	✓	✓	x	Minor	Low	Very Low
			1	✓	✓	✓	✓	✓	x	Minor	Low	Very Low

Risk estimation establishes the magnitude and probability of the possible consequences (what degree of harm might result and how likely).  
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EPH = Extractable hydrocarbons  
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	Client 	CRUACHAN EXPANSION PROJECT, ARGYLL AND BUTE - WEST AREA			Date		15/04/2022	
					A3 Scale		NTS	
					Drawn By		RM	
					Checked By		GS	
		TABLE SUMMARISING POLLUTANT LINKAGES AND RISK ESTIMATION						
Caversham Bridge House, Waterman Place, Reading, RG1 8DN Tel 0118 950 0761 Fax 0118 959 7499		HAZARD CLASSIFICATION	2	THE POTENTIAL CONTAMINANTS OF CONCERN ARE: ASBESTOS, METALS, INORGANICS, PAHs, FUELS/HYDROCARBONS, VOCs/SVOCs, CHLORINATED ALIPHATIC/AROMATIC HYDROCARBONS, PCBs				