Dyfed Steels Limited

DAFEN, LLANELLI

Desk Study Report

14316/LP/24/CMRA

Intégral
Géotechnique

CLIENT: **Dyfed Steels Limited**

PROJECT: **Dafen, Llanelli**

TITLE: **Coal Mining Risk Assessment**

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1.0 INTRODUCTION

1.1 GENERAL

Dyfed Steels Limited are proposing to redevelop areas within their current ownership boundary in Dafen for continued commercial end-use. The site location is shown on Figure 1.

In support of the submission, Intégral Géotechnique (Wales) Limited have been appointed as the Geotechnical Engineers to undertake a Coal Mining Risk Assessment.

This report presents the findings of the desk study and coal mining searches and sets out the Coal Mining Risk Assessment in line with the Coal Authority's guidelines.

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1.2 PROPOSED DEVELOPMENT

The proposed development will comprise the construction of a new industrial unit within the eastern area of the site and the refurbishment of the former Radnedge Unit located within the western area of the site.

The new building will provide 3026 sqm of floorspace with a simple pitched roof design. The Radnedge Unit will have elements of the existing structure demolished in order to accommodate the construction of the replacement roof. The refurbished building will have a change of use from architectural salvage to storage and processing of steel. The proposed development and refurbishment is shown on Figure 2A. Both the new build and former Radnedge Unit will be for Class B2 use (general industrial).

The development will also include the construction of new drainage routes extending northward away from the development area as shown on Figure 2B.

1.3 SCOPE OF WORKS

The objectives of the coal mining risk assessment are to:

1. Present a desk-based review of all available information within this report on the coal mining issues which are relevant to the site.
2. Use the information obtained to identify and assess the risks to the proposed development from coal mining legacy, including cumulative impact issues.
3. Set out appropriate mitigation measures to address the coal mining legacy issues affecting the site, including any necessary remedial works and/or demonstrate how coal mining issues have influenced the proposed development.
4. Demonstrate to the Local Planning Authority that the application is or can be made safe and stable to meet the requirements of the National Planning Policy Framework and the requirements of the Coal Authority in respect of their determination of planning application consultations.
5. Minimise the risks and effects of land instability on properties, infrastructure, and the public.
6. Help to ensure that various types of development should not be placed in unstable locations without appropriate precautions.
7. Bring unstable land, wherever possible, back into productive use.
8. Assist in safeguarding public and private investment by a proper appreciation of site conditions and necessary precautionary measures.

This report has been prepared in general accordance with the guidance within Section 11 of CIRIA Report C758 - Abandoned Mine Workings Manual and the Mining Risk Assessment Model Report Template and intends to demonstrate to the Local Planning Authority and the Coal Authority that the site is, or can be, made safe and stable, and to meet the requirements of the National Policy Planning Framework (NPPF).

The desk study comprised a review of:

- Old Ordnance Survey maps covering the site,
- Geological maps of the area provided by the British Geological Survey,
- A Consultants Coal Mining Report obtained from The Coal Authority,
- Available abandonment plans obtained from British Geological Survey (BGS) and The Coal Authority.

1.4 LIMITATIONS

This document is intended to be a working document for further development in discussion with all concerned including the Local Planning Authority and The Coal Authority.

2.0 THE SITE

2.1 SITE LOCATION AND DESCRIPTION

The site is located within the wider Dyfed Steels ownership boundary on the southern edge of Dafen in Llanelli at a National Grid Reference of 253110, 201260, see Figure 1.

The site is irregular in shape to incorporate the proposed unit, the existing building and the potential proposed drainage routes and occupies an area of approximately 2.5 hectares. The boundaries of the site are defined by existing commercial/industrial land and the River Dafen to the north, existing commercial/industrial land to the west and the A4138 road to the southeast. A site plan is presented in Figure 2B.

The site is located on relatively level ground with some localised undulations at an approximate elevation of 18m AOD.

The site typically comprises areas of hardstanding/rough unfinished surfacing and with some areas of scrub vegetation. Access roads cross the site and with many of the external areas utilised for storage. The former Radnedge building is located within the southern area of the site and accessed via Dafen Inn Row. The main Dyfed Steels site is accessed via the main entrance off Dafen Road. An existing electrical substation is located to the southeast of the proposed development area.

