# TECHNICAL NOTE - GEOTECHNICAL SYNOPSIS

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| **DATE:** | 17 July 2024 | **CONFIDENTIALITY:** | Confidential |
| **SUBJECT:** | Cambushinnie 400kV Substation, 70108968 | | |
| **CLIENT:** | Balfour Beatty | **AUTHOR:** | Sophie Gedge |
| **CHECKED:** | Darren Warnock | **APPROVED:** | Brennig Davis |

## INTRODUCTION

The proposed Cambushinnie 400 kV substation site is to be located approximately 4 km west of Braco, Perth and Kinross, Scotland, as shown in ***Figure 1*** below. The proposed site is located to the south of the existing Braco West Substation. The site is on the plateau of Feddal Hill and the surrounding land use is primarily commercial forestry plantations.

This Technical Note presents the findings of a review of available information including the Ground Investigation for the site commissioned by SSE. The aim of this note is to inform the expected ground conditions at the site, assess likely earthworks solutions and expected foundation solutions and discuss likely key geotechnical risks. It is the responsibility of the Client to make appropriate cost and contingency allowances in any tender submission to cover the geotechnical risks presented in this document, as well as qualifying and caveating their tender submission accordingly, based on the provisional review of geotechnical information in this document.


*Figure 1 – Proposed Braco West Substation location (approximate)*

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## EARTHWORKS DESIGN REQUIREMENTS:

The proposed finished platform level is 241.0 m AOD. The site is currently sloping terrain and significant engineering earthworks are required.

All platform earthworks are to be undertaken in compliance with *SP-NET-CIV-501 Specification for Earthworks Revision: 2.00 Date: February 2023.*

## HISTORICAL LAND USE

Historical mapping for the site has been obtained and extracts are included as **Appendix A**. The sequence of historical maps shows that the site remained undeveloped from 1866 through to 1979 as Heath/Rough Grassland/Bracken. The next available maps are 2001 and 2006 which show the land to be populated with coniferous trees and a few tracks. This is likely in relation to the Christmas tree farm present in the current day at the site and greater surrounding area. Mapping for 2023 shows the existing substation to the east and a few additional tracked roads to the west and south of the site.

## PUBLISHED GEOLOGY

The following sources have been reviewed:

- BGS GeoIndex 1:50,000 mapping and borehole records
- BGS 1:50,000 geological map, Sheet 39W, Stirling, solid geology, 1976
- BGS 1:50,000 geological map, Sheet 39W, Stirling, drift, 1974
- BGS 1:10,560 geological map, NN70NE, solid and drift, 1961
- BGS 1:10,560 geological map, NN70NE, drift, 1982

The 1:50:000 BGS Online Geoindex map shows the superficial geology at the site to entirely comprise of *Peat* over *Till – Diamicton* present to the southern edge of the site boundary. The BGS lexicon of named rock units describes the Peat as *partially decomposed mass of semi-carbonized vegetation which has grown under waterlogged, anaerobic conditions, usually in bogs or swamps*. The Till - Diamicton is described as *heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape.*

Glacial meltwater channels are shown within the Till, both to the north and south of the site and follow the generally topography of the land facing east towards Braco.

The BGS mapping information shows the bedrock geology to comprise Teith Sandstone Formation. This formation is described on the BGS 1:50,000 map as *purple, brown and grey sandstone with purple and brown siltstones and mudstones, also pebbly sandstones; passes laterally into conglomerate.* The older Cromlix Formation subcrops to adjacent to the east of the site. This formation is described on the BGS 1:50,000 map as *purple, red and brown mudstones and siltstones*. Both show to dip at 5 degrees in a general westerly direction. A fault is shown approximately 1 km to the south with a generally east to west orientation.

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## AVAILABLE GROUND INVESTIGATION (GI) INFORMATION

### *2011 Ground Investigation for existing Braco substation.*

For the existing Braco substitution, located to the northeast of the proposed new substation, SSEN commissioned a ground investigation that was designed by Waterman Transport and Development Ltd, with the fieldwork undertaken by Raeburn Drilling and Geotechnical Ltd (*Proposed Braco Substation Feddal Hill Report on Ground Investigation, 22305, November 2011*). The ground investigation comprised ten boreholes sunk by cable percussion and rotary open-hole and coring drilling methods to a maximum depth of 9m bgl. Eighteen trial pits were machine excavated to a maximum depth of 4m bgl, with termination depths varying based on localised ground conditions and excavation stability. The fieldwork was undertaken between 27th September and 5th October 2011.

A summary of the ground conditions recorded is presented in ***Table 1*** below.

*Table 1 – Summary of encountered ground conditions (2011 Ground Investigation)*

| **Strata** - and typical description | **Top Depth Range (m bgl)** | **Base Depth Range (m bgl)** | **Typical Thickness (m)** |
|---|---|---|---|
| **Peat** – Dark brown partially rooty predominantly amorphous PEAT (H8/B3, H9/B3). Often with a surface layer, 0.05 to 0.3m thick, of moss and brown rooty PEAT (H3/B4, H4/B4) with tree stumps. | 0.00 | 0.25 to 1.20 | 0.60 [Range 0.25 to 1.20] |
| **Glacial Till** – Predominantly cohesive, described as sandy / sandy gravelly CLAY with (occasional) cobbles. Material typically stronger with depth (soft becoming very stiff). Granular bands present typically described as very clayey very gravelly SAND. Upper 0.05m often described as a sandy gravelly SILT with relic rootlets. | 0.25 to 1.20 | 1.70 to 5.00 | 2.30 [Range 0.50 to 4.50) |
| **Bedrock** – Teith Sandstone Formation: Predominantly Sandstone, weak to strong. Often with bands of extremely weak to weak Siltstone and Mudstone. | 1.70 to 5.00 | Not proven | Not proven |

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## INSITU TESTING

Standard Penetration Tests (SPTs) were undertaken at regular intervals through the superficial deposits. Hand vanes were completed for the trial pits within cohesive deposits and soils were sampled for laboratory testing.

## GROUNDWATER

Water strikes were recorded in two boreholes (01, BHR02) at depths of 3.20 and 5.00m bgl and 0.0 to 0.8 m bgl respectively. Both are shown to be located on the northern side of the existing substation site. Four boreholes had standpipes with four rounds of weekly monitoring in October 2011, all results were recorded as dry. Gas monitoring was also undertaken and is summarised within the Factual Report.

## SOIL CONTAMINATION

No Made Ground was observed in the ground investigation, and no asbestos was detected from the soil samples tested in the laboratory testing. This does not rule out the possibility of contaminated soil, given its location adjacent to the existing sub station and the historic and current land use as a Christmas tree farm (for example pesticides, oil/fuel leaks from machinery etc).

## GEOTECHNICAL LABORATORY TESTING

Soil and rock samples were submitted for various geotechnical laboratory tests which are summarised as follows:

- 18 natural moisture content;
- 14 Atterberg tests;
- 11 particle size distribution tests (including sedimentation tests);
- 3 compaction tests (2.5kg);
- 4 moisture condition value (MCV) tests;
- 3 CBR tests;
- 4 oedometers;
- 7 undrained unconsolidated triaxial tests;
- 3 uniaxial compression tests;
- 14 point load tests; and
- 4 water content of rock tests.

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### GEOENVIRONMENTAL LABORATORY TESTING

Soil samples were also submitted for various geoenvironmental laboratory tests which are summarised as follows:

- 7 metals, pH, cyanide, thiocyanate, total phenols, sulphide, total sulphur, total petroleum hydrocarbons, polyaromatic hydrocarbons (PAH) (USEPA 16);
- 7 BRE SD1 Suite D tests; and
- 7 asbestos identification tests;

## ***2023 Ground Investigation (Site 2 and 3)***

SSEN commissioned a ground investigation for the site area that was undertaken by IGNE (Raeburn) between 15th November and 8th December 2023. The investigation comprised fourteen boreholes and twenty trial pits. Boreholes were advanced by cable percussive, sonic and rotary core drilling methods to depths of 10 to 15 m. Trial pits were excavated by mechanical excavator to a maximum depth of 3 m. A total of 4600 Peat probes were also undertaken, across the site being taken forward (Site 2) and the adjacent area (Site 3). During the ground investigation it was discovered that Site 3 was underlain by a significant thickness of Peat and therefore planned exploratory holes were moved to Site 2 to improve coverage of the platform and laydown areas. An extract of the GI layout plan is indicated in ***Figure 2*** below:

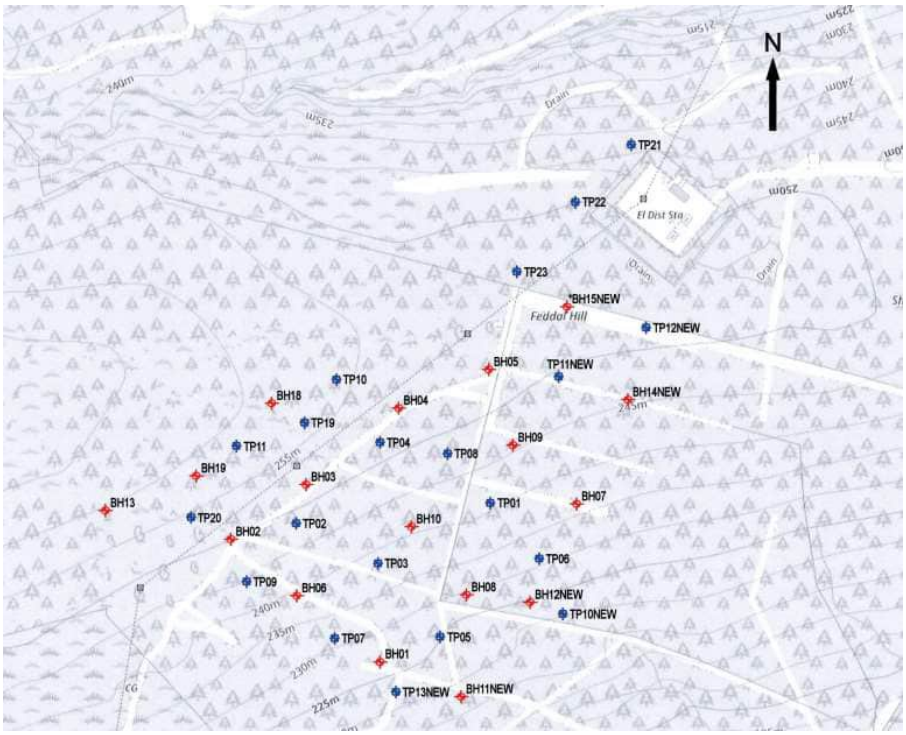


*Figure 2 – GI Layout (2023)*

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A summary of the ground conditions recorded is presented in Table 2 below.

*Table 2 – Summary of encountered ground conditions (2023 Ground Investigation)*

| **Strata** - and typical description | **Top Depth Range (m bgl)** | **Base Depth Range (m bgl)** | **Typical Thickness (m)** |
|---|---|---|---|
| **Peat** – Soft brown to dark brown spongy pseudo-fibrous/ amorphous PEAT. Occasional pieces of wood. | 0.00 | 0.20 to 3.00 | 0.80 [Range 0.20 to 3.00] |
| **Glacial Till** – Predominantly cohesive, described as reddish brown sandy gravelly CLAY with (occasional) cobbles. Material typically stronger with depth (soft to very stiff). Thick granular bands present and typically described as medium dense to very dense SAND or GRAVEL, ranging from very clayey to very sandy. Layer of SILT at interface with overlying PEAT. | 0.20 to 3.00 | 0.90 to 5.50 | 1.60 [Range 0.40 to 4.30) |
| **Bedrock** – Predominantly SANDSTONE, weak to strong, with siltstone laminae. Factures are sub-horizontal and very closely to medium spaced. Occasional thick (>0.5 m) bands of weak Mudstone. | 0.90 to 5.50 | Not proven | Not proven |

**GROUND INVESTIGATION REPORT (GIR)**

A Ground Investigation Report has been prepared by SLR Consulting Limited on behalf of SSEN (Braco West ASTI 400kV Substation, Ground Investigation Report, 21 May 2024). This report summarises in greater detail the same factual information obtained from the 2023 ground investigation.

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## INSITU TESTING

Twenty Standard Penetration Tests (SPTs) were undertaken at regular intervals through the superficial deposits. Hand vanes were completed for the trial pits within cohesive deposits and soils were sampled for laboratory testing.

Nine Dynamic Cone Penetrometer (DCP) tests were undertaken adjacent to ten of the trial pits, with results providing cumulative blow count and correlated California Bearing Ratio with depth.

10Tthermal resistivity tests were undertaken

Six soakaway tests were undertaken in four trial pits which are summarised in Table 3 below.

*Table 3 – Summary of soakaway infiltration tests*

| Test Location | Ground conditions at base of test pit | Infiltration Rate | Comments |
|---|---|---|---|
| TP03 | Reddish brown silty SAND and GRAVEL with cobbles. | Indeterminate | Test terminated due to slow water outflow (drainage). |
| TP06 (1) | Greyish brown SANDSTONE. | 1.1 E-03 m/s | Unable to fill pit above 1.1 m due to filtration rate. |
| TP06 (2) | Greyish brown SANDSTONE. | 3.6 E-04 m/s | Unable to fill pit above 1.1 m due to filtration rate. |
| TP06 (3) | Greyish brown SANDSTONE. | 4.2 E-04 m/s | |
| TP07 | Greyish brown slightly clayey slight gravelling SANDSTONE with cobbles and boulders | Indeterminate | Test terminated due to slow water outflow (drainage). |
| TP13 | Reddish brown very gravelly clayed SAND with cobbles | Indeterminate | Test terminated due to slow water outflow (drainage). |

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## GROUNDWATER

No water strikes were recorded in boreholes of the 2023 ground investigation, possibly due to the method of drilling. Seepages were recorded in trial pits TP07 and TP09 at 1.2 mbgl and 2.0 mbgl. Standpipes were installed in nine of the boreholes and four rounds of monitoring return visits were undertaken. The monitoring recorded that four of the installations (boreholes BH04, BH10, BH13 and BH14) remained dry throughout. The remaining installations recorded groundwater levels between 0.88 mbgl and 8.77 mbgl, as shown in Table 4. Gas monitoring was also undertaken and is summarised within the Factual Report.

*Table 4 – Summary of groundwater monitoring*

| Wellpoint ID | Depth of Installation (mbgl) | Round 1 Water Level (mbgl) | Round 2 Water Level (mbgl) | Round 3 Water Level (mbgl) | Round 4 Water Level (mbgl) |
|---|---|---|---|---|---|
| BH01 | 5.00 | 2.44 | 2.44 | 2.42 | 3.95 |
| BH02 | 8.00 | 4.78 | 4.88 | 4.91 | 4.9 |
| BH04 | 2.00 | dry | dry | dry | dry |
| BH07 | 10.00 | 4.51 | 4.62 | 4.67 | 7.12 |
| BH10 | 1.50 | dry | dry | dry | dry |
| BH11 | 5.00 | 1.02 | 0.88 | 0.91 | 1.48 |
| BH13 | 2.80 | dry | dry | dry | dry |
| BH14 | 2.70 | dry | dry | dry | dry |
| BH19 | 10.00 | 8.74 | 8.73 | 8.77 | dry |

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## GEOTECHNICAL AND GEOENVIRONMENTAL LABORATORY TESTING

Soil and rock samples were submitted for various geotechnical laboratory tests for classification and determination of strength parameters, and also geoenvironmental testing. The tests undertaken are summarised below as Table 5.

*Table 5 – Summary of laboratory tests (duplicated from GIR (SLR, 2024)).*

| Laboratory Test | Number of Tests |
|---|---|
| Soil Testing | |
| Moisture content | 69 |
| Atterberg Limits | 13 |
| Particle size distribution by wet sieving | 50 |
| Sedimentation by pipette | 44 |
| Dry density/moisture content relationship using 2.5 kg rammer | 2 |
| Dry density/moisture content relationship using 4.5 kg rammer | 7 |
| Moisture Condition Value at natural moisture content | 8 |
| California Bearing Ratio on re-compacted disturbed sample | 5 |
| Suite A (Greenfield site – pyrite absent Schedule 1.19.6) | 30 |
| Rock Testing | |
| Single measurement of point load strength on irregular rock lump or core sample (either axial or diametral test) | 340 |
| Uniaxial compressive strength | 37 |
| LA Coefficient | 7 |
| Environmental Testing | |
| Suite E (Soil samples Schedule S1.20.3) | 19 |
| Suite H (Inert waste landfill Schedule S1.20.5) | 1 |

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## GENERALISED GROUND MODEL

The generalised ground model presented in Table 6 is based on the results of the 2023 ground investigation which was undertaken on the proposed site. It is noted that this ground model may not be representative of ground conditions below the entire site as variation in strata thicknesses is likely at a local level. Earthworks volumes are based on triangulation of exploratory hole locations and interpolating layer thicknesses between those locations. The ground model derived by SLR and presented within the GIR is largely in agreement with the table below.

*Table 6 – Generalised Ground Model*

| Strata and typical description | Top Depth (m bgl) | Base Depth (m bgl) | Typical thickness (m) |
|---|---|---|---|
| **Peat** - Soft brown to dark brown spongy pseudo-fibrous/ amorphous PEAT | 0.00 | 0.80 | 0.80 |
| **Superficial Deposits: Glacial Till** - Predominantly cohesive, described as sandy / sandy gravelly CLAY with (occasional) cobbles. Material typically stronger with depth (soft becoming very stiff).<br>Thick granular bands present typically described as very clayey very gravelly SAND or GRAVEL. | 0.80 | 2.40 | 1.60 |
| **Bedrock**: **Teith Sandstone Formation**: Predominantly Sandstone, weak to strong. Often with bands of extremely weak to weak Siltstone and Mudstone. Upper layer highly / completed weathered, recovered as gravel. | 2.40 | Not proven | Not Proven |

Assumed groundwater level is 2 m below existing ground level, based on four rounds of monitoring of groundwater installations. Note that groundwater is expected to vary and may be locally higher.

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## EARTHWORKS STRATEGY

Ground levels at the site vary between approximately 253 m AOD at the northern corner and 230 m AOD in the southern corner. The proposed finished platform level is 241 m AOD however due to the sloping nature of the site, sloping downward from north to south, significant cut and fill will be required to create a level platform (predominantly fill). The level of the platform is governed by acceptable access road profiles. Maximum fill depth, above existing ground level (and excluding any dig and replace of unsuitable material) is approximately 14 m at the southern edge of the platform. A cutting slope up to approximately 9 m deep is required along the northern platform edge.

Below proposed fill areas, any variable, soft or compressible soils (including Topsoil, Peat and any soft Glacial Till where present) will require removal and replacement with suitable engineered fill prior to upfilling.

Preliminary earthworks drawings are included in **Appendix B** and provisional quantities for the 400 kV platform, based on the 2023 ground investigation, are currently estimated to be as follows:

- **Cut arisings (from cut areas and removal of unsuitable soil from formation prior to placement in fill areas): 289,095 m$^3$** (of which 67,578 m$^3$ is Topsoil / Peat, 71,233 m$^3$ is Glacial Till or weathered rock, and 150,284 m$^3$ is rock).
- **Engineered fill requirement: 291,663 m$^3$** (engineered fill from formation, substation drainage layers and platform surface finishes).

Provisional quantities for the access roads, based on the 2023 ground investigation, are currently estimated to be as follows:

- **Cut arisings (from cut areas and removal of unsuitable soil from formation prior to placement in fill areas): 41,774 m$^3$** (of which 33,916 m$^3$ is Topsoil / Peat, 6,235 m$^3$ is Glacial Till or weathered rock, and 1,623 m$^3$ is rock).
- **Engineered fill requirement: 43,060 m$^3$** (engineered fill from formation to finished road level)

Provisional quantities for the drainage basin are currently estimated to be as follows:

- **Cut arisings: 807 m$^3$**.
- **Engineered fill requirement: 2,548 m$^3$** (to form basin perimeter bund).

It is considered that the Topsoil and Peat are unsuitable for re-use as an engineered fill and will require disposal where these are present within the footprint of the platform earthworks. The superficial deposits, considered to be both Glacial Till and the weathered rock profile, are likely to be a mixed soil comprising cohesive and granular elements. Where primarily granular, superficial deposits may be suitable for reuse as engineered fill, subject to some careful selection and correct handling. Primarily cohesive Glacial Till is unlikely to be suitable for reuse without modification (e.g., lime, cement). The underlying competent

sandstone rock, where locally exposed in cut areas, should also be suitable for crushing, processing and re-use as engineered fill.

Indicatively, assuming that 50% of the Glacial Till is reused as general fill, there is a general surplus of *unsuitable* soils (approximately 141,035 $m^3$) and a shortfall of engineered fill required (approximately 146,630 $m^3$). These figures do not include for any bulking or compaction related changed in volume. Unsuitable soils comprise Topsoil and Peat and any soft cohesive Glacial Till where present. These figures are subject to change depending on Contractor preference to process site won superficial materials or import granular fill. Should all of the Glacial Till be deemed not suitable for processing for use as general upfill, the estimated shortfall of engineered fill would increase to approximately 185,364 $m^3$.

Excavations into the superficial deposits at the site may be unstable as perched groundwater may be present at shallow depths within granular layers. Excavations would therefore need to be supported or battered back to safe angles. Groundwater management using sump pumping is likely to be sufficient for any dewatering necessary during construction as part of the proposed developments – subject to confirmation of groundwater regime. Once constructed, the engineered fill wedge will be generally free draining and existing groundwater flows will re-establish within and below the platform and in the underlying superficial deposits.

## CUT SLOPES

A cut slope is required at the northern edge of the platform where existing ground levels are up to approximately 9 m higher than the proposed platform level.

Based on the generalised ground model, these cut slopes will be within Peat, Glacial Till and Sandstone Rock. As the proposed cut is likely to extend into bedrock the use of rock breakers may be required, which may be extensive should strong rock be encountered in any cut areas or for foundation, drainage or ducting excavations. It is not expected that blasting would be required as the bedrock is sedimentary which can generally be easily ripped.

At this stage it is anticipated that a conventional cut slope will be possible without requirement for strengthening measures.

For cut slopes in Glacial Till it is likely that a slope of approximately 1v:3h (18.4º) will be suitable. The gradient of any cut slope through Peat should be slackened to a maximum gradient of 1v:4h (14º) or shallower, or locally removed and replaced with granular fill if / where exposed in any cut faces. If / where rock is exposed in cut slopes, this can be cut at 1v:1h (45º), or potentially steeper subject to detailed stability analysis.

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## FILL SLOPES

Where fill slopes are required these shall be formed from either site won or imported granular engineered fill. Depending on any imposed loads or groundwater conditions, the fill slopes may be designed to gradients of 1v:3h (18.4º) where formed of granular material. It is not recommended that the fill slopes are formed using cohesive material.

At this stage it is anticipated that conventional earthworks fill slopes will be possible without requirement for strengthening measures (e.g., reinforced soil, soil nailing).

## MATERIAL RE-USE

A material re-use assessment has been undertaken based on results of the 2023 ground investigation. A summary of the assessment is as follows:

- The Topsoil Peat or any soft cohesive Glacial Till (where present) will not be suitable for use as engineered fill but may be suitable for use as landscaped fill or peat restoration.
- The majority of the site-won superficial deposits are likely to classify as a Class 1A or 2C material, with an assumption that 50% of this is suitable for re-use as general upfill earthworks, with processing to remove oversized particles or soft or low strength material.
- A review of the oversize content within the superficial deposits suggests that is may be possible to bulk crush and process the oversized content to produce a Class 1 fill material suitable for use as bulk upfill earthworks. The fines content of the natural soils within the proposed area of cut is approximately 17%.
- Any rock excavated/recovered is expected to be predominately red Sandstone (non-argillaceous). This can be bulk crushed and processed into structural fill (Class 1 and/or Class 6 subject to additional testing).
- Discrete layers of siltstone or mudstone, of varying thickness, are present below the site and these materials are argillaceous and may not be reused in platform construction layers 1-3.

## PLATFORM MAKE UP

The make-up of the platform fill and surfacing shall be in accordance with SSEN Specification for Earthworks (SP-NET-CIV-501, rev 2.0), as shown below as Figure 3.

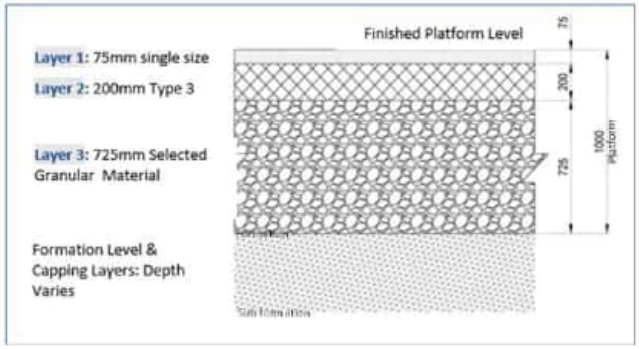


*Figure 2 – Substation platform make up (Figure 5.1 of SP-NET-CIV-501 rev 2.0)*

Additionally, the SSEN Specification for Earthworks clarifies as follows:

- ***Layer 1:*** Single size durable aggregate is to be used as a surfacing material out with areas of concrete and asphalt bound aggregate surfaces. This layer is required to mitigate step and touch electrical earthing potentials and shall be a minimum of 75mm thick with **20mm single-sized washed aggregate**. This layer is required to be free draining.
- ***Layer 2***: The layer beneath the single size aggregate shall consist of 200mm **Type 3** granular material (as defined in Series 800 of the SHW). This layer is required to be free draining.
- ***Layer 3***: This shall consist of a minimum of 725mm well graded selected granular material. **Class 6F2** (as defined in Series 600 of the SHW) is pre-approved by The Employer for this layer (beneath the 200mm Type 3). This layer shall be required to be free draining.

# EXPECTED FOUNDATION SOLUTIONS

Based on the generalised ground model for the site and on the assumption that Peat and any soft Glacial Till below the platform is fully excavated and replaced, it is considered that conventional ground bearing shallow foundations are likely to be suitable at the site, bearing within either placed engineered granular fill or the existing firm or stiff Glacial Till, weathered rock or bedrock. The allowable bearing capacity of placed granular fill is anticipated to be 150 kN/m$^2$, which is the minimum requirement for the sub-formation as specified within SSEN Specification for Earthworks (SP-NET-CIV-501, rev 2.0)

If different material types are expected across the foundation footprint (i.e., fill / superficial soil / rock), these should be locally deepened to bear on similar material. Specific combinations of applied loads and ground conditions may require deeper pad foundations or piling to limit settlement. This will be confirmed during detailed design.

### SOIL CONTAMINATION AND WASTE DISPOSAL

A full assessment of soil contamination risks is outside the scope of this report. It is understood that the recent SSEN ground investigation will be reviewed by contaminated land specialists once the information has been made available.

Soils requiring removal from site as either unsuitable due to contamination status or geotechnically unsuitable (such as the Peat and some of the Made Ground) are not expected to be classified as *Inert* if disposed to landfill and may be classified as either *Non-hazardous* or *Hazardous* waste. Further soils analysis including Waste Acceptance Classification (WAC) tests will be required one the relevant soils and disposal faciality have been identified. All excavated soils must be carefully segregated to enable selective disposal of different waste classifications as required.

# TECHNICAL NOTE - GEOTECHNICAL SYNOPSIS

| | | | |
|---|---|---|---|
| **DATE:** | 17 July 2024 | **CONFIDENTIALITY:** | Confidential |
| **SUBJECT:** | Cambushinnie 400kV Substation, 70108968 | | |
| **CLIENT:** | Balfour Beatty | **AUTHOR:** | Sophie Gedge |
| **CHECKED:** | Darren Warnock | **APPROVED:** | Brennig Davis |

## UNEXPLODED ORDNANCE

SSEN commissioned a UXO desk study and risk assessment that was prepared by Zetica UXO (Ref: P13558-23-R1). The risk assessment for the considered site indicates that the UXO risk is low for encountering unexploded bombs or other unexploded ordnance.

*Table 3 – UXO Risk (Zetica UXO Desk Study and Risk assessment (P13558-23-R1)*

| Potential UXO Hazard | Anticipated Works | PE | PD | P = PE x PD | Likelihood | Severity | Risk Rating | UXO Risk |
|---|---|---|---|---|---|---|---|---|
| UXB | Excavations | 1 | 1 | 1 | 1 | 5 | 5 | Low |
| | Peat Probing | 1 | 1 | 1 | 1 | 5 | 5 | Low |
| | Boreholes | 1 | 1 | 1 | 1 | 4 | 4 | Low |
| Other UXO | Shallow Excavations | 1 | 1 | 1 | 1 | 4 | 4 | Low |
| | Peat Probing | 1 | 1 | 1 | 1 | 4 | 4 | Low |
| | Boreholes | 1 | 1 | 1 | 1 | 3 | 3 | Low |
| **PE (Probability of Encounter), PD (Probability of Detonation), P (Overall Probability)** | | | | | | | | |

## PEAT

The presence and thickness of Peat varies across the site. If left in situ this would give rise to very high total and differential settlements below the platform, substation surfaced areas and foundations and should therefore be removed. For the purposes of the tender design it is assumed that all Peat shall be excavated and removed from below the footprint of the platform and access road and, in fill areas, replaced with site won or imported granular engineered fill.

# TECHNICAL NOTE - GEOTECHNICAL SYNOPSIS

| | | | |
|---|---|---|---|
| **DATE:** | 17 July 2024 | **CONFIDENTIALITY:** | Confidential |
| **SUBJECT:** | Cambushinnie 400kV Substation, 70108968 | | |
| **CLIENT:** | Balfour Beatty | **AUTHOR:** | Sophie Gedge |
| **CHECKED:** | Darren Warnock | **APPROVED:** | Brennig Davis |

## KEY GEOTECHNICAL RISKS AND ASSUMPTIONS

The key geotechnical risks considered relevant to the scheme based on the information reviewed are listed below, and are discussed in detail in the *Geotechnical Risk Register* presented in **Appendix C**. Geotechnical assumptions are also presented in a *Geotechnical Assumptions Register* in **Appendix C**.

- **Potential for soft or loose ground or Peat** (and/or potentially with greater thickness than encountered during the GI) leading to low and variable bearing capacities and/or high total or differential settlement – foundations may need to be deepened to reach more competent strata and more unsuitable material may need to be locally removed.
- **Localised high groundwater levels** leading to instability of excavations or slopes. Groundwater monitoring shows near surface groundwater levels in two boreholes and two trial pits encountered groundwater within 2 m of ground level. Localised potential for 'running sand' conditions to temporarily develop during earthworks if surface and groundwater not controlled.
- **Potential for rockhead being higher than anticipated in the areas of the proposed cut slope**, resulting in more of the cut and slopes being in rock, increasing excavation difficulty and likely extending programme.

### SUPPLEMENTARY GROUND INVESTIGATION FOR DETAILED DESIGN

The ground investigation undertaken generally provides reasonable coverage of the site however there are notable gaps in the data required to complete the detailed design where existing exploratory holes are widely spaced.

A ***supplementary ground investigation scope*** has been prepared and issued under separate cover.

### MATERIAL MANAGEMENT PLAN

A *Material Management Plan* (MMP) prepared in line with CL:AIRE voluntary code of conduct is likely to be required to satisfy waste legislation to cover the re-use of excavated surplus soils from the site (on this site or another site) which may otherwise be considered as waste soils. This will require review of the proposed material movements through the life cycle of construction, validation by the Qualified Person (QP), registration of the scheme with the Scottish Environmental Protection Agency (SEPA) and ultimate sign off on completion. Note that this does not cover material movements associated with any remediation, if required, or off-site disposal to landfill.

# TECHNICAL NOTE - GEOTECHNICAL SYNOPSIS

| | | | |
|---|---|---|---|
| **DATE:** | 17 July 2024 | **CONFIDENTIALITY:** | Confidential |
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| **CHECKED:** | Darren Warnock | **APPROVED:** | Brennig Davis |

## APPENDIX A

## HISTORICAL MAPS

# Envirocheck® Report:

# Historical Data Report Datasheet

## Order Details:

**Order Number:**
327698237_1_1

**Customer Reference:**
70108968

**National Grid Reference:**
279170, 709030

**Slice:**
A

**Site Area (Ha):**
14.26

**Search Buffer (m):**
1000

## Site Details:

Site at
Braco
Perth and Kinross

## Client Details:

Ms S Gedge
WSP UK Ltd
110 Queen Street
Glasgow
Lanarkshire
G1 3BX

# Contents



**Introduction**

The Environment Act 1995 has made site sensitivity a key issue, as the legislation pays as much attention to the pathways by which contamination could spread, and to the vulnerable targets of contamination, as it does the potential sources of contamination.
For this reason, Landmark's Site Sensitivity maps and Datasheet(s) place great emphasis on statutory data provided by the Environment Agency and the Scottish Environment Protection Agency; it also incorporates data from Natural England (and the Scottish and Welsh equivalents) and Local Authorities; and highlights hydrogeological features required by environmental and geotechnical consultants. It does not include any information concerning past uses of land. The datasheet is produced by querying the Landmark database to a distance defined by the client from a site boundary provided by the client.

In the attached datasheet the National Grid References (NGRs) are rounded to the nearest 10m in accordance with Landmark's agreements with a number of Data Suppliers.

**Copyright Notice**



**Report Version v53.0**

# Summary

| Data Type | Page Number | On Site | 0 to 250m | 251 to 500m | 501 to 1000m |
|---|---|---|---|---|---|
| **Historical Building Plans Information** | | | | | |
| Areas Cleared Due To Enemy Action | | | | | |
| Above Ground Fuel Tanks (100m) | | | | n/a | n/a |
| Asbestos (100m) | | | | n/a | n/a |
| Benzene/Benzole/Naphtha, Naphthalene/Kerosene (100m) | | | | n/a | n/a |
| Electricity Generation (100m) | | | | n/a | n/a |
| Electricity Sub-Stations (100m) | | | | n/a | n/a |
| Gas Industry (100m) | | | | n/a | n/a |
| Gas Storage (100m) | | | | n/a | n/a |
| Gas Use (100m) | | | | n/a | n/a |
| Oil Industry (100m) | | | | n/a | n/a |
| Oil Storage (100m) | | | | n/a | n/a |
| Oil Use (100m) | | | | n/a | n/a |
| Paint based Oils (100m) | | | | n/a | n/a |
| Paraffin (100m) | | | | n/a | n/a |
| Petrol and Diesel Industry (100m) | | | | n/a | n/a |
| Petrol and Diesel Storage (100m) | | | | n/a | n/a |
| Petrol and Diesel Use (100m) | | | | n/a | n/a |
| Potential Fuel Gas (100m) | | | | n/a | n/a |
| Potential Fuel Oil (100m) | | | | n/a | n/a |
| Potential Fuel Use (100m) | | | | n/a | n/a |
| Potential Petrol and Diesel (100m) | | | | n/a | n/a |
| Potential Tanks (100m) | | | | n/a | n/a |
| Potentially Fuel-related Tanks (100m) | | | | n/a | n/a |
| Underground Fuel Tanks (100m) | | | | n/a | n/a |
| **Historical Land Use Information** | | | | | |
| Former Marshes | | | | | |
| Historical Flood Liabilities | | | | | |
| Potentially Contaminative Industrial Uses (Past Land Use) | | | | | |
| Potentially Infilled Land (Non-Water) | | | | | |
| Potentially Infilled Land (Water) | pg 1 | | | | 1 |

# Summary

| Data Type | Page Number | On Site | 0 to 250m | 251 to 500m | 501 to 1000m |
|---|---|---|---|---|---|
| **Historical Tanks and Energy Facilities** | | | | | |
| Electrical Sub Station Facilities (100m) | | | | n/a | n/a |
| Electricity Industry Facilities (100m) | | | | n/a | n/a |
| Gas Industry Facilities (100m) | | | | n/a | n/a |
| Gas Monitoring Facilities (100m) | | | | n/a | n/a |
| Miscellaneous Power Facilities (100m) | | | | n/a | n/a |
| Oil Industry Facilities (100m) | | | | n/a | n/a |
| Petroleum Storage Facilities (100m) | | | | n/a | n/a |
| Potential Tanks (100m) | | | | n/a | n/a |
| Tanks (100m) | | | | n/a | n/a |

# Historical Land Use Information

| Map ID | Details | Quadrant Reference (Compass Direction) | Estimated Distance From Site | Contact | NGR |
|---|---|---|---|---|---|
| 1 | **Potentially Infilled Land (Water)**<br>Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc)<br>Date of Mapping: 1901 | A7NE (E) | 527 | 1 | 279832 708777 |

# Historical Map List

**No Historical Building Plans information available.**

**The following mapping has been analysed for Historical Land Use Information:**

| 1:10,560 | Mapsheet | Published Date |
|---|---|---|
| Perthshire | 116_00 | 1866 |
| Perthshire | 116_SE | 1901 |
| Ordnance Survey Plan | NN70NE | 1958 |
| Ordnance Survey Plan | NN80NW | 1958 |
| Ordnance Survey Plan | NN81SW | 1959 |
| **1:10,000** | **Mapsheet** | **Published Date** |
| Ordnance Survey Plan | NN70NE | 1978 |
| Ordnance Survey Plan | NN71SE | 1978 |
| Ordnance Survey Plan | NN80NW | 1979 |
| Ordnance Survey Plan | NN81SW | 1982 |

**No Historical Tanks and Energy Facilities information available.**

# Useful Contacts and Further Information

| Contact | Name and Address | Contact Details |
|---|---|---|
| 1 | **Landmark Information Group Limited**<br>Imperium, Imperial Way, Reading, Berkshire, RG2 0TD | Telephone: 0844 844 9966<br>Fax: 0844 844 9951<br>Email: helpdesk@landmark.co.uk<br>Website: www.landmark.co.uk |

**Historical Building Plans Information**

This data set contains potentially contaminative features such as asbestos, petrol, oil and tanks captured from Historical Building Plans. The Historical Building Plans were produced by the London-based firm Charles E. Goad Ltd. as fire insurance plans, dating back to 1885. The firm ceased production of fire insurance plans in 1970. Most of the important towns and cities of the British Isles are covered. Historical Building Plans are usually at the scales of 1:480 (1 inch to 40 feet) for the British Isles. They were updated every 5-6 years by means of revision sheets designed to be pasted on to the original plans.

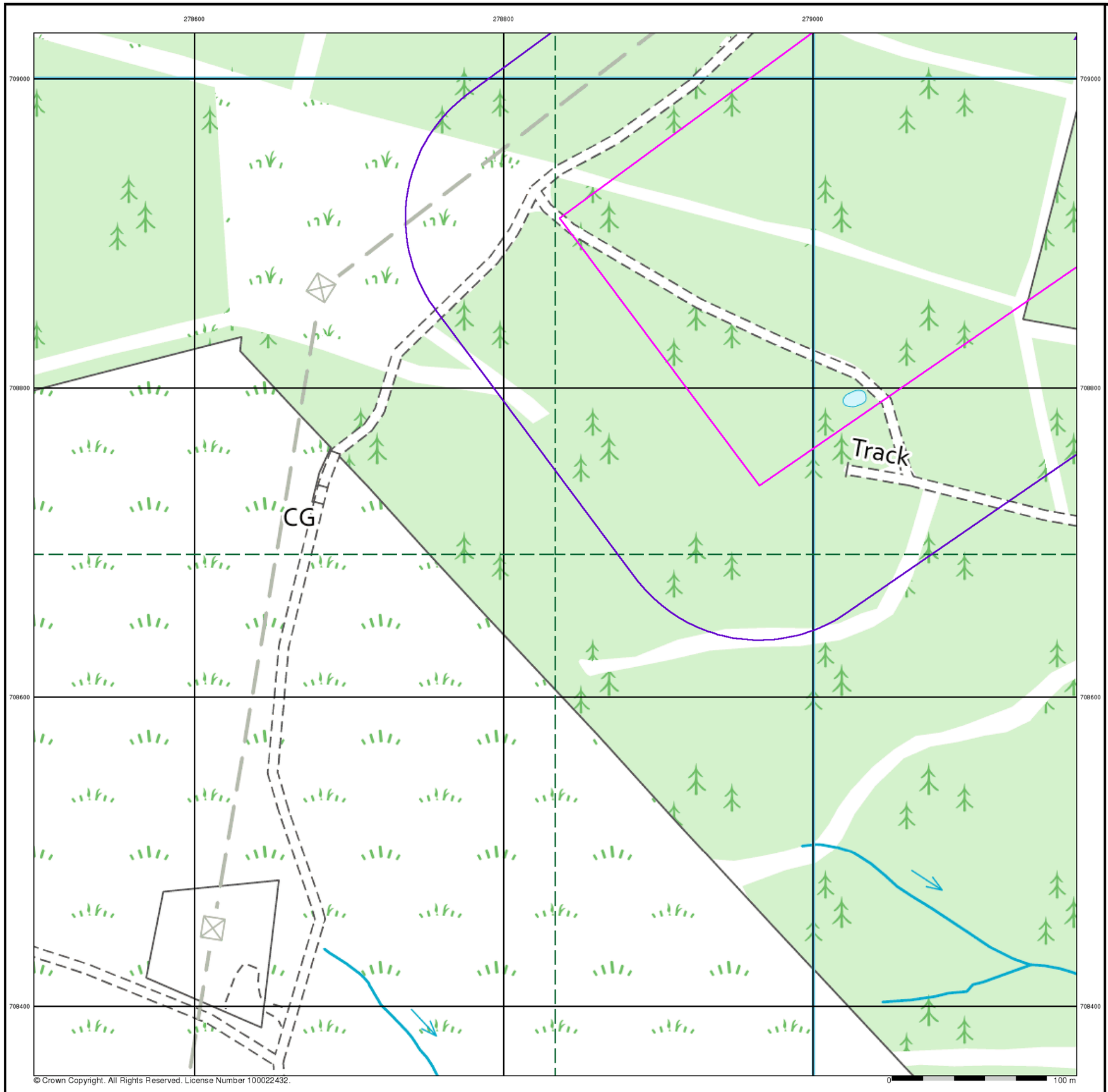
It should be noted that Historical Building Plans are only available for certain major towns and cities and in some cases there may only be partial coverage of the search area. It cannot therefore be assumed that the absence of responses under the Historical Building Plans section of this report indicates that no hazards exist. Please check the Historical Building Plans Map List table in the Historical Map List section of this report to establish if Historical Building Plans are available for this search area.