2.2 SITE OPERATIONS

The site is currently utilised by Dyfed Steels with the proposed development area used for general storage. The former Radnedge building is currently disused.

2.3 SURROUNDING LAND USE

The immediate surrounding areas are typically developed for commercial/industrial use.

2.4 AVAILABLE SITE INVESTIGATION DATA

There is no available site investigation data for the site to our knowledge. However, there is available information for a site investigation undertaken to the northeast of the site for Dyfed Steels. Additional boreholes have also been drilled within the undeveloped fields beyond the road to the east of the site.

2.4 AVAILABLE SITE INVESTIGATION DATA (CONTINUED)

Available information suggests that made ground of between approximately 1.2m and 1.8m in thickness was present to the northeast and was variable in nature. The made ground comprised fine to coarse sand and gravel sized fragments of coal, ash, limestone and bricks. The made ground was underlain by superficial deposits which were typically cohesive and comprising gravelly clay down to depths of between approximately 3.8m and 5.6m. The superficial deposits then became more granular in nature and comprised sands, gravels and cobbles down to depths of between 9.4m and 12.7m. The mudstone bedrock was encountered beneath the superficial deposits.

Deeper boreholes have been drilled within the fields to the east of the site. Shallow coal and broken ground was recorded at depths between 19.0m and 28.9m with the depth to coal/workings deepening in a southerly direction.

3.0 SITE HISTORY

The recent history of the site has been traced with the aid of the following historical maps which have been presented in Appendix A:

Map Scale	Dates
1:2,500	1880, 1907, 1916, 1954-1959, 1978
1:1,250	1953-1987, 1993, 2001 (aerial photo)
1:10,560	1889, 1907-1908, 1921-1922, 1938-1951, 1953
1:10,000	1965, 1973-1975, 1992, 1999-2000, 2006, 2024

The earliest edition of the map dated 1880 indicated that the majority of the site comprised undeveloped fields. Private gardens with associated outbuildings to the rear of a residential terrace which lined Church Street were indicated within the northwest elongated section of the site (area of the possible drainage route). A reading room was located at the end of the terrace within the northwest area.

A school building also encroached across this area of the site. An existing surface water featured flowed along the northern edge of the elongated potential future drainage routes. A spoil heap of deposited material was located within the southern area of the site and extended off site to the southeast. A large reservoir was located to the north of the site beyond the surface water feature.

Dafen Works (Iron and Tin Plate) was located directly to the west of the site. Residential development off Dafen Inn Row and Incline Row were located to the west of the southern area of the site.

St Davids Incline was located approximately 15m to the south of the site at the nearest point which was a self-acting roped incline from Dafen to St Davids Pit located approximately 700m to the east.

Gelli Pit was located to the south of St Davids Incline approximately 300m east of the site but was indicated to be disused by this time. Bryngwyn Pit was located approximately 220m to the west. St Davids Incline and tramways associated with Dafen Works all connected into the St Davids Branch of the Great Western Railway approximately 100m to the southwest of the site.

3.0 SITE HISTORY (CONTINUED)

The 1907 edition of the map indicated that the majority of the site had remained undeveloped. The school had been slightly reconfigured across the northwest area of the site and a new building had also been constructed just off site. The spoil heap within the southern area had been reprofiled and spread further across the southern area of the site. Dafen Works (Tin Plate) remained operational to the west of the site. St Davids Incline was disused by this time although St Davids Pit was still operational. There was no longer any indication of the buildings associated with Gelli Pit, and Bryngwyn Pit was disused. Gors Colliery was indicated approximately 175m to the east. A new railway line had been constructed in a cutting to form the southeast boundary of the site.

The 1916 edition of the map indicated a large elongated structure to have been constructed within the northeast area of the site and extended off site to the northeast. There was also associated smaller buildings and a chimney adjacent to the main building, and with small buildings accessed via Dafen Inn Row located within the southern area of the site. The main building was served by tracks which connected into the railway which bounded the site to the southeast. The railway was now indicated to be the Great Western Railway St Davids Branch. Spoil remained across the southern area of the site. The works buildings to the west continued to expand and be reconfigured. Gors Colliery and St Davids Pit to the east were disused by this time.

By the edition of the map dated 1954-1959 significant development had taken place within the site. The works building within the northeast had been extended and additional smaller buildings had been constructed within the eastern area of the site. Additional tracks had also been added to serve the new larger building. Another large works building, accessed from Dafen Inn Row had been constructed within the southern area of the site along with some additional smaller buildings. A large pond feature with an associated sluice had been constructed approximately in the centre of the site in between the two main buildings. The residential terrace along Church Street and associated gardens were no longer present within the northwest area. The original school building which encroached across the site was also no longer present. The surface water feature which flowed across the northern elongated areas of the site was indicated to be Afon Dafen. The railway line to the southeast had been partially removed by this time. Additional works buildings had been constructed to the west of the site with one of the buildings now indicated to be a Blackplate and Galvanised Steel Works.

3.0 SITE HISTORY (CONTINUED)

The 1978 edition of the map indicated that many of the buildings had been demolished from site with only the large factory building now indicated within the southern area. All railway tracks had been removed from site and off site to the south and southeast. The large pond feature was no longer evident within the site. An electric substation had been constructed to the southeast of the site and a new works building had been constructed to the northeast. The buildings to the west were now indicated to be an Engineering Works. The large reservoir to the north had been partially infilled by this time and a smaller pond feature remained with the rest of the former reservoir indicated to be marshland. There was no longer any residential development to the off Dafen Inn Row or Incline Road to the west of the southern area of the site.

The 1993 edition of the map indicated only the works building to be present within the southern area of the site. New small access roads had been constructed within the site to access the works buildings to the northeast. The works building to the west of the site continued to be reconfigured. The A4138 road had been constructed approximately along the route of the former railway line to the southeast of the site by this time.

The year 2000 aerial photo indicated that the undeveloped areas of the site were covered with unfinished surfacing and rough vegetation, with the site crossed by tarmac access roads. The site was utilised for general storage including the storage of HGV's and trailers. The large works building occupied the southern area of the site.

The site has remained relatively unchanged between the year 2000 and the present day apart from some changes to the site surfacing. Development continued in the vicinity of the site including further expansion of the works building to the west by 2010.

4.0 SITE ENVIRONMENTAL SETTING

4.1 PHYSICAL SETTING

The site is situated within a commercial setting in the Dafen area of Llanelli.

The site is located on relatively level ground with some localised undulations at an approximate elevation of 18m AOD.

The River Dafen flows to the north of the site with a large pond indicated beyond.

4.2 GEOLOGY

The 1:50,000 and 1:10,560 scale (Sheet No. SN 50 SW) geological maps of the area indicate the site to be underlain by strata of the Swansea Member formed during the Carboniferous period. These rocks typically comprise green-grey Pennant sandstones with thin mudstones, siltstones and seatearth interbeds, and mainly thin coals. The strata dips in an approximately southerly direction. There are no dip angles in the vicinity of the site but further to the north and east they are indicated to be between 12^{o} and 15^{o}.

Any coal seams which conjecturally outcrop to the north of the site would underlie the site. The nearest conjectural outcrop is the Swansea Five Feet seam which is located approximately 140m to the north. Based on the strata dips this seam is likely to underlie the site at shallow depths. Additional conjectural outcrops to the north include the Swansea Six Feet (Upper and Lower), the Swansea Three Feet and the Swansea Two Feet. These seams all conjecturally outcrop in excess of 500m to the north of the site and would therefore underlie the site at much greater depths in excess of 100m.

The approximately north to south trending Gors Fault is located approximately 70m to the east of the site and downthrows to the east. The coal seams all terminate at the fault.

The geology map indicates superficial Devensian Till deposits of the Quaternary period overlie the solid strata. These deposits are typically poorly sorted and variable in nature comprising clays, sands and gravel. Alluvium deposits are indicated associated with the path of the River Dafen, the superficial deposits could be more clayey towards the northern area.

A variable thickness of made ground is anticipated above the superficial deposits across the site due to the past developments and site uses.

A summary of the anticipated geological succession is given below in Table 1.