**Historical Land Use Information**

Landmark's Historical Land Use Data is the result of combined analysis of historical map data captured at 1:10,560 and 1:10,000. A unique comprehensive database of Historic Land Use from the 1840's to 1996 it includes 67 different types of potentially contaminated past industrial land use. This entailed analysing over 60,000 maps and is drawn from at least four, and up to six historical map editions. In addition a seventh layer was also created, known as the land use layer, containing areas of infilled land which are plotted via comparison between two or more map editions.

**Historical Tanks and Energy Facilities**

In addition to HLUD, additional analysis uncovered some of the most dangerous sources of contamination (past and present tanks, petrol storage, oil, gas, electricity, miscellaneous facilities). This data set covers over 390,000 Historical Tanks and Energy facilities in Great Britain and was captured from post war 1:2500 and 1:1250 Ordnance Survey historical mapping covering a period from 1943 to 1996.






## General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID
Several of Type at Location

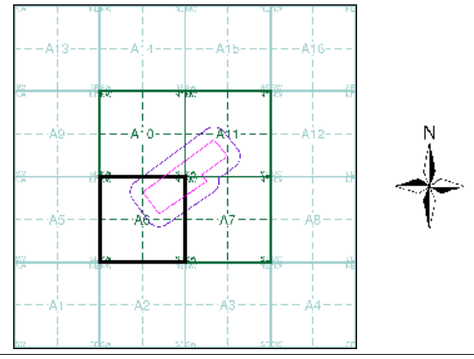
## Historical Building Plans

- Area Cleared due to Enemy Action
- Asbestos
- Above Ground Fuel Tanks
- Benzene/Benzole/Naphtha, Naphthalene/Kerosene
- Electricity Generation
- Electricity Sub-Stations
- Gas Industry
- Gas Storage
- Gas Use
- Oil Industry
- Oil Storage
- Oil Use
- Paint based Oils
- Paraffin
- Petrol and Diesel Industry
- Petrol and Diesel Storage
- Petrol and Diesel Use
- Potential Fuel Gas
- Potential Fuel Oil
- Potential Fuel Use
- Potential Petrol and Diesel
- Potential Tanks
- Potentially Fuel-related Tanks
- Underground Fuel Tanks

## Historical Tanks and Energy Facilities

- (B) Electrical Sub Station Facility
- (E) Electricity Industry Facility
- (G) Gas Industry Facility
- (V) Gas Monitoring Facility
- (M) Miscellaneous Power Facility
- (O) Oil Industry Facility
- (S) Petroleum Storage Facility
- (P) Potential Tank
- (T) Tank

## Historical Data Report - Segment A6



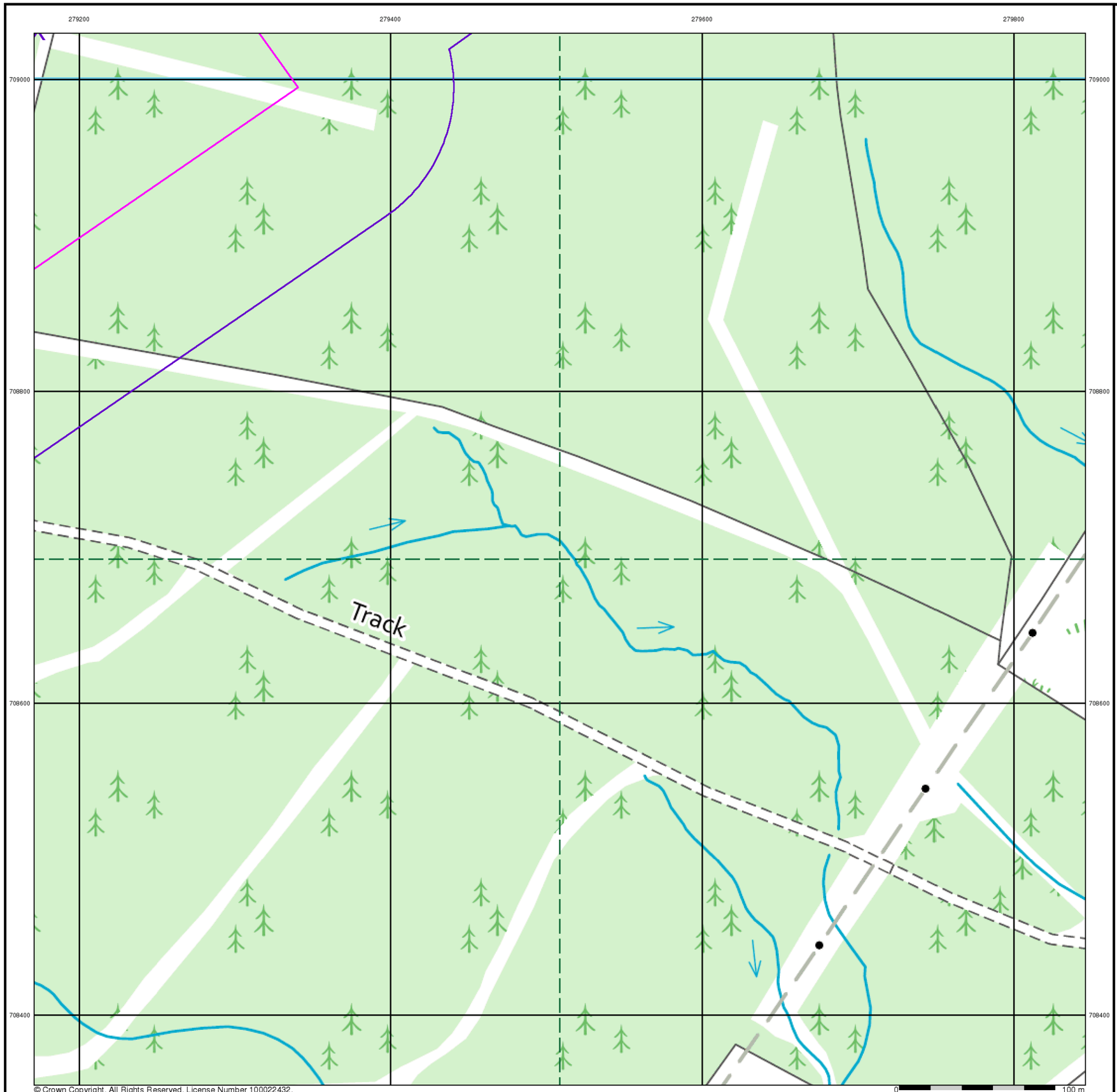

## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Plot Buffer (m): | 100 |

## Site Details

Site at, Braco, Perth and Kinross

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk




## General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

## Historical Building Plans

- Area Cleared due to Enemy Action
- Asbestos
- Above Ground Fuel Tanks
- Benzene/Benzole/Naphtha, Naphthalene/Kerosene
- Electricity Generation
- Electricity Sub-Stations
- Gas Industry
- Gas Storage
- Gas Use
- Oil Industry
- Oil Storage
- Oil Use
- Paint based Oils
- Paraffin
- Petrol and Diesel Industry
- Petrol and Diesel Storage
- Petrol and Diesel Use
- Potential Fuel Gas
- Potential Fuel Oil
- Potential Fuel Use
- Potential Petrol and Diesel
- Potential Tanks
- Potentially Fuel-related Tanks
- Underground Fuel Tanks

## Historical Tanks and Energy Facilities

- (B) Electrical Sub Station Facility
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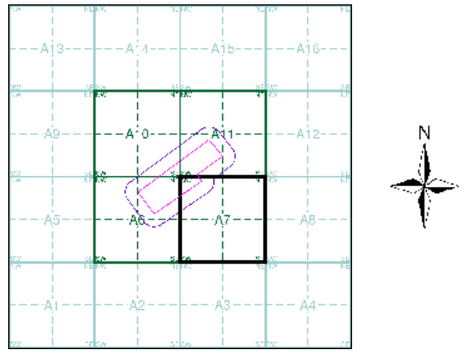
- (G) Gas Industry Facility
- (V) Gas Monitoring Facility
- (M) Miscellaneous Power Facility
- (O) Oil Industry Facility
- (S) Petroleum Storage Facility
- (P) Potential Tank
- (T) Tank

## Historical Data Report - Segment A7




## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Plot Buffer (m): | 100 |

## Site Details

Site at, Braco, Perth and Kinross

Landmark INFORMATION GROUP
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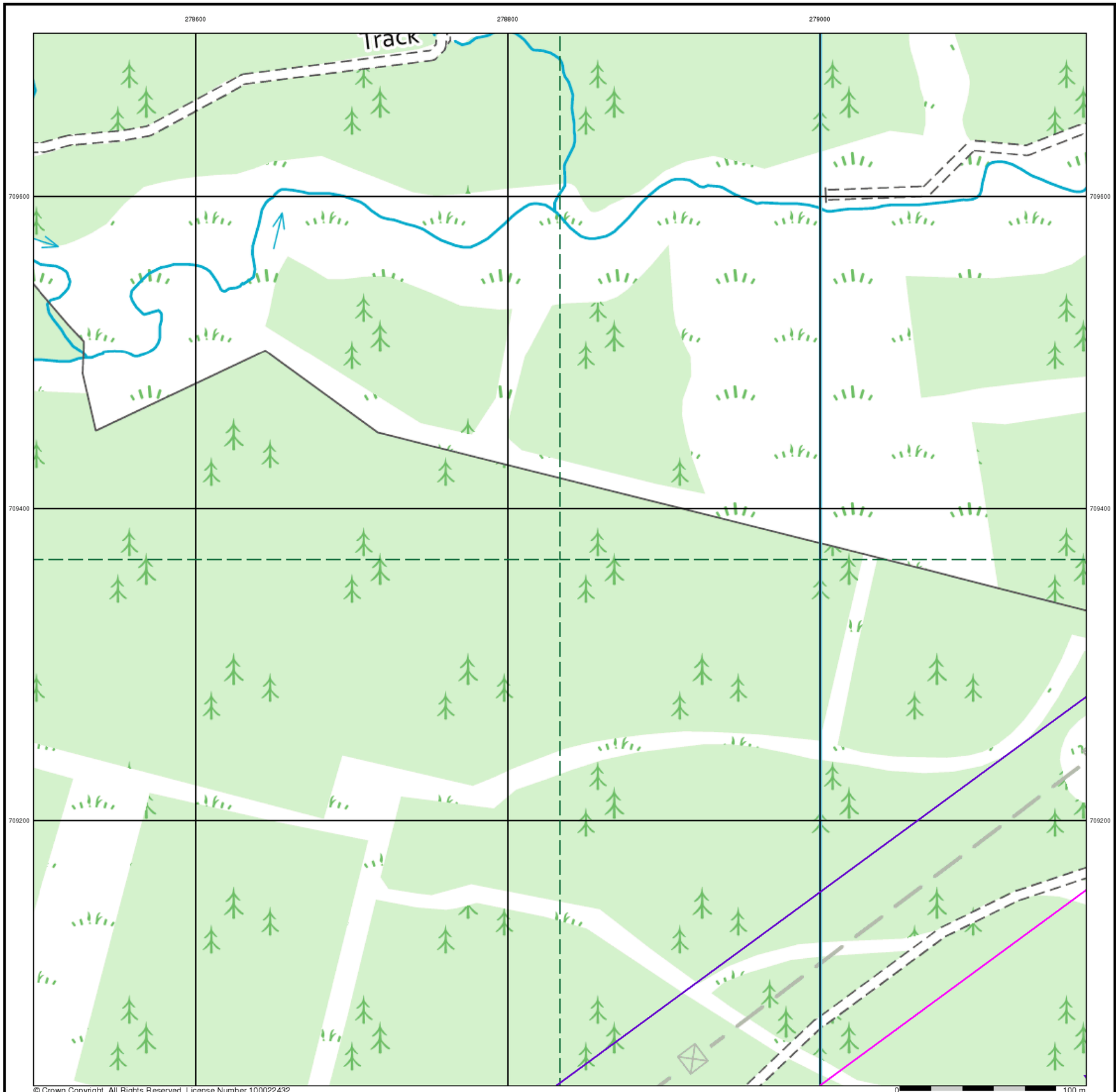
Web: www.envirocheck.co.uk




## General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID

Several of Type at Location

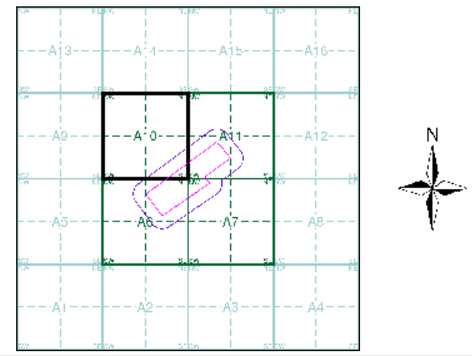
## Historical Building Plans

- Area Cleared due to Enemy Action
- Asbestos
- Above Ground Fuel Tanks
- Benzene/Benzole/Naphtha, Naphthalene/Kerosene
- Electricity Generation
- Electricity Sub-Stations
- Gas Industry
- Gas Storage
- Gas Use
- Oil Industry
- Oil Storage
- Oil Use
- Paint based Oils
- Paraffin
- Petrol and Diesel Industry
- Petrol and Diesel Storage
- Petrol and Diesel Use
- Potential Fuel Gas
- Potential Fuel Oil
- Potential Fuel Use
- Potential Petrol and Diesel
- Potential Tanks
- Potentially Fuel-related Tanks
- Underground Fuel Tanks

## Historical Tanks and Energy Facilities

- (B) Electrical Sub Station Facility
- (E) Electricity Industry Facility
- (G) Gas Industry Facility
- (V) Gas Monitoring Facility
- (M) Miscellaneous Power Facility
- (O) Oil Industry Facility
- (S) Petroleum Storage Facility
- (P) Potential Tank
- (T) Tank

## Historical Data Report - Segment A10



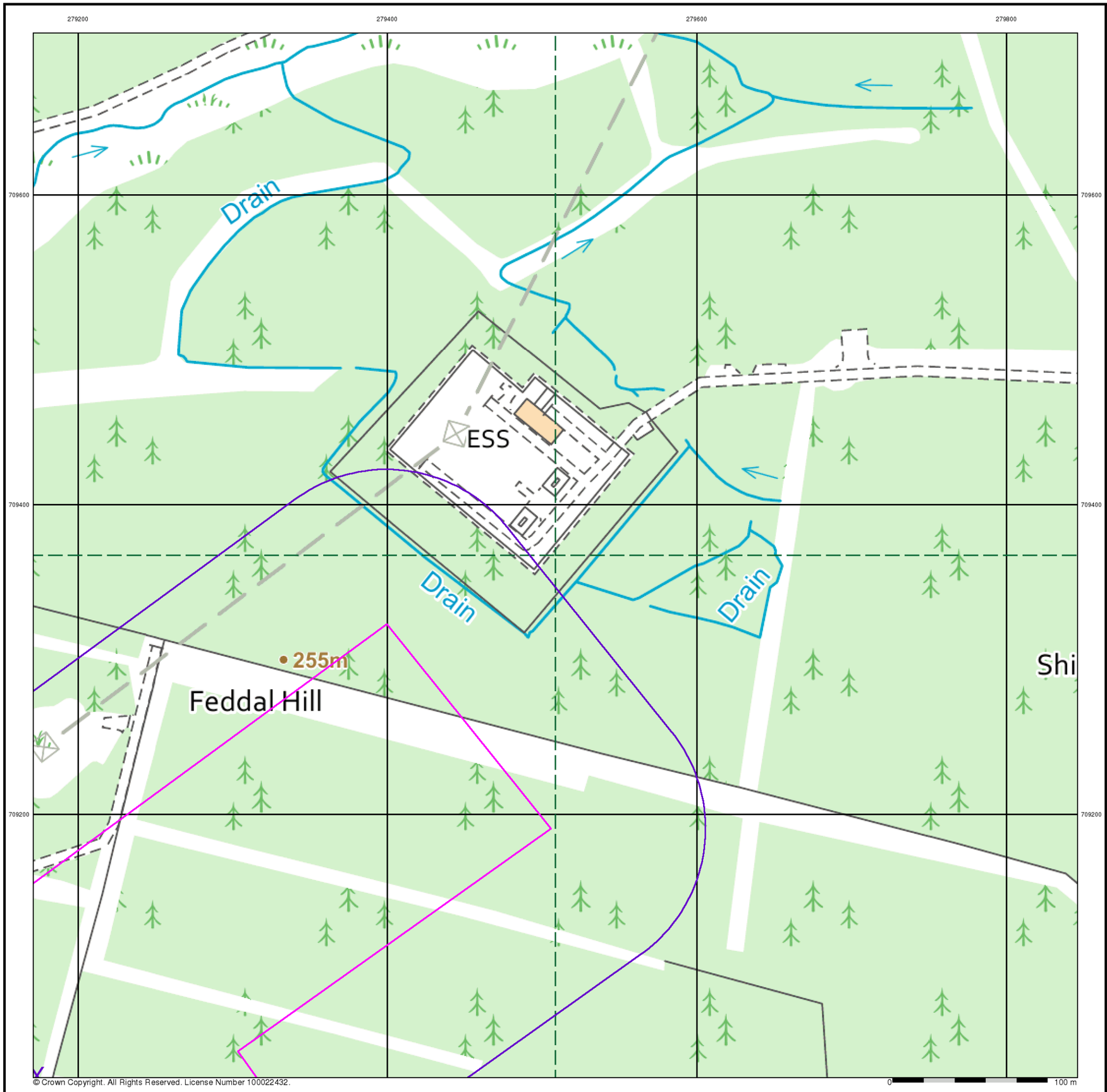

## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Plot Buffer (m): | 100 |

## Site Details

Site at, Braco, Perth and Kinross

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk




## General

Specified Site | Specified Buffer(s) | Bearing Reference Point | Map ID
Several of Type at Location

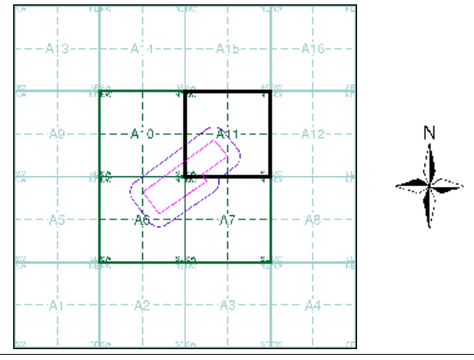
## Historical Building Plans

- Area Cleared due to Enemy Action
- Asbestos
- Above Ground Fuel Tanks
- Benzene/Benzole/Naphtha, Naphthalene/Kerosene
- Electricity Generation
- Electricity Sub-Stations
- Gas Industry
- Gas Storage
- Gas Use
- Oil Industry
- Oil Storage
- Oil Use
- Paint based Oils
- Paraffin
- Petrol and Diesel Industry
- Petrol and Diesel Storage
- Petrol and Diesel Use
- Potential Fuel Gas
- Potential Fuel Oil
- Potential Fuel Use
- Potential Petrol and Diesel
- Potential Tanks
- Potentially Fuel-related Tanks
- Underground Fuel Tanks

## Historical Tanks and Energy Facilities

- (B) Electrical Sub Station Facility
- (E) Electricity Industry Facility
- (G) Gas Industry Facility
- (V) Gas Monitoring Facility
- (M) Miscellaneous Power Facility
- (O) Oil Industry Facility
- (S) Petroleum Storage Facility
- (P) Potential Tank
- (T) Tank

## Historical Data Report - Segment A11




## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Plot Buffer (m): | 100 |

## Site Details

Site at, Braco, Perth and Kinross

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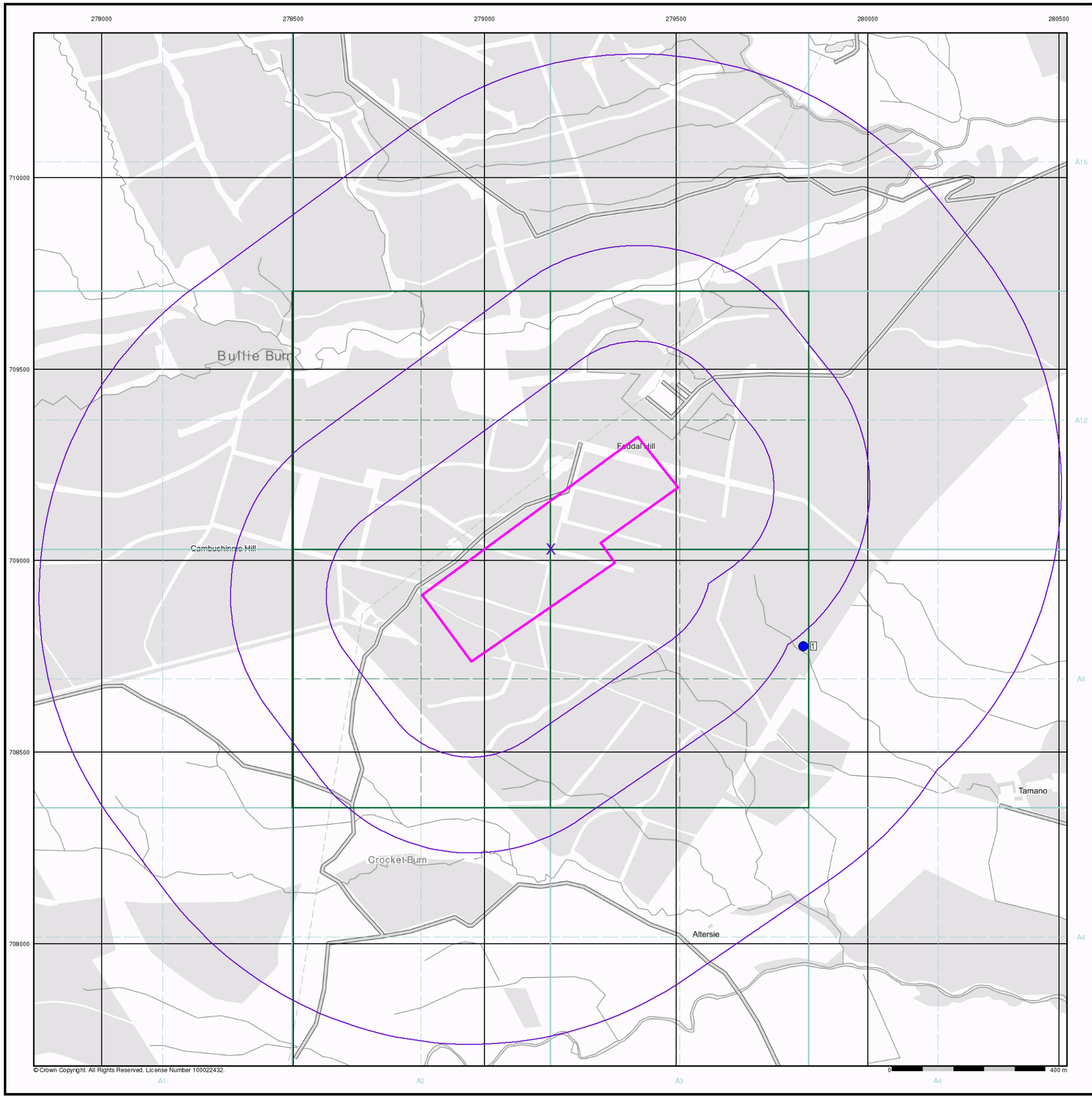
Web: www.envirocheck.co.uk




## General

Specified Site
Specified Buffer(s)
Bearing Reference Point
Map ID
Several of Type at Location

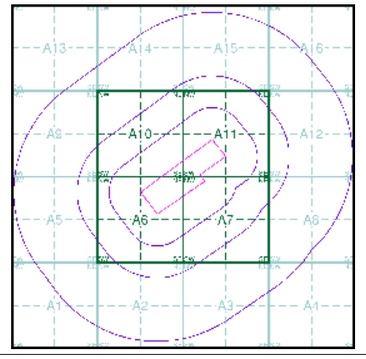
## Historical Building Plans

Area Cleared due to Enemy Action

## Historical Land Use

Former Marsh
Historical Flood Liability
Historical Flood Liability (Location)
Potentially Contaminative Industrial Use (Past Land Use)
Potentially Contaminative Industrial Use (Past Land Use) (Linear)
Potentially Contaminative Industrial Use (Past Land Use) (Location)
Potentially Infilled Land (Non-Water)
Potentially Infilled Land (Non-Water) (Linear)
Potentially Infilled Land (Non-Water) (Location)
Potentially Infilled Land (Water)
Potentially Infilled Land (Water) (Linear)
Potentially Infilled Land (Water) (Location)

## Historical Data Report - Slice Map A




## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Search Buffer (m): | 1000 |

## Site Details

Site at, Braco, Perth and Kinross

Landmark IN-FORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

# Historical Mapping Legends

## Ordnance Survey County Series 1:10,560

Gravel Pit
Sand Pit
Other Pits
Quarry
Shingle
Orchard
Osiers
Reeds
Marsh
Mixed Wood
Deciduous
Brushwood
Fir
Furze
Rough Pasture
Arrow denotes flow of water
Trigonometrical Station
Site of Antiquities
Bench Mark
Pump, Guide Post, Signal Post
Well, Spring, Boundary Post
·285 Surface Level
Sketched Contour
Instrumental Contour
Main Roads
Fenced
Un-Fenced
Minor Roads
Fenced
Un-Fenced
Sunken Road
Raised Road
Road over Railway
Railway over River
Railway over Road
Level Crossing
Road over River or Canal
Road over Stream
Road over Stream
County Boundary (Geographical)
County & Civil Parish Boundary
Administrative County & Civil Parish Boundary
Co. Boro. Bdy. County Borough Boundary (England)
Co. Burgh Bdy. County Burgh Boundary (Scotland)
R.D. Bdy. Rural District Boundary
Civil Parish Boundary

## Ordnance Survey Plan 1:10,000

Chalk Pit, Clay Pit or Quarry
Gravel Pit
Sand Pit
Disused Pit or Quarry
Refuse or Slag Heap
Lake, Loch or Pond
Dunes
Boulders
Coniferous Trees
Non-Coniferous Trees
Orchard
Scrub
Coppice
Bracken
Heath
Rough Grassland
Marsh
Reeds
Saltings
Building
Direction of Flow of Water
Shingle
Sand
Glasshouse
Pylon
Pylon
Electricity Transmission Line
Sloping Masonry
Cutting
Embankment
Standard Gauge Multiple Track
Road Under
Road Over
Level Crossing
Foot Bridge
Standard Gauge Single Track
Siding, Tramway or Mineral Line
Narrow Gauge
Geographical County
Administrative County, County Borough or County of City
Municipal Borough, Urban or Rural District, Burgh or District Council
Borough, Burgh or County Constituency
Shown only when not coincident with other boundaries
Civil Parish
Shown alternately when coincidence of boundaries occurs

| | | | |
|---|---|---|---|
| BP, BS | Boundary Post or Stone | Pol Sta | Police Station |
| Ch | Church | PO | Post Office |
| CH | Club House | PC | Public Convenience |
| F E Sta | Fire Engine Station | PH | Public House |
| FB | Foot Bridge | SB | Signal Box |
| Fn | Fountain | Spr | Spring |
| GP | Guide Post | TCB | Telephone Call Box |
| MP | Mile Post | TCP | Telephone Call Post |
| MS | Mile Stone | W | Well |

## 1:10,000 Raster Mapping

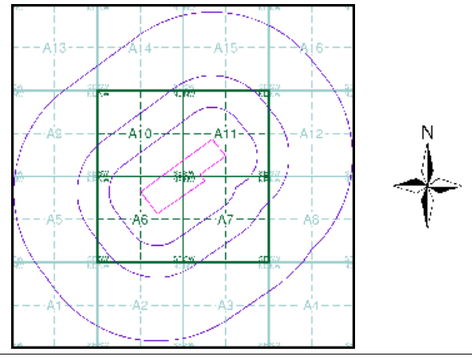
Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or community boundary
District, Unitary, Metropolitan, London Borough boundary
Constituency boundary
Area of wooded vegetation
Non-coniferous trees
Non-coniferous trees (scattered)
Coniferous trees
Coniferous trees (scattered)
Positioned tree
Orchard
Coppice or Osiers
Rough Grassland
Heath
Scrub
Marsh, Salt Marsh or Reeds
Water feature
Flow arrows
MHW(S) Mean high water (springs)
MLW(S) Mean low water (springs)
Telephone line (where shown)
Electricity transmission line (with poles)
BM 123.45 m Bench mark (where shown)
Triangulation station
Point feature (e.g. Guide Post or Mile Stone)
Pylon, flare stack or lighting tower
Site of (antiquity)
Glasshouse
General Building
Important Building

wsp

## Historical Mapping & Photography included:

| Mapping Type | Scale | Date | Pg |
|---|---|---|---|
| Perthshire | 1:10,560 | 1866 | 2 |
| Perthshire | 1:10,560 | 1901 | 3 |
| Ordnance Survey Plan | 1:10,000 | 1958 - 1959 | 4 |
| Ordnance Survey Plan | 1:10,000 | 1978 - 1979 | 5 |
| Ordnance Survey Plan | 1:10,000 | 1982 | 6 |
| 10K Raster Mapping | 1:10,000 | 2001 | 7 |
| 10K Raster Mapping | 1:10,000 | 2006 | 8 |
| VectorMap Local | 1:10,000 | 2023 | 9 |

## Historical Map - Slice A



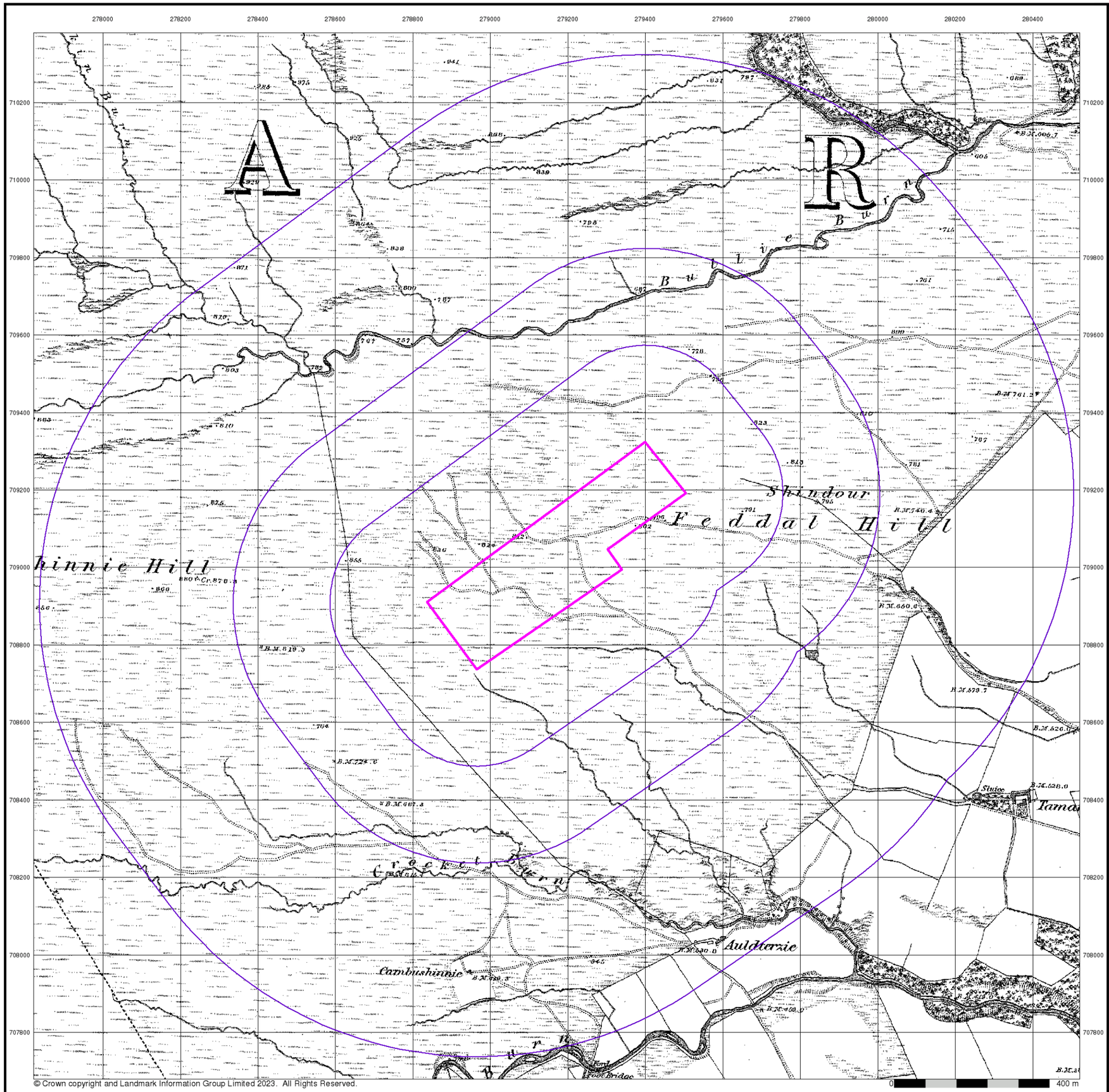

## Order Details

Order Number: 327698237_1_1
Customer Ref: 70108968
National Grid Reference: 279170, 709030
Slice: A
Site Area (Ha): 14.26
Search Buffer (m): 1000

## Site Details

Site at, Braco, Perth and Kinross


Landmark IN-ORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk





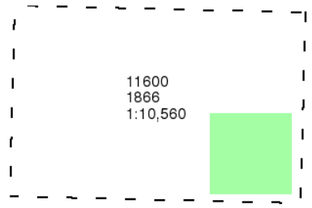

## Perthshire

## Published 1866

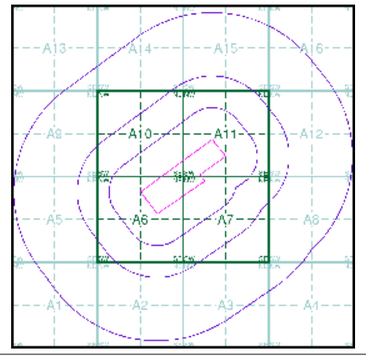
## Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)




## Historical Map - Slice A




## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
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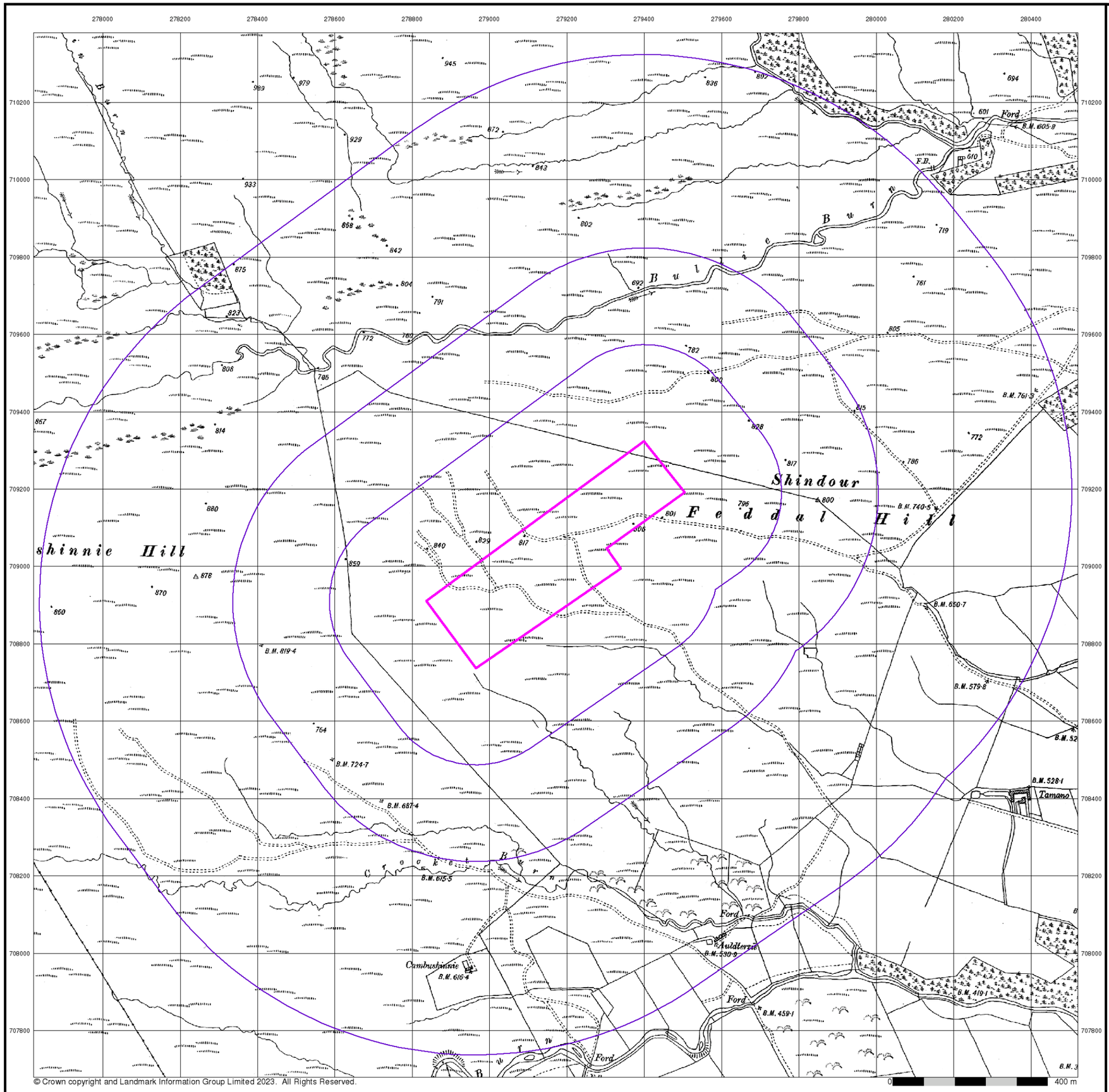




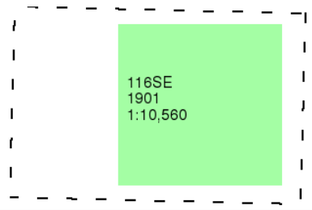

## Perthshire

## Published 1901

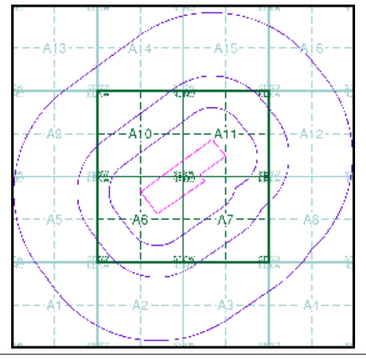
## Source map scale - 1:10,560

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)




## Historical Map - Slice A




## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
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## Site Details

Site at, Braco, Perth and Kinross

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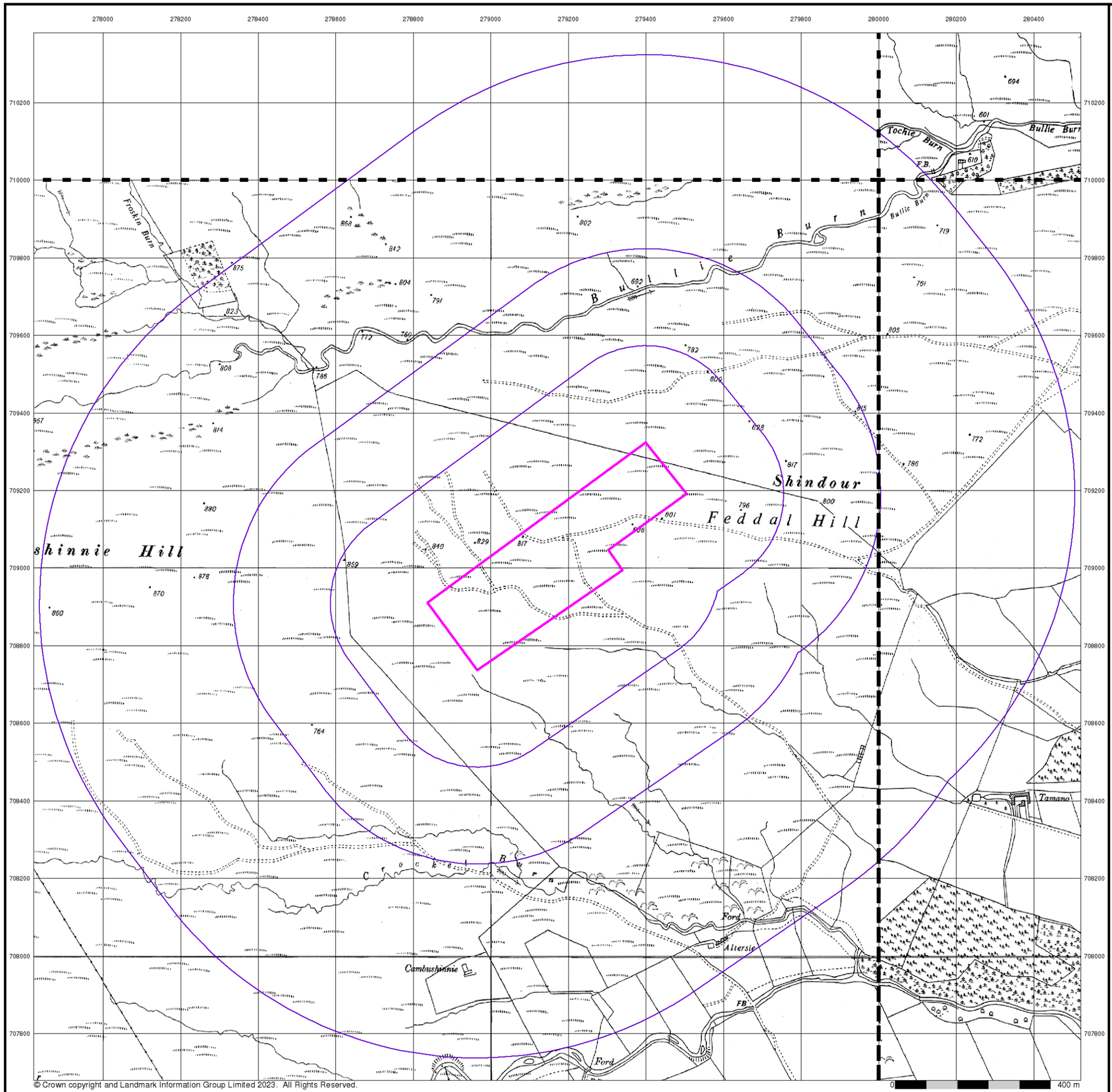





wsp

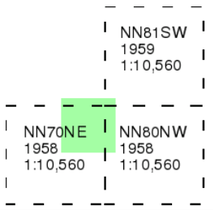
## Ordnance Survey Plan

## Published 1958 - 1959

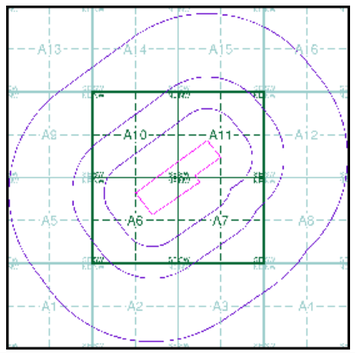
## Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)




## Historical Map - Slice A




## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Search Buffer (m): | 1000 |

## Site Details

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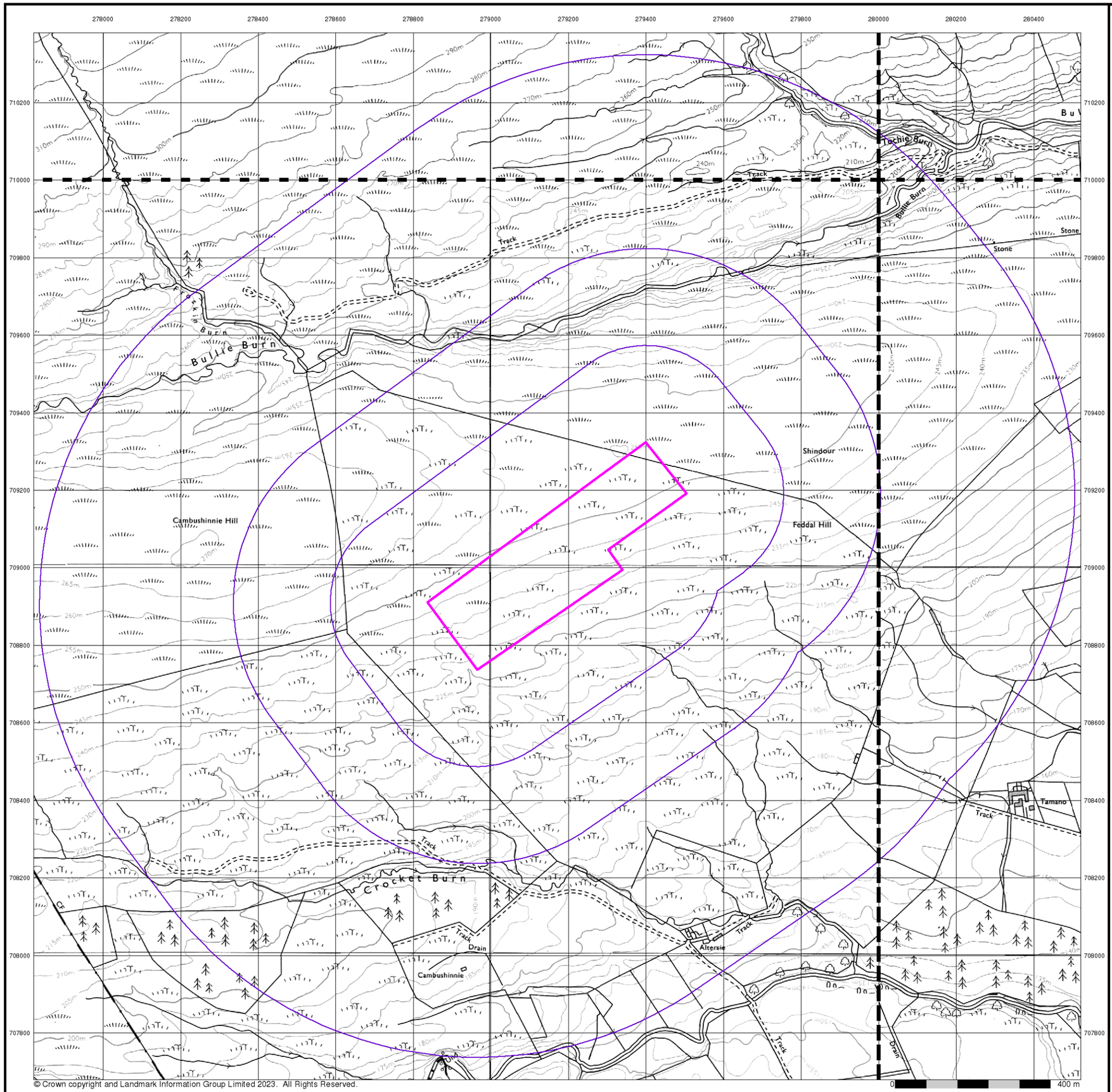





## Ordnance Survey Plan

## Published 1978 - 1979

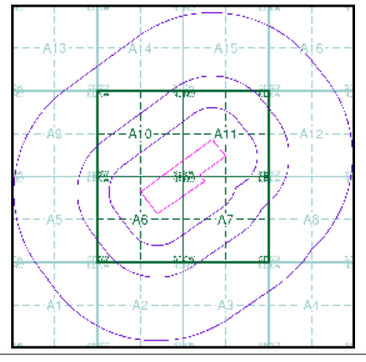
## Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)

| | |
|---|---|
| NN71SE 1978 1:10,000 | NN81SW 1978 1:10,000 |
| NN70NE 1978 1:10,000 | NN80NW 1979 1:10,000 |

## Historical Map - Slice A




## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Search Buffer (m): | 1000 |

## Site Details

Site at, Braco, Perth and Kinross

Landmark IN-FORMATION GROUP
Tel: 0844 844 9952
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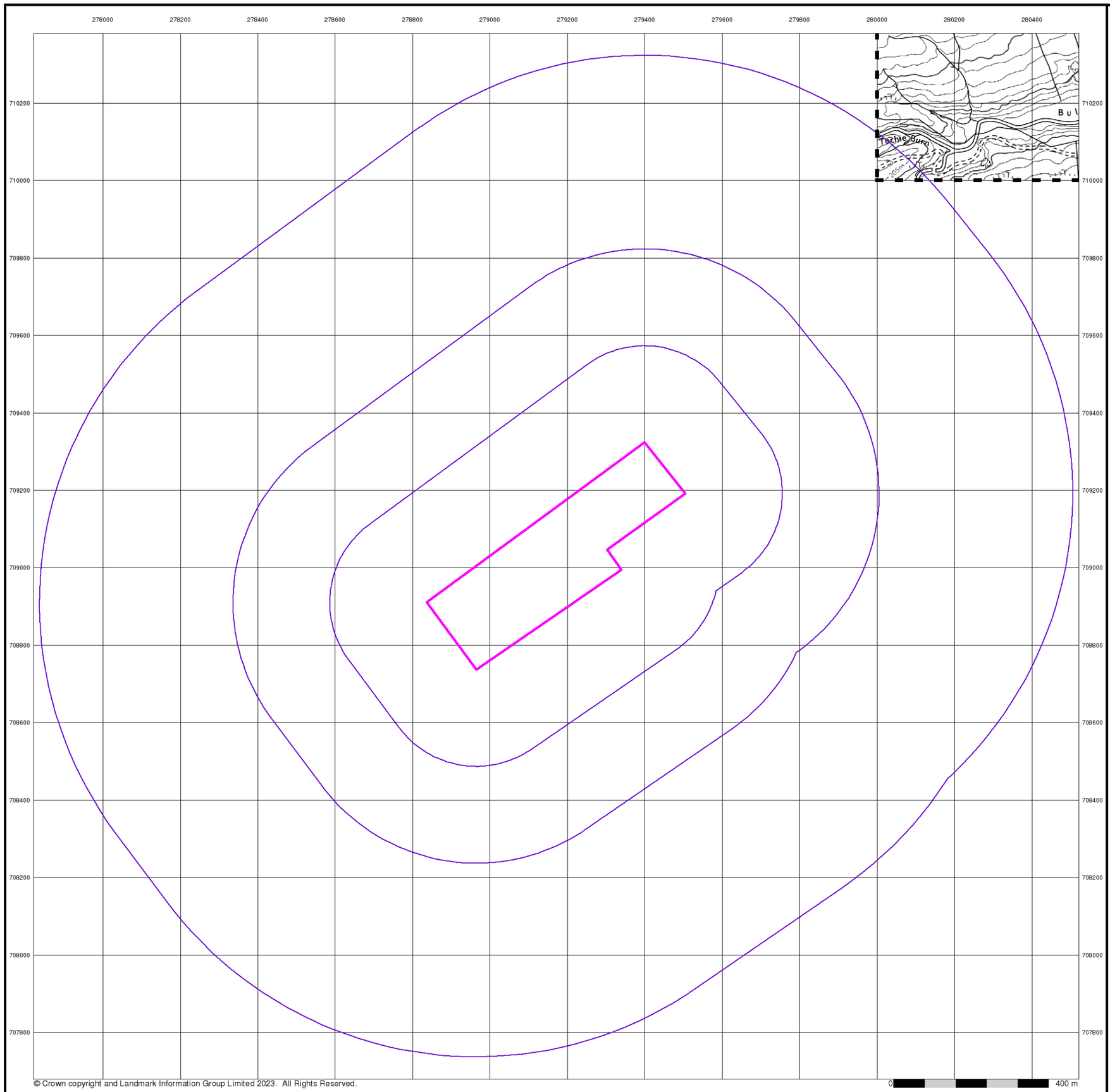




wsp

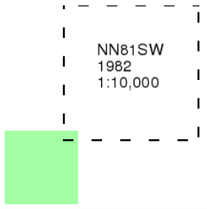
## Ordnance Survey Plan

## Published 1982

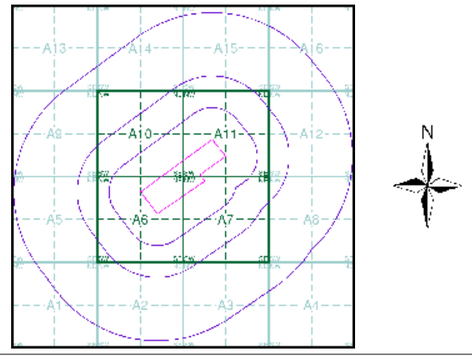
## Source map scale - 1:10,000

The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some years later than the surveyed date. Before 1938, all OS maps were based on the Cassini Projection, with independent surveys of a single county or group of counties, giving rise to significant inaccuracies in outlying areas. In the late 1940`s, a Provisional Edition was produced, which updated the 1:10,560 mapping from a number of sources. The maps appear unfinished - with all military camps and other strategic sites removed. These maps were initially overprinted with the National Grid. In 1970, the first 1:10,000 maps were produced using the Transverse Mercator Projection. The revision process continued until recently, with new editions appearing every 10 years or so for urban areas.

## Map Name(s) and Date(s)




## Historical Map - Slice A




## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Search Buffer (m): | 1000 |

## Site Details

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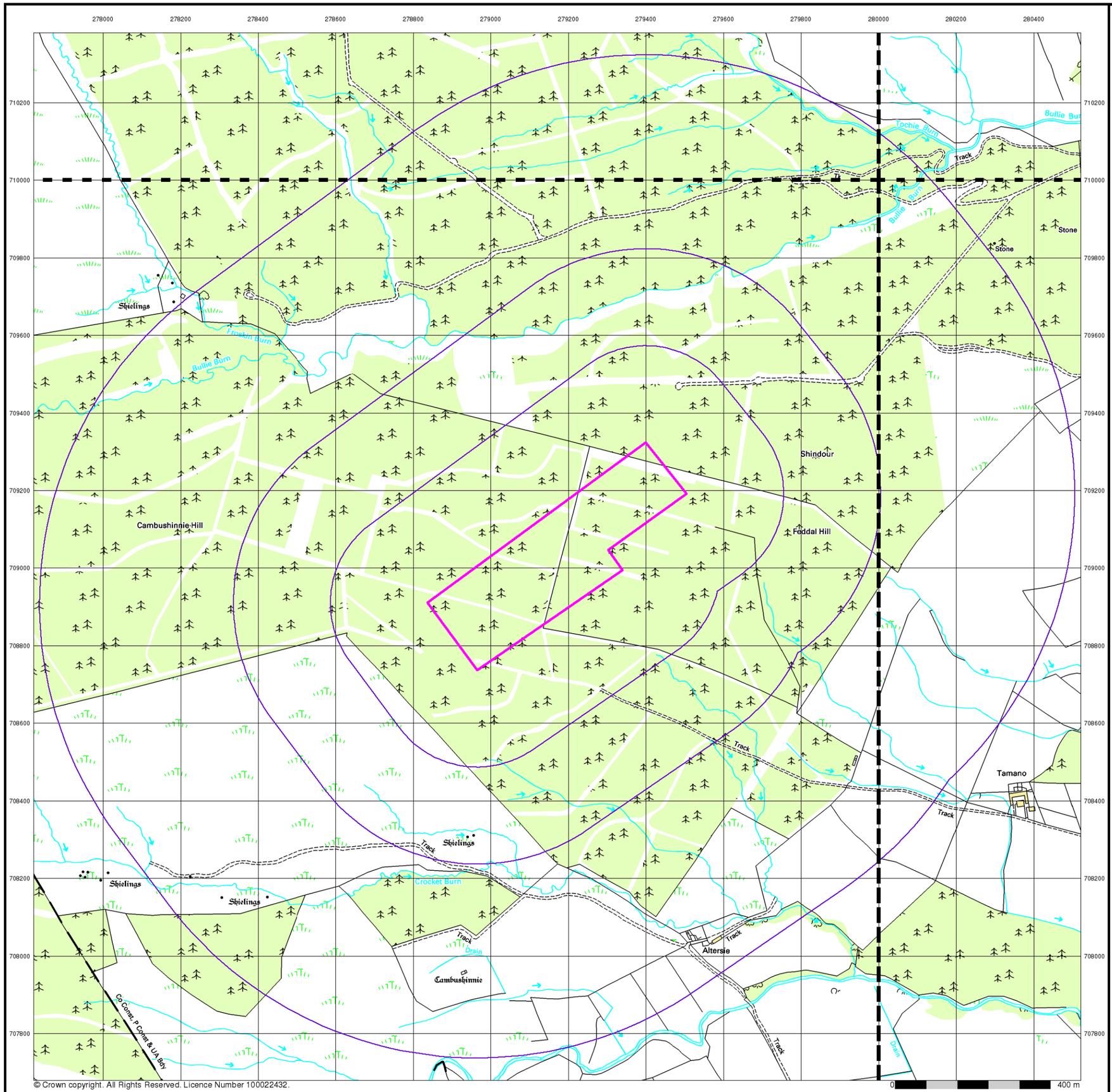



# 10k Raster Mapping

## Published 2001

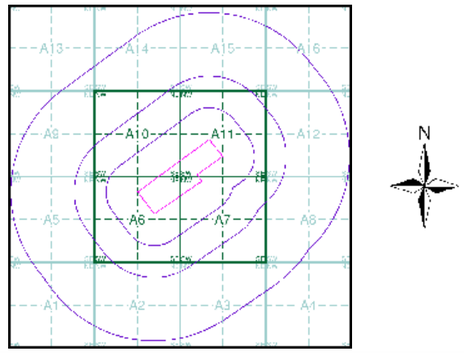
## Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

## Map Name(s) and Date(s)

| | |
|---|---|
| NN71SE 2001 1:10,000 | NN81SW 2001 1:10,000 |
| NN70NE 2001 1:10,000 | NN80NW 2001 1:10,000 |

## Historical Map - Slice A



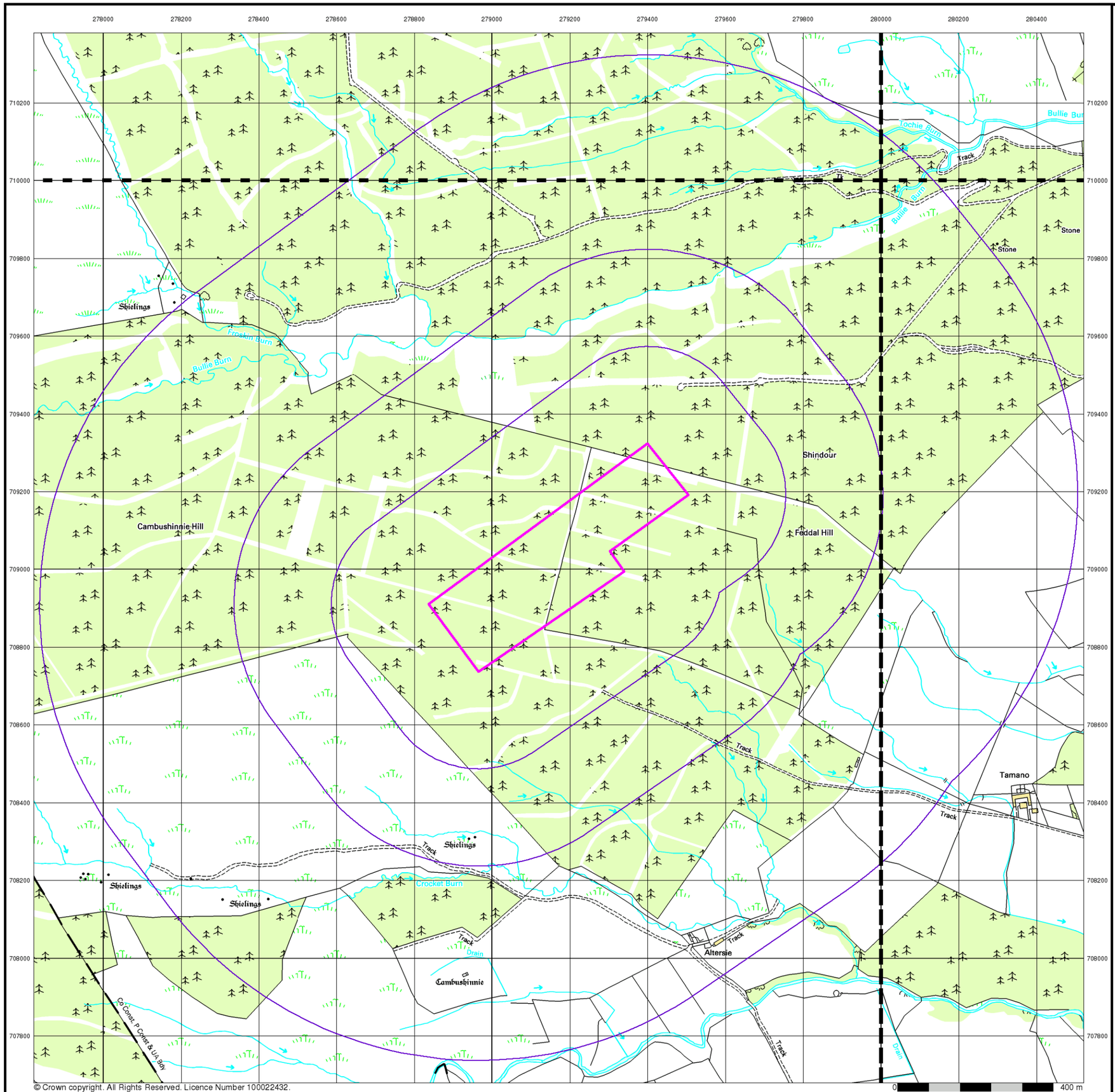

## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Search Buffer (m): | 1000 |

## Site Details

Site at, Braco, Perth and Kinross


Landmark IN-FORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk






wsp

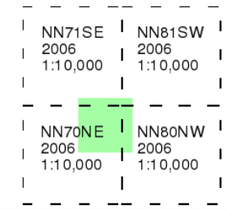
## 10k Raster Mapping

## Published 2006

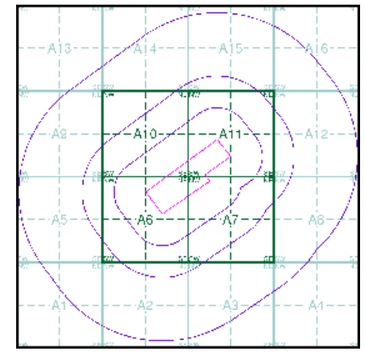
## Source map scale - 1:10,000

The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks and paths. Road names are also included together with the relevant road number and classification. Boundary information depiction includes county, unitary authority, district, civil parish and constituency.

## Map Name(s) and Date(s)




## Historical Map - Slice A




## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
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## Site Details

Site at, Braco, Perth and Kinross

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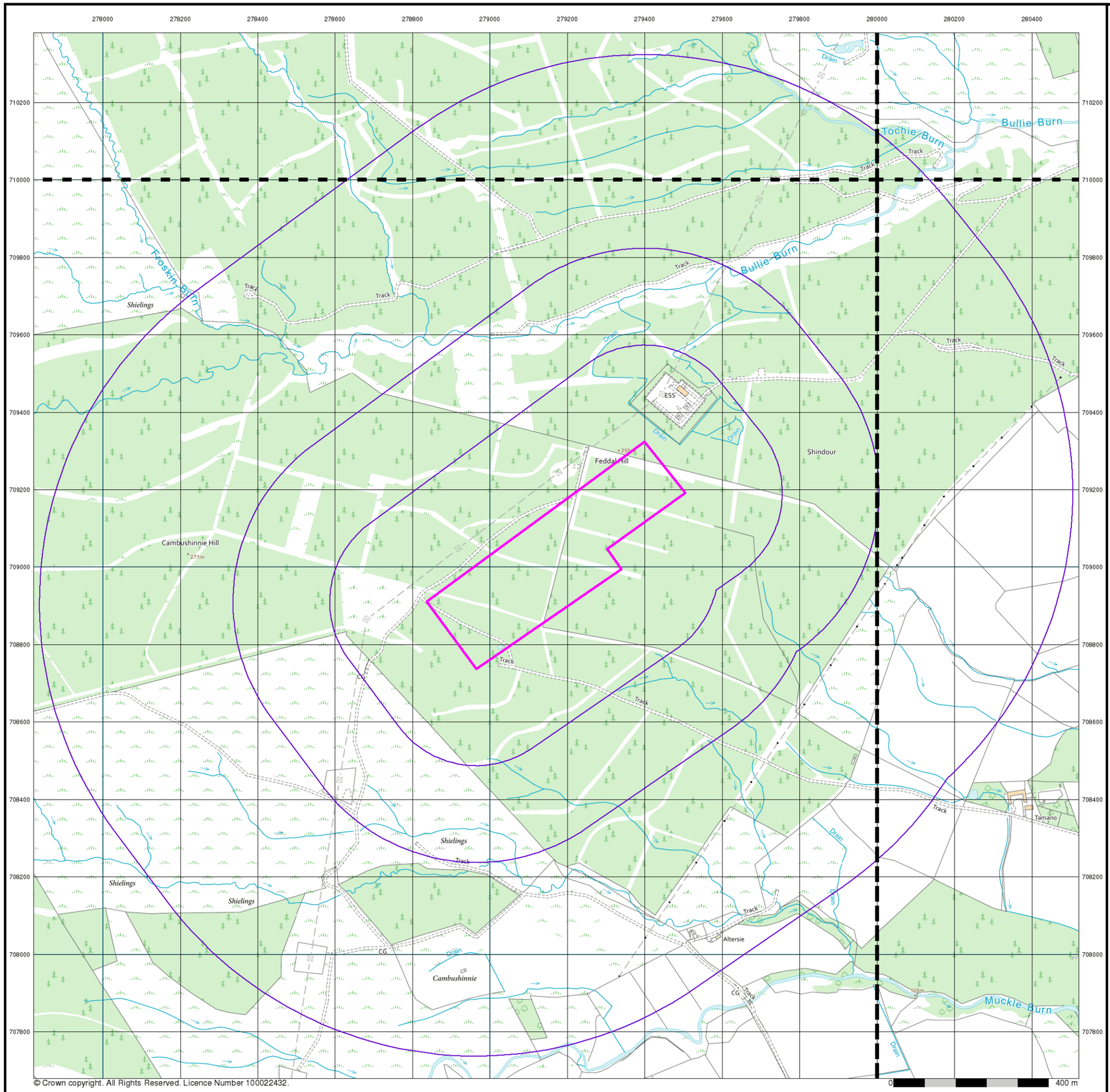



# VectorMap Local

## Published 2023

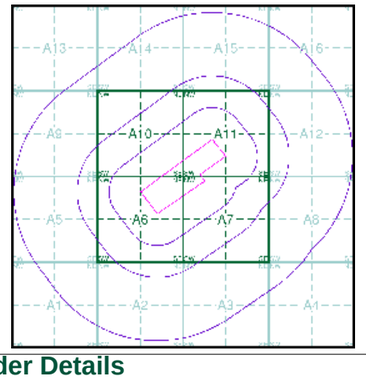
## Source map scale - 1:10,000

VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap Local is derived from large-scale information surveyed at 1:1250 scale (covering major towns and cities),1:2500 scale (smaller towns, villages and developed rural areas), and 1:10 000 scale (mountain, moorland and river estuary areas).

## Map Name(s) and Date(s)

| | |
|---|---|
| NN71SE 2023 Variable | NN81SW 2023 Variable |
| NN70NE 2023 Variable | NN80NW 2023 Variable |

## Historical Map - Slice A




## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Search Buffer (m): | 1000 |

## Site Details

Site at, Braco, Perth and Kinross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# Historical Mapping Legends

## Ordnance Survey County Series and Ordnance Survey Plan 1:2,500

Quarry
Gravel Pit
Sand Pit
Clay Pit
Shingle
Refuse Heap
Sloping Masonry
Flat Rock
Marsh
Reeds
Osiers
Rough Pasture
Furze
Wood
Mixed Wood
Brushwood
Orchard
Fir
Ford
Stepping Stones
Ferry
Waterfall
Lock

| | | | |
|---|---|---|---|
| △ | Trig. Station | 507 △ | Altitude at Trig. Station |
| B.M.325·9 ↑ | Bench Mark | 342 + | Surface Level |
| ←←←← | Arrow denotes flow of water | ✣ | Antiquities (site of) |

Cutting
Embankment
Railway crossing Road
Level Crossing
Road crossing Railway
Railway crossing River or Canal
Road over single stream
Road over River or Canal

| | |
|---|---|
| — — — — — | County Boundary (Geographical) |
| — · — · — · | County & Civil Parish Boundary |
| + · + · + · + | Administrative County & Civil Parish Boundary |
| — — — — — Co. Boro. Bdy. | County Borough Boundary (England) |
| — — — — — Co. Burgh Bdy. | County Burgh Boundary (Scotland) |

| | | | |
|---|---|---|---|
| B P B S | Boundary Post or Stone | P.C.B | Police Call Box |
| B.R. | Bridle Road | P | Pump |
| E.P | Electricity Pylon | S.P | Signal Post |
| F.B. | Foot Bridge | Sl. | Sluice |
| F.P. | Foot Path | Sp. | Spring |
| G.P | Guide Post or Board | T.C.B | Telephone Call Box |
| M.S | Mile Stone | Tr. | Trough |
| M.P M.R | Mooring Post or Ring | W | Well |

## Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250

Inactive Quarry, Chalk Pit or Clay Pit
Active Quarry, Chalk Pit or Clay Pit
Rock
Boulders
Cliff
Slopes
Top
Roofed Building
Glazed Roof Building
Top
Sloping Masonry
Archway
Non-Coniferous Tree (surveyed)
Coniferous Tree (surveyed)
Non-Coniferous Trees (not surveyed)
Coniferous Trees (not surveyed)
Orchard Tree
Scrub
Bracken
Coppice, Osier
Reeds
Marsh, Saltings
Rough Grassland
Heath
Culvert
Direction of water flow
Bench Mark
Antiquity (site of)
Cave Entrance
Triangulation Station
Electricity Pylon
Electricity Transmission Line

| | |
|---|---|
| — — — — | County Boundary (Geographical) |
| — · — · — | County & Civil Parish Boundary |
| · · · · · · · · · · | Civil Parish Boundary |
| — + — + — | Admin. County or County Bor. Boundary |
| L B Bdy | London Borough Boundary |
| | Symbol marking point where boundary mereing changes |

| | | | |
|---|---|---|---|
| BH | Beer House | P | Pillar, Pole or Post |
| BP, BS | Boundary Post or Stone | PO | Post Office |
| Cn, C | Capstan, Crane | PC | Public Convenience |
| Chy | Chimney | PH | Public House |
| D Fn | Drinking Fountain | Pp | Pump |
| El P | Electricity Pillar or Post | SB, S Br | Signal Box or Bridge |
| FAP | Fire Alarm Pillar | SP, SL | Signal Post or Light |
| FB | Foot Bridge | Spr | Spring |
| GP | Guide Post | Tk | Tank or Track |
| H | Hydrant or Hydraulic | TCB | Telephone Call Box |
| LC | Level Crossing | TCP | Telephone Call Post |
| MH | Manhole | Tr | Trough |
| MP | Mile Post or Mooring Post | Wr Pt, Wr T | Water Point, Water Tap |
| MS | Mile Stone | W | Well |
| NTL | Normal Tidal Limit | Wd Pp | Wind Pump |

## Large-Scale National Grid Data 1:2,500 and 1:1,250

Cliff
Slopes
Top
Top
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Positioned Boulder
Scree
Non-Coniferous Tree (surveyed)
Coniferous Tree (surveyed)
Non-Coniferous Trees (not surveyed)
Coniferous Trees (not surveyed)
Orchard Tree
Scrub
Bracken
Coppice, Osier
Reeds
Marsh, Saltings
Rough Grassland
Heath
Culvert
Direction of water flow
Triangulation Station
Antiquity (site of)
Electricity Transmission Line
Electricity Pylon
BM 291.60m
Bench Mark
Buildings with Building Seed
Roofed Building
Glazed Roof Building

| | |
|---|---|
| · · · · · · | Civil parish/community boundary |
| — — — — | District boundary |
| — • — — | County boundary |
| ◦ | Boundary post/stone |
| | Boundary mereing symbol (note: these always appear in opposed pairs or groups of three) |

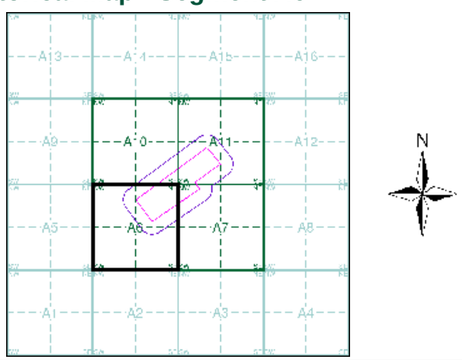
| | | | |
|---|---|---|---|
| Bks | Barracks | P | Pillar, Pole or Post |
| Bty | Battery | PO | Post Office |
| Cemy | Cemetery | PC | Public Convenience |
| Chy | Chimney | Pp | Pump |
| Cis | Cistern | Ppg Sta | Pumping Station |
| Dismtd Rly | Dismantled Railway | PW | Place of Worship |
| El Gen Sta | Electricity Generating Station | Sewage Ppg Sta | Sewage Pumping Station |
| El P | Electricity Pole, Pillar | SB, S Br | Signal Box or Bridge |
| El Sub Sta | Electricity Sub Station | SP, SL | Signal Post or Light |
| FB | Filter Bed | Spr | Spring |
| Fn / D Fn | Fountain / Drinking Ftn. | Tk | Tank or Track |
| Gas Gov | Gas Valve Compound | Tr | Trough |
| GVC | Gas Governer | Wd Pp | Wind Pump |
| GP | Guide Post | Wr Pt, Wr T | Water Point, Water Tap |
| MH | Manhole | Wks | Works (building or area) |
| MP, MS | Mile Post or Mile Stone | W | Well |

wsp

## Historical Mapping & Photography included:

| Mapping Type | Scale | Date | Pg |
|---|---|---|---|
| Historical Aerial Photography | 1:2,500 | 2005 | 2 |

## Historical Map - Segment A6



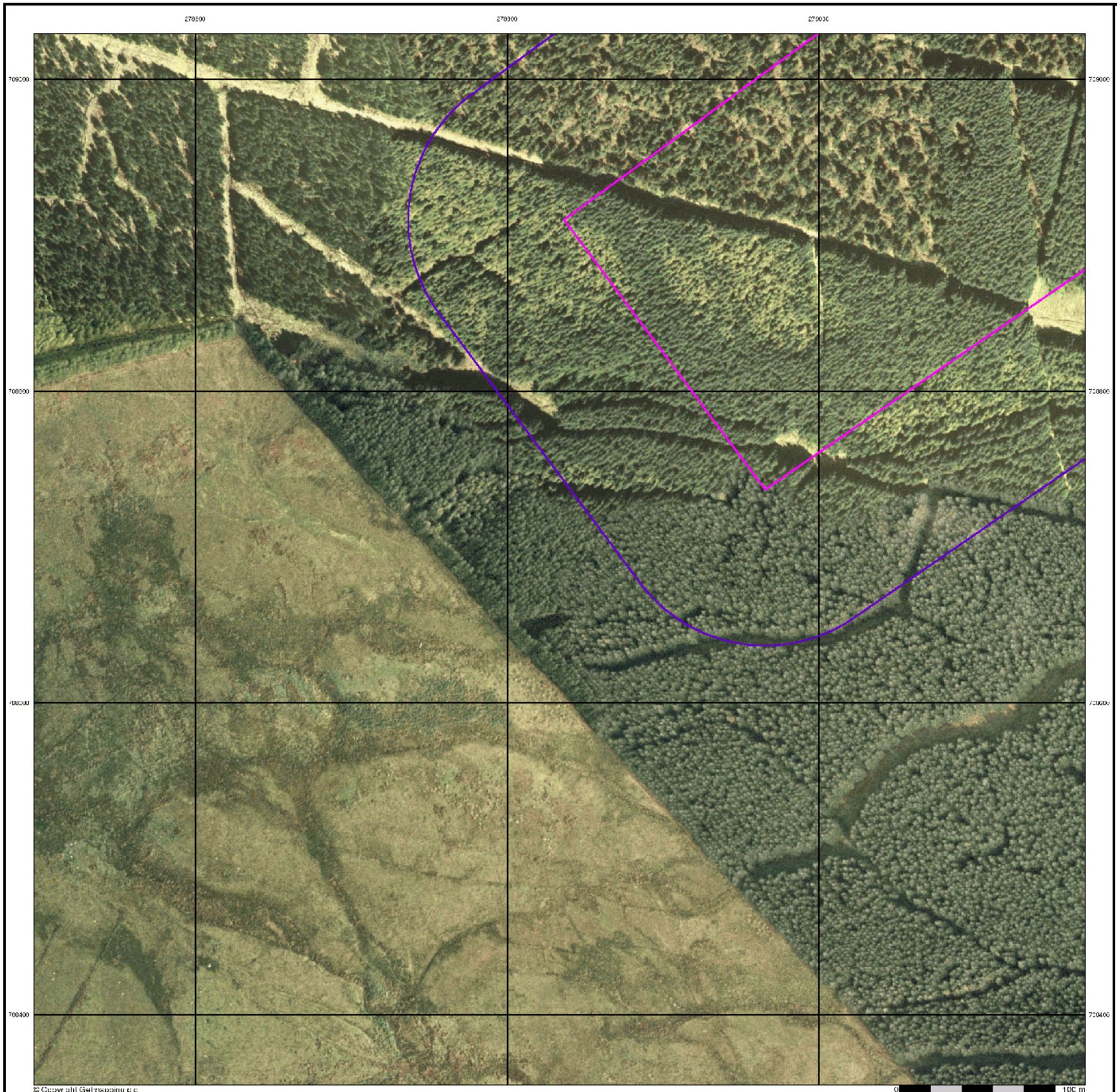

## Order Details

Order Number: 327698237_1_1
Customer Ref: 70108968
National Grid Reference: 279170, 709030
Slice: A
Site Area (Ha): 14.26
Search Buffer (m): 100

## Site Details

Site at, Braco, Perth and Kinross


Landmark IN-ORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

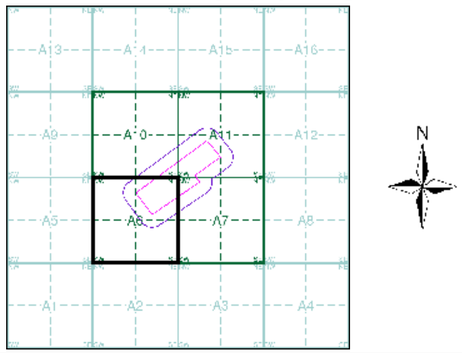



# Historical Aerial Photography

## Published 2005

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

### Historical Aerial Photography - Segment A6




## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Search Buffer (m): | 100 |

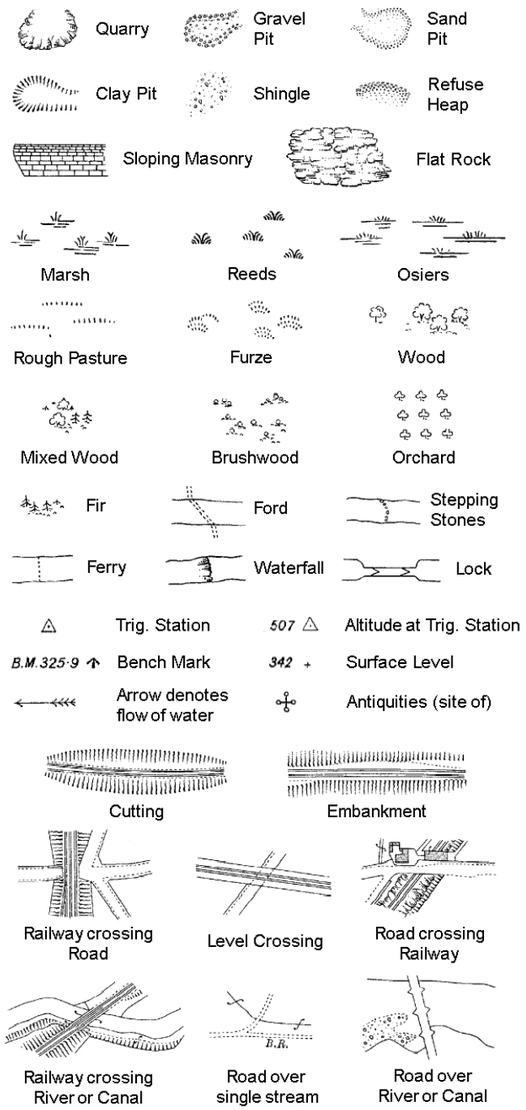
## Site Details

Site at, Braco, Perth and Kinross

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

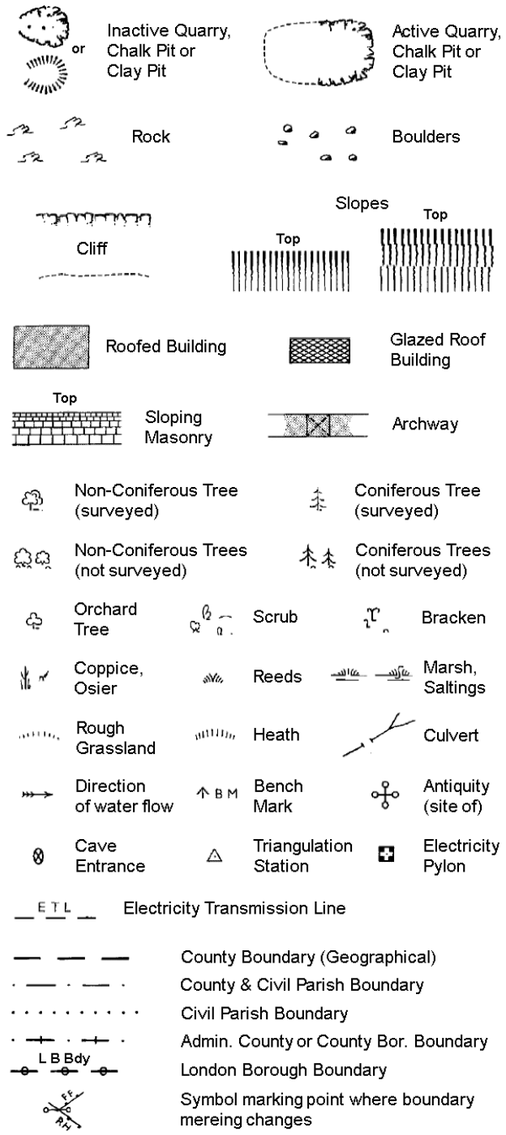
# Historical Mapping Legends

## Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



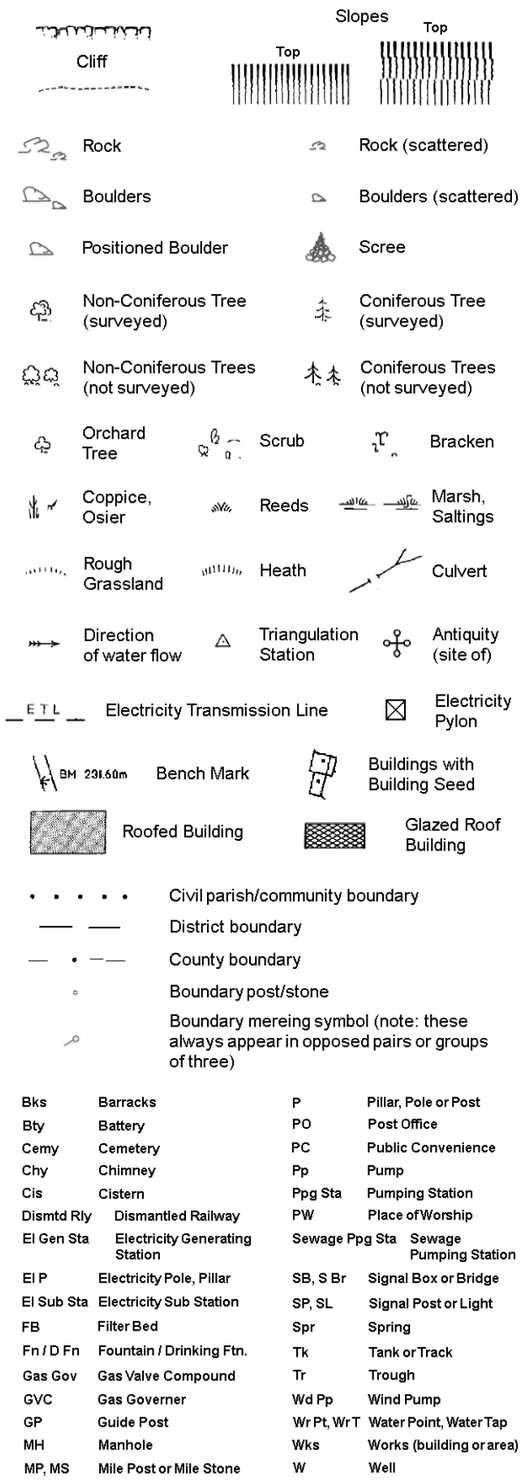

| | | | |
|---|---|---|---|
| B P B S | Boundary Post or Stone | P.C.B | Police Call Box |
| B.R. | Bridle Road | P | Pump |
| E.P | Electricity Pylon | S.P | Signal Post |
| F.B. | Foot Bridge | St. | Sluice |
| F.P. | Foot Path | Sp. | Spring |
| G.P | Guide Post or Board | T.C.B | Telephone Call Box |
| M.S | Mile Stone | Tr. | Trough |
| M.P M.R | Mooring Post or Ring | W | Well |

## Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250




| | | | |
|---|---|---|---|
| BH | Beer House | P | Pillar, Pole or Post |
| BP, BS | Boundary Post or Stone | PO | Post Office |
| Cn, C | Capstan, Crane | PC | Public Convenience |
| Chy | Chimney | PH | Public House |
| D Fn | Drinking Fountain | Pp | Pump |
| El P | Electricity Pillar or Post | SB, S Br | Signal Box or Bridge |
| FAP | Fire Alarm Pillar | SP, SL | Signal Post or Light |
| FB | Foot Bridge | Spr | Spring |
| GP | Guide Post | Tk | Tank or Track |
| H | Hydrant or Hydraulic | TCB | Telephone Call Box |
| LC | Level Crossing | TCP | Telephone Call Post |
| MH | Manhole | Tr | Trough |
| MP | Mile Post or Mooring Post | Wr Pt, Wr T | Water Point, Water Tap |
| MS | Mile Stone | W | Well |
| NTL | Normal Tidal Limit | Wd Pp | Wind Pump |

## Large-Scale National Grid Data 1:2,500 and 1:1,250



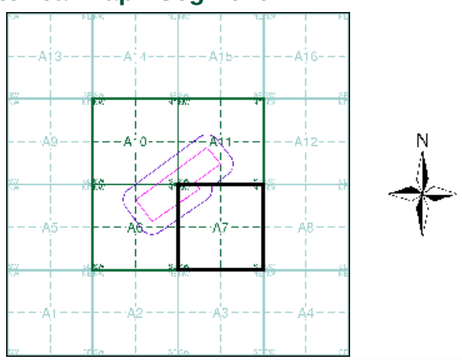

| | | | |
|---|---|---|---|
| Bks | Barracks | P | Pillar, Pole or Post |
| Bty | Battery | PO | Post Office |
| Cemy | Cemetery | PC | Public Convenience |
| Chy | Chimney | Pp | Pump |
| Cis | Cistern | Ppg Sta | Pumping Station |
| Dismtd Rly | Dismantled Railway | PW | Place of Worship |
| El Gen Sta | Electricity Generating Station | Sewage Ppg Sta | Sewage Pumping Station |
| El P | Electricity Pole, Pillar | SB, S Br | Signal Box or Bridge |
| El Sub Sta | Electricity Sub Station | SP, SL | Signal Post or Light |
| FB | Filter Bed | Spr | Spring |
| Fn / D Fn | Fountain / Drinking Ftn. | Tk | Tank or Track |
| Gas Gov | Gas Valve Compound | Tr | Trough |
| GVC | Gas Governer | Wd Pp | Wind Pump |
| GP | Guide Post | Wr Pt, Wr T | Water Point, Water Tap |
| MH | Manhole | Wks | Works (building or area) |
| MP, MS | Mile Post or Mile Stone | W | Well |

wsp

## Historical Mapping & Photography included:

| Mapping Type | Scale | Date | Pg |
|---|---|---|---|
| Historical Aerial Photography | 1:2,500 | 2005 | 2 |

## Historical Map - Segment A7



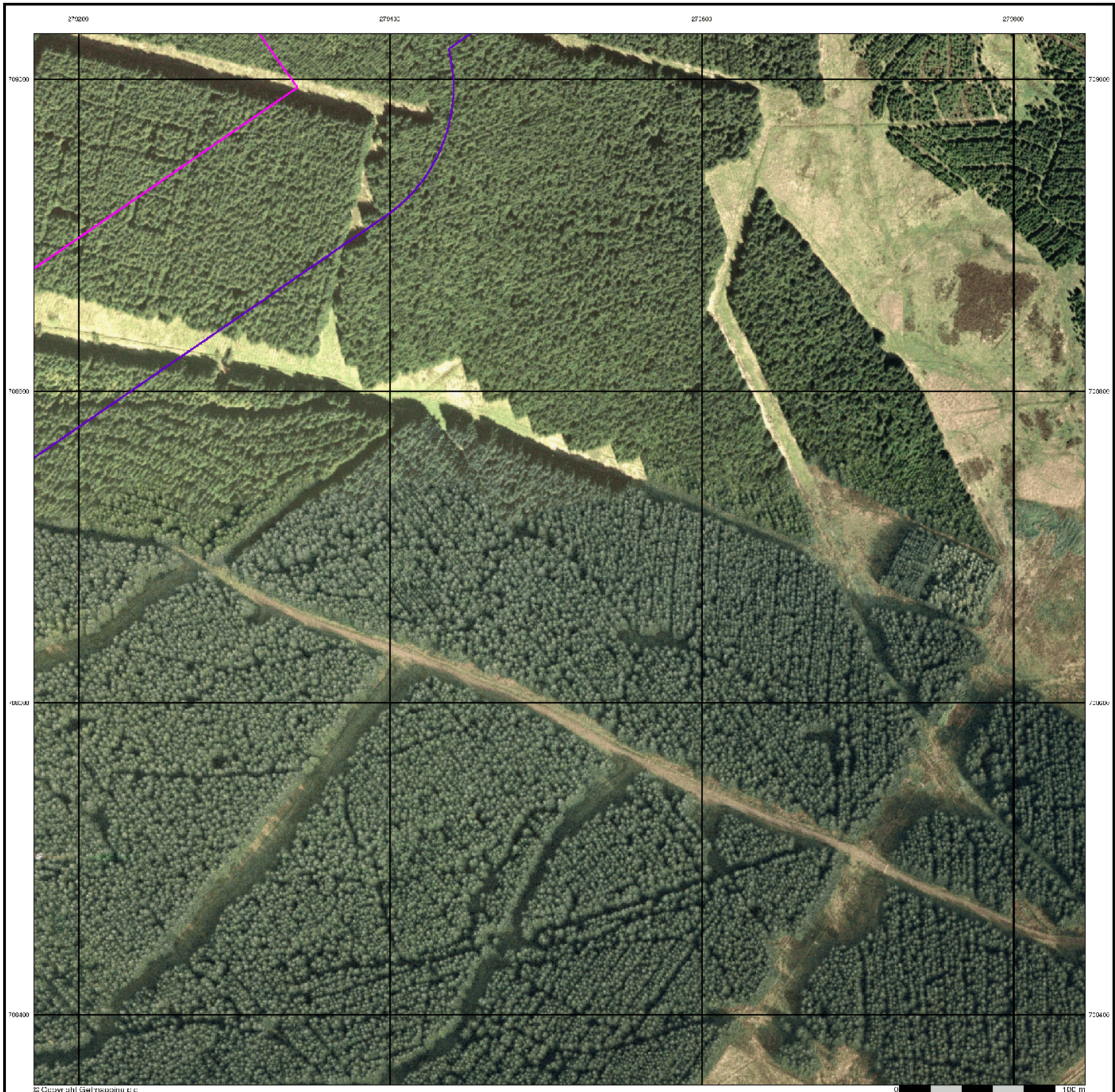

## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Search Buffer (m): | 100 |

## Site Details

Site at, Braco, Perth and Kinross


Landmark IN-ORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

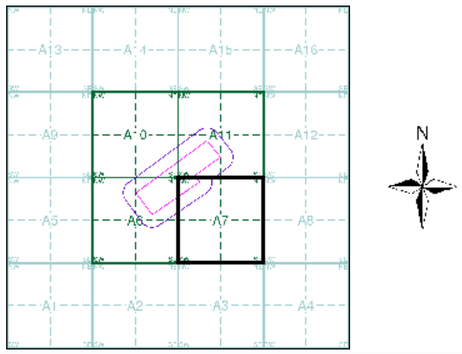



# Historical Aerial Photography

## Published 2005

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

### Historical Aerial Photography - Segment A7




### Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Search Buffer (m): | 100 |

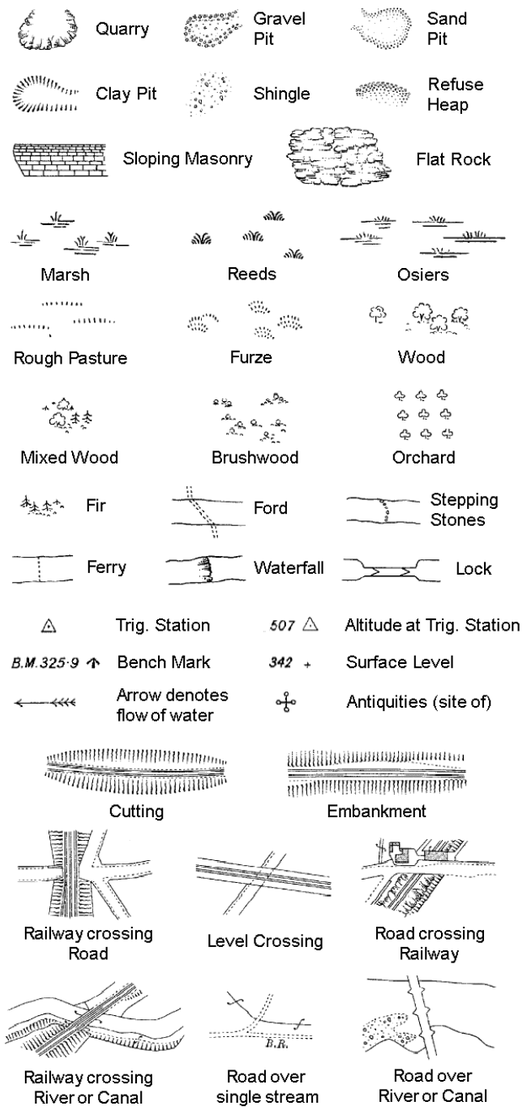
### Site Details

Site at, Braco, Perth and Kinross

Landmark INFORMATION GROUP
Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

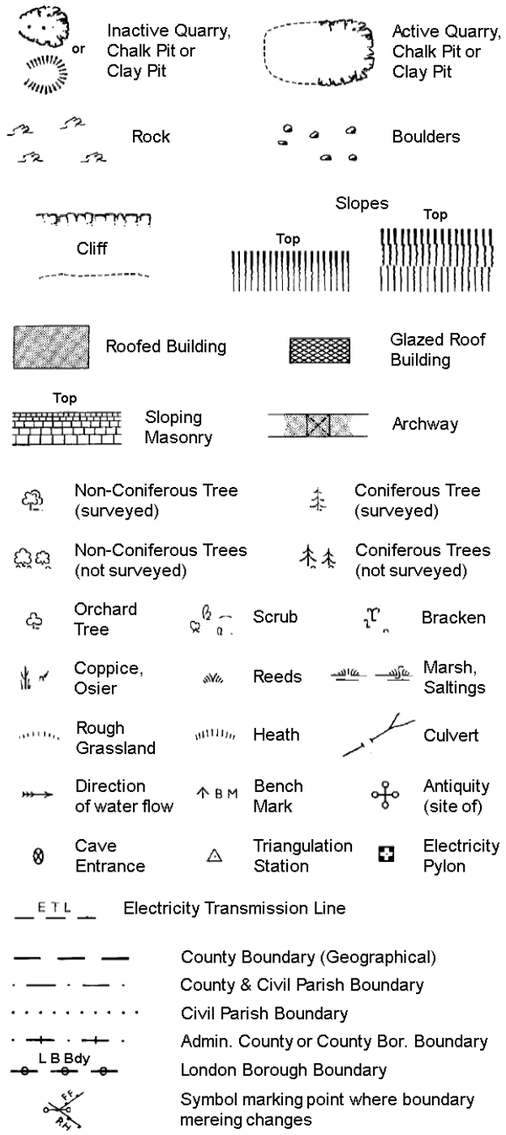
# Historical Mapping Legends

## Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



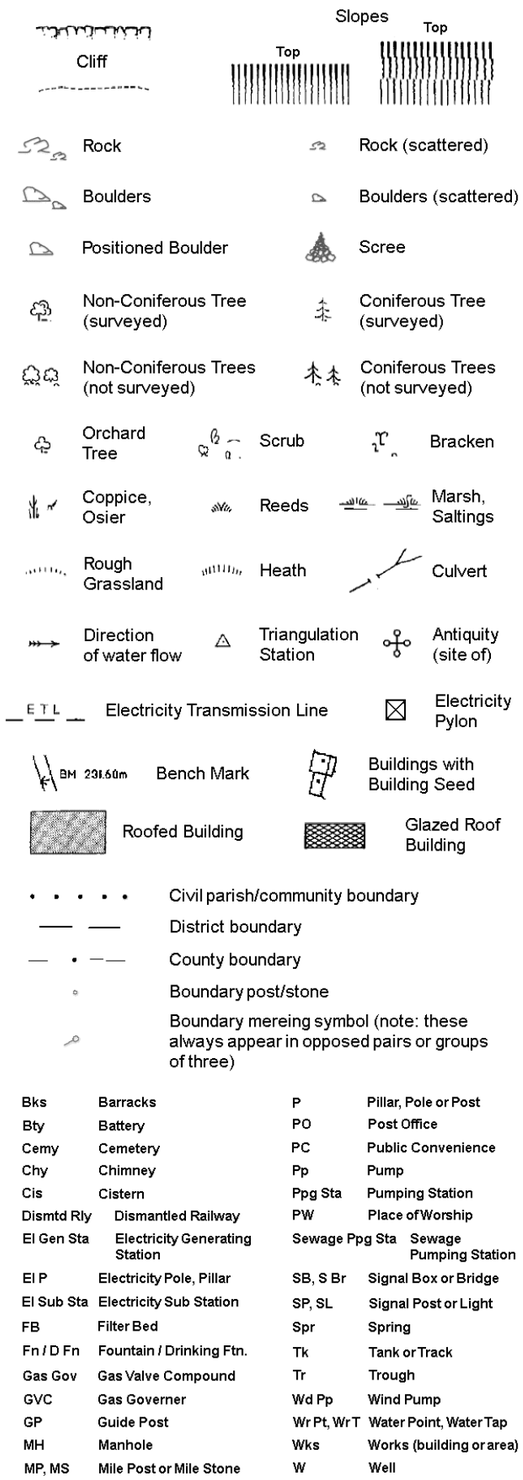

| | | | |
|---|---|---|---|
| B P B S | Boundary Post or Stone | P.C.B | Police Call Box |
| B.R. | Bridle Road | P | Pump |
| E.P | Electricity Pylon | S.P | Signal Post |
| F.B. | Foot Bridge | St. | Sluice |
| F.P. | Foot Path | Sp. | Spring |
| G.P | Guide Post or Board | T.C.B | Telephone Call Box |
| M.S | Mile Stone | Tr. | Trough |
| M.P M.R | Mooring Post or Ring | W | Well |

## Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250




| | | | |
|---|---|---|---|
| BH | Beer House | P | Pillar, Pole or Post |
| BP, BS | Boundary Post or Stone | PO | Post Office |
| Cn, C | Capstan, Crane | PC | Public Convenience |
| Chy | Chimney | PH | Public House |
| D Fn | Drinking Fountain | Pp | Pump |
| El P | Electricity Pillar or Post | SB, S Br | Signal Box or Bridge |
| FAP | Fire Alarm Pillar | SP, SL | Signal Post or Light |
| FB | Foot Bridge | Spr | Spring |
| GP | Guide Post | Tk | Tank or Track |
| H | Hydrant or Hydraulic | TCB | Telephone Call Box |
| LC | Level Crossing | TCP | Telephone Call Post |
| MH | Manhole | Tr | Trough |
| MP | Mile Post or Mooring Post | Wr Pt, Wr T | Water Point, Water Tap |
| MS | Mile Stone | W | Well |
| NTL | Normal Tidal Limit | Wd Pp | Wind Pump |

## Large-Scale National Grid Data 1:2,500 and 1:1,250



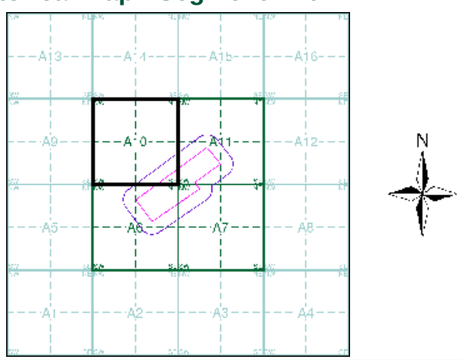

| | | | |
|---|---|---|---|
| Bks | Barracks | P | Pillar, Pole or Post |
| Bty | Battery | PO | Post Office |
| Cemy | Cemetery | PC | Public Convenience |
| Chy | Chimney | Pp | Pump |
| Cis | Cistern | Ppg Sta | Pumping Station |
| Dismtd Rly | Dismantled Railway | PW | Place of Worship |
| El Gen Sta | Electricity Generating Station | Sewage Ppg Sta | Sewage Pumping Station |
| El P | Electricity Pole, Pillar | SB, S Br | Signal Box or Bridge |
| El Sub Sta | Electricity Sub Station | SP, SL | Signal Post or Light |
| FB | Filter Bed | Spr | Spring |
| Fn / D Fn | Fountain / Drinking Ftn. | Tk | Tank or Track |
| Gas Gov | Gas Valve Compound | Tr | Trough |
| GVC | Gas Governer | Wd Pp | Wind Pump |
| GP | Guide Post | Wr Pt, Wr T | Water Point, Water Tap |
| MH | Manhole | Wks | Works (building or area) |
| MP, MS | Mile Post or Mile Stone | W | Well |

wsp

## Historical Mapping & Photography included:

| Mapping Type | Scale | Date | Pg |
|---|---|---|---|
| Historical Aerial Photography | 1:2,500 | 2005 | 2 |

## Historical Map - Segment A10




## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Search Buffer (m): | 100 |

## Site Details

Site at, Braco, Perth and Kinross


Landmark IN-ORMATION GROUP

Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

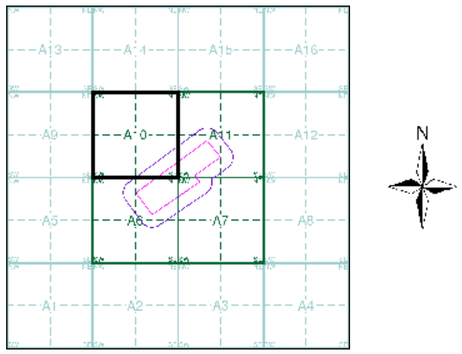


# Historical Aerial Photography

## Published 2005

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

### Historical Aerial Photography - Segment A10




## Order Details

| | |
|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Search Buffer (m): | 100 |

## Site Details

Site at, Braco, Perth and Kinross

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Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

# Historical Mapping Legends

## Ordnance Survey County Series and Ordnance Survey Plan 1:2,500

Quarry
Gravel Pit
Sand Pit
Clay Pit
Shingle
Refuse Heap
Sloping Masonry
Flat Rock
Marsh
Reeds
Osiers
Rough Pasture
Furze
Wood
Mixed Wood
Brushwood
Orchard
Fir
Ford
Stepping Stones
Ferry
Waterfall
Lock

| | | | |
|---|---|---|---|
| △ | Trig. Station | 507 △ | Altitude at Trig. Station |
| B.M.325·9 ↾ | Bench Mark | 342 + | Surface Level |
| ←←←← | Arrow denotes flow of water | ✣ | Antiquities (site of) |

Cutting
Embankment
Railway crossing Road
Level Crossing
Road crossing Railway
Railway crossing River or Canal
Road over single stream
Road over River or Canal

| | |
|---|---|
| — — — — | County Boundary (Geographical) |
| — · — · — | County & Civil Parish Boundary |
| + · + · + · + | Administrative County & Civil Parish Boundary |
| — — — — — Co. Boro. Bdy. | County Borough Boundary (England) |
| — — — — — Co. Burgh Bdy. | County Burgh Boundary (Scotland) |

| | | | |
|---|---|---|---|
| B P B S | Boundary Post or Stone | P.C.B | Police Call Box |
| B.R. | Bridle Road | P | Pump |
| E.P | Electricity Pylon | S.P | Signal Post |
| F.B. | Foot Bridge | St. | Sluice |
| F.P. | Foot Path | Sp. | Spring |
| G.P | Guide Post or Board | T.C.B | Telephone Call Box |
| M.S | Mile Stone | Tr. | Trough |
| M.P M.R | Mooring Post or Ring | W | Well |

## Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250

Inactive Quarry, Chalk Pit or Clay Pit
Active Quarry, Chalk Pit or Clay Pit
Rock
Boulders
Cliff
Slopes
Top
Roofed Building
Glazed Roof Building
Top
Sloping Masonry
Archway
Non-Coniferous Tree (surveyed)
Coniferous Tree (surveyed)
Non-Coniferous Trees (not surveyed)
Coniferous Trees (not surveyed)
Orchard Tree
Scrub
Bracken
Coppice, Osier
Reeds
Marsh, Saltings
Rough Grassland
Heath
Culvert
Direction of water flow
Bench Mark
Antiquity (site of)
Cave Entrance
Triangulation Station
Electricity Pylon
Electricity Transmission Line

| | |
|---|---|
| — — — — | County Boundary (Geographical) |
| — · — · — | County & Civil Parish Boundary |
| · · · · · · · · · · | Civil Parish Boundary |
| — + — + — L B Bdy | Admin. County or County Bor. Boundary / London Borough Boundary |
| | Symbol marking point where boundary mereing changes |

| | | | |
|---|---|---|---|
| BH | Beer House | P | Pillar, Pole or Post |
| BP, BS | Boundary Post or Stone | PO | Post Office |
| Cn, C | Capstan, Crane | PC | Public Convenience |
| Chy | Chimney | PH | Public House |
| D Fn | Drinking Fountain | Pp | Pump |
| El P | Electricity Pillar or Post | SB, S Br | Signal Box or Bridge |
| FAP | Fire Alarm Pillar | SP, SL | Signal Post or Light |
| FB | Foot Bridge | Spr | Spring |
| GP | Guide Post | Tk | Tank or Track |
| H | Hydrant or Hydraulic | TCB | Telephone Call Box |
| LC | Level Crossing | TCP | Telephone Call Post |
| MH | Manhole | Tr | Trough |
| MP | Mile Post or Mooring Post | Wr Pt, Wr T | Water Point, Water Tap |
| MS | Mile Stone | W | Well |
| NTL | Normal Tidal Limit | Wd Pp | Wind Pump |

## Large-Scale National Grid Data 1:2,500 and 1:1,250

Cliff
Slopes
Top
Top
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Positioned Boulder
Scree
Non-Coniferous Tree (surveyed)
Coniferous Tree (surveyed)
Non-Coniferous Trees (not surveyed)
Coniferous Trees (not surveyed)
Orchard Tree
Scrub
Bracken
Coppice, Osier
Reeds
Marsh, Saltings
Rough Grassland
Heath
Culvert
Direction of water flow
Triangulation Station
Antiquity (site of)
Electricity Transmission Line
Electricity Pylon
BM 291.60m Bench Mark
Buildings with Building Seed
Roofed Building
Glazed Roof Building

| | |
|---|---|
| · · · · · · | Civil parish/community boundary |
| — — — — | District boundary |
| — • — • — | County boundary |
| ○ | Boundary post/stone |
| | Boundary mereing symbol (note: these always appear in opposed pairs or groups of three) |

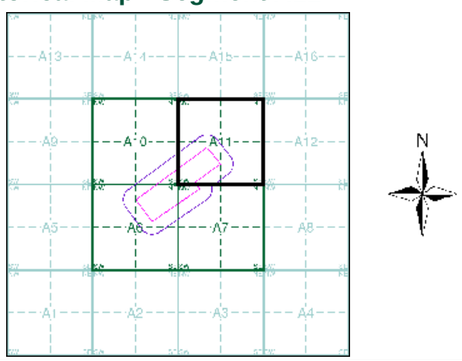
| | | | |
|---|---|---|---|
| Bks | Barracks | P | Pillar, Pole or Post |
| Bty | Battery | PO | Post Office |
| Cemy | Cemetery | PC | Public Convenience |
| Chy | Chimney | Pp | Pump |
| Cis | Cistern | Ppg Sta | Pumping Station |
| Dismtd Rly | Dismantled Railway | PW | Place of Worship |
| El Gen Sta | Electricity Generating Station | Sewage Ppg Sta | Sewage Pumping Station |
| El P | Electricity Pole, Pillar | SB, S Br | Signal Box or Bridge |
| El Sub Sta | Electricity Sub Station | SP, SL | Signal Post or Light |
| FB | Filter Bed | Spr | Spring |
| Fn / D Fn | Fountain / Drinking Ftn. | Tk | Tank or Track |
| Gas Gov | Gas Valve Compound | Tr | Trough |
| GVC | Gas Governer | Wd Pp | Wind Pump |
| GP | Guide Post | Wr Pt, Wr T | Water Point, Water Tap |
| MH | Manhole | Wks | Works (building or area) |
| MP, MS | Mile Post or Mile Stone | W | Well |

wsp

## Historical Mapping & Photography included:

| Mapping Type | Scale | Date | Pg |
|---|---|---|---|
| Historical Aerial Photography | 1:2,500 | 2005 | 2 |

## Historical Map - Segment A11




## Order Details

Order Number: 327698237_1_1
Customer Ref: 70108968
National Grid Reference: 279170, 709030
Slice: A
Site Area (Ha): 14.26
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## Site Details

Site at, Braco, Perth and Kinross


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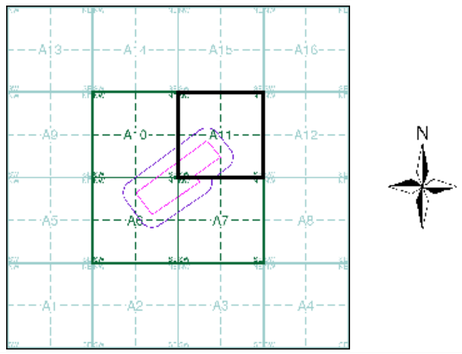
# Historical Aerial Photography

## Published 2005

This aerial photography was produced by Getmapping, these vertical aerial photographs provide a seamless, full colour survey of the whole of Great Britain

### Historical Aerial Photography - Segment A11

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|---|---|
| Order Number: | 327698237_1_1 |
| Customer Ref: | 70108968 |
| National Grid Reference: | 279170, 709030 |
| Slice: | A |
| Site Area (Ha): | 14.26 |
| Search Buffer (m): | 100 |

### Site Details

Site at, Braco, Perth and Kinross

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Tel: 0844 844 9952
Fax: 0844 844 9951
Web: www.envirocheck.co.uk

| | | | |
|---|---|---|---|
| **DATE:** | 17 July 2024 | **CONFIDENTIALITY:** | Confidential |
| **SUBJECT:** | Cambushinnie 400kV Substation, 70108968 | | |
| **CLIENT:** | Balfour Beatty | **AUTHOR:** | Sophie Gedge |
| **CHECKED:** | Darren Warnock | **APPROVED:** | Brennig Davis |

## APPENDIX B

## PRELIMINARY EARTHWORKS DRAWINGS

| | | | |
|---|---|---|---|
| **DATE:** | 17 July 2024 | **CONFIDENTIALITY:** | Confidential |
| **SUBJECT:** | Cambushinnie 400kV Substation, 70108968 | | |
| **CLIENT:** | Balfour Beatty | **AUTHOR:** | Sophie Gedge |
| **CHECKED:** | Darren Warnock | **APPROVED:** | Brennig Davis |

## APPENDIX C

## GEOTECHNICAL RISK REGISTER

## &

## GEOTECHNICAL ASSUMPTIONS REGISTER

# TECHNICAL NOTE

| | | | |
|---|---|---|---|
| **DATE:** | 17 July 2024 | **CONFIDENTIALITY:** | Confidential |
| **SUBJECT:** | Cambushinnie 400kV Substation, 70108968 | | |
| **CLIENT:** | Balfour Beatty | **AUTHOR:** | Sophie Gedge |
| **CHECKED:** | Darren Warnock | **APPROVED:** | Brennig Davis |

## APPENDIX C - GEOTECHNICAL RISK REGISTER AND ASSUMPTIONS REGISTER

**Table C-1** presents a *Geotechnical Risk Register* for the proposed works; **Table C-2** presents a *Geotechnical Assumptions Register* for the proposed works.

The assessment of Geotechnical Risk partly fulfils the requirements of the 'Designer' as defined by the Construction (Design and Management) Regulations 2015 and considers the geotechnical risks associated with: carrying out design, during construction, maintenance, and as part of demolition work, taking into account the requirements of the Workplace (Health, Safety and Welfare) Regulations 1992. Assessed risks include consideration of risk to the project in general (i.e. time, cost etc.).

The risks discussed in **Table C-1** have been considered following a review of the available data only. These risks shall form the basis of a 'live' risk register document as defined in and maintained for the lifetime of the project, updated on every review of geotechnical risks. The risks discussed consider the risks that are impacted by or impact on the design of the proposed works discussed in this Technical Note.

The Risk Grading in **Table C-1** is given both before and after mitigation.

**Table C-1 – Geotechnical Risk Register**

| Risk Ref. | Risk | Works Affected | Details | Likelihood (Severity) | Risk Grading | Mitigation | Likelihood (Severity) After mitigation | Risk Grading After mitigation |
|---|---|---|---|---|---|---|---|---|
| 1 | Lack of ground investigation information below the proposed site leading to inappropriate ground model and material properties | Excavations, Earthworks, Foundations | Ground investigation undertaken by SSE has widely spaced exploratory holes.<br>Assumptions made for purposes of design may results in inaccurate results or excessive design requirements (i.e. deepening of foundation block). | Likely<br>(Serious) | Moderate | GI proposed spread over the whole site area with allowance for geotechnical testing.<br>The encountered ground conditions should be reviewed and characteristic values of parameters should be determined where appropriate, based on in situ and laboratory test results.<br>The encountered ground conditions should be used to inform proposed founding depths for foundations, and to inform proposed slope angles.<br>It is the responsibility of the Contractor to make appropriate cost and contingency allowances in their tender submission to cover all geotechnical risks presented in this document, as well as qualifying and caveating their tender submission accordingly. | Unlikely<br>(Serious) | Moderate |
| 2 | Weak or compressible Superficial Deposits leading to excessive settlement, insufficient bearing capacity or slope instability | Earthworks, Foundations | Peat poses a potential risk to the scheme due to its inherent variability in composition, sporadic distribution and presence of deleterious material and obstructions.<br>Extent and depth of peat and other soft superficial deposits are not well confirmed, leading to low and variable bearing capacities and/or high total | Likely<br>(Serious) | Moderate | GI proposed spread over the whole site area with allowance for geotechnical testing.<br>The encountered ground conditions should be reviewed and characteristic values of parameters should be determined where appropriate, based on in situ and laboratory test results.<br>The encountered ground conditions should be used to inform proposed founding depths for foundations, and to inform proposed slope angles. | Unlikely<br>(Serious) | Moderate |

| Risk Ref. | Risk | Works Affected | Details | Likelihood (Severity) | Risk Grading | Mitigation | Likelihood (Severity) After mitigation | Risk Grading After mitigation |
|---|---|---|---|---|---|---|---|---|
| | | | or differential settlement. Foundations may need to be deepened to reach more competent strata.<br>Proportion of the superficial deposits will be unsuitable for reuse as upfill earthworks, increasing requirement for imported fill. | | | | | |
| 3 | Contaminated Soil | Excavations, Earthworks, Foundations | Ground investigation undertaken by SSE has widely spaced exploratory holes.<br>Potential for contaminated soil due to current land use as Christmas tree farm (pesticides, machinery oil/fuel leaks).<br>Delays to programme and costs associated with remediation, handling, off-site disposal and protective measures. | Likely (Moderate) | Moderate | Site specific Ground Investigation proposed with geochemical testing to determine extent and level of contamination. If required, specialists to be consulted to determine remedial works and safe systems of work. | Unlikely (Moderate) | Low |
| 4 | High / perched groundwater resulting in collapse of excavations, instability of slopes or reduced bearing capacity | Excavations, Earthworks, Foundations | Groundwater identified as being with 1 m of ground level in borehole installations, although this is not site wide where groundwater is generally deeper or absent within top 10 m.<br>GI available for area adjacent to site suggests a low groundwater level but also a significant presence of peat. | Unlikely (Serious) | Moderate | The Contractor is to manage this risk during construction and should consider use of pre-treatment or management (pumping or other) of groundwater to manage the stability of excavations if required. | Unlikely (Serious) | Moderate |
| 5 | Chemical attack on buried concrete resulting in deterioration of foundations | Foundations | There is the potential for ground conditions that could give rise to chemical attack on buried concrete. | Unlikely (Serious) | Moderate | Samples of natural deposits have been tested in accordance with ICE Suite D, and the results should be assessed in accordance with BRE Special Digest 1.<br>As part of detailed design, the specification of concrete should give due cognisance to the geotechnical chemistry test results from the proposed ground investigation and the resulting classifications in accordance with BRE Special Digest 1. | Unlikely (Serious) | Moderate |
| 6 | Buried obstructions or hard stratum resulting in construction delays | Excavations, Foundations | Tree stumps and roots and shallow rockhead all indicate the potential for obstructions to be encountered within the ground.<br>Obstructions have the potential to cause delays and increases in construction cost if unforeseen, or if encountered at shallower depths than anticipated. | Extremely Likely (Moderate) | Moderate | The Contractor should review the data from the ground investigation to inform the selection of suitable method(s) of excavation. | Likely (Moderate) | Moderate |
| 7 | Unexploded ordnance | Excavations | The risk presented by unexploded ordnance should be considered for all sites. | Likely (Serious) | High | A UXO desk study and risk assessment has been undertaken which graded the site as low risk. | Unlikely (Serious) | Moderate |

| Risk Grading | | Severity | | | | |
|---|---|---|---|---|---|---|
| | | Trivial | Minor | Moderate | Serious | Catastrophic |
| Likelihood | Extremely Unlikely | Very Low | Very Low | Very Low | Low | Moderate |
| | Unlikely | Very Low | Low | Low | Moderate | Moderate |
| | Likely | Very Low | Low | Moderate | Moderate | High |
| | Extremely Likely | Low | Moderate | Moderate | High | High |
| | Almost Certain | Low | Moderate | High | High | High |

The risk gradings are defined as follows:

- Very Low: very unlikely to affect the development
- Low: unlikely to affect development but cannot be entirely ruled out and contingency should be made for further assessment or mitigation during construction stage
- Moderate: likely to affect the development with moderate impact to programme or cost and further assessment required
- High: expected to affect the development with significant impact - further assessment required during design and / or construction phase

The severities are defined as follows:

- Trivial: trivial damage or loss (no human injury)
- Minor: minor damage or loss (slight injury or illness)
- Moderate: moderate damage or loss (moderate injury or illness)
- Serious: substantial damage or loss (serious injury or illness)
- Catastrophic: catastrophic damage or loss (fatality or fatal injury)

**Table C-2 – Geotechnical Assumptions Register**

| Assumption Ref. | Assumption | Works Affected | Details | Responsibility / Owner | Related Geotechnical Risks (See Table C-1) | Proposed Action |
|---|---|---|---|---|---|---|
| 1 | Rockhead level | Earthworks, Excavations, Foundations | Rockhead level has been modelled by exploratory hole information. Ground investigation data available for the site is widely spaced and therefore rockhead level had been interpolated between exploratory hole locations and therefore may not be locally accurate. | Contractor | 1, 2, 3, 6 | The tender design undertaken is based on the draft factual report for the 2023 ground investigation.<br>Supplementary GI is proposed spread over the whole site area with allowance for geotechnical testing and will be used to confirm ground model and properties.<br>Appropriate cost and contingency allowances should be made by the Contractor in their tender submission to cover the risk of significant variation from the assumed rockhead level, in addition to caveating/qualifying their tender accordingly, to reflect the limited nature of the information this presumed rockhead level is based on. |
| 2 | Presumed properties of superficial deposits | Earthworks, Foundations | It is assumed that for certain lightly loaded structures which are not sensitive to settlement, that the natural superficial deposits will provide sufficient bearing capacity for suitably designed shallow foundations.<br>It is assumed that Peat will be excavated and replaced with granular fill due to compressibility. Extent, depth and composition of peat at site location not well defined. | Contractor | 1, 2, 3 | Supplementary GI is proposed spread over the whole site area with allowance for geotechnical testing and will be used to confirm ground model and properties.<br>Appropriate cost and contingency allowances should be made by the Contractor in their tender submission to cover the risk of significant variation of material properties on a localised basis, in addition to caveating/qualifying their tender accordingly.<br>This should include consideration of additional costs related to the foundations of lightly loaded structures needing to be deepened to bear onto bedrock, due to superficial deposits being weaker and/or more compressible than assumed. |
| 3 | Reuse of site won fill | Earthworks | It is currently assumed that 50% of the site won superficial deposits (excluding Peat) and rock can be reused for upfilling earthworks as engineered fill. Site won fill originating from superficial deposits may require screening and/or modification (e.g., lime, cement). | Contractor | 1, 2, 3 | Supplementary GI is proposed spread over the whole site area with allowance for geotechnical testing and will be used to confirm ground model and properties.<br>Appropriate cost and contingency allowances should be made by the Contractor in their tender submission to cover the risk of significant variation of material properties on a localised basis, in addition to caveating/qualifying their tender accordingly. |
| 4 | Foundation type(s) | Foundations | It is assumed that conventional ground bearing shallow foundations are likely to be suitable at the site, bearing within either placed engineered granular fill or the existing Glacial Till, weathered rock or bedrock. The allowable bearing capacity of placed granular fill or rock is anticipated to be >150 kN/m$^2$, which is the minimum requirement for the sub formation as specified within SSEN Specification for Earthworks (SP-NET-CIV-501, rev 2.0) | Contractor | 1 to 6 | Supplementary GI is proposed spread over the whole site area with allowance for geotechnical testing and will be used to confirm ground model and properties.<br>Appropriate cost and contingency allowances should be made by the Contractor in their tender submission to cover the risk of significant variation of material properties on a localised basis, in addition to caveating/qualifying their tender accordingly.<br>This should include consideration of additional costs related to the foundations of lightly loaded structures needing to be deepened to bear onto bedrock, due to superficial deposits being weaker and/or more compressible than assumed. |