4.2 GEOLOGY (CONTINUED)

Table 1: Summary of Anticipated Site Geology		
Geological unit	**Horizon**	**Description**
Recent	Made ground	Various materials
Quaternary	Devensian Till	Poorly sorted and variable clays, sands and gravel
Carboniferous	Swansea Member	Green-grey Pennant sandstones with thin mudstones, siltstones and seatearth interbeds, and mainly thin coals

4.3 MINING

The site is located within a coal mining reporting area and therefore a Consultants Coal Mining Report has been obtained from the Coal Authority and a copy is included in Appendix B.

An appraisal of the mining data and its significance is presented below.

Past Underground Coal Mining

The Coal Authority states that there are recorded workings in five seams of coal between 26m and 185m depth which were last worked in 1910. The shallowest recorded workings at 26m and 34m are considered to be within the Swansea Five Feet seam and have an extraction thickness of 120cm with a dipping rate within the seam of 14.0° and 8.1° respectively. The next recorded workings at 134m and 148m depth are considered to be within the Swansea Upper and Lower Six Feet seams and have an extraction thickness of 110cm with a dipping rate of 14.0° and 8.1° respectively. The Coal Authority state that the recorded workings at 185m depth are within the Swansea Three Feet seam and have an extraction thickness of 61cm with a dipping rate of 14.0°.

The Coal Authority Interactive Map indicates that the recorded workings within the Swansea Five Feet seam (also known as the Llanelly Four Feet) at 26m are located beneath the north eastern elongated area of the site (the proposed drainage route). An extract from the abandonment plan has been sourced from British Geological Survey (BGS) and is presented on Figure 3A. The slighter deeper recorded workings within the Swansea Five Feet seam at 34m depth are indicated beneath the majority of the main site area. An extract from abandonment plan Ref: LPL387 is presented on Figure 3B.

4.3 MINING (CONTINUED)

Probable Unrecorded Shallow Workings

The Coal Authority state that the probable unrecorded workings is “none”. However, this does not mean that additional shallow unrecorded workings do not exist, but rather any information to support this has not come into the possession of the Coal Authority. Additional unrecorded shallow workings within the Swansea Five Feet seam should not be ruled out beneath the northern area of the site.

Spine Roadways at Shallow Depth

The Coal Authority have indicated that there are no shallow spine roadway recorded at shallow depths beneath the site. The presence of unrecorded shallow roadways should not be ruled out.

Mine Entries

The Coal Authority indicates that there are five mine entries located within 100m of the site boundary. A summary of the mine entry data is presented in Table 2.

Table 2: Published Mine Entry Data

Ref:	Shaft/Adit	Approx. distance from site (m)	Assumed Diameter (m)	Depth of Shaft (m)	CA Easting, Northing (Desk based)	CA Assigned Departure Distance (m)
252201-040	Shaft	96m west	2.0m (actual)	Not known	252951 201154	0m
253201-068	Shaft	77m east	2.5m	Not known	253270 201250	10m
253201-069	Shaft	73m northeast	2.5m	Not known	253248 201419	10m
253201-070	Shaft	5m southwest	2.5m	Not known	253052 201133	10m
253201-071	Shaft	13m southeast	2.5m	Not known	253148 201138	10m

Three of the shafts (Ref: 252201-040, 252201-068 and 252201-069) are located greater than 50m from the site boundary and therefore are not considered to be within an influencing distance of the site.

4.3 MINING (CONTINUED)

Typically, a no build exclusion zone of 20m should be allowed in the vicinity of any mine entries. It should therefore be noted that Shaft Ref: 253201-070 is located 5m southwest of the site (approximately 18m from the proposed refurbished building) and shaft Ref: 253201-071 is located 13m to the southeast of the site (approximately 35m from the proposed refurbished building). The approximate location of the shafts is shown on Figure 2B. Shaft Ref: 253201-070 would be within an influencing distance of the existing building which is due to be refurbished. Shaft Ref: 253201-071 is likely to be located below the A4138 road but not within an influencing distance of the building. Both of these shafts are not within an influencing distance of the proposed new building even when considering the potential departure distance.

Allowances may also need to be made for the possibility that unrecorded features could be present on or within an influencing distance of the site.

Geological Faults, Fissures and Breaklines

The Coal Authority states that there are no faults, fissures or breaklines recorded beneath the site.

There are no issues regarding faults in the area.

Opencast Mines

The Coal Authority indicates that there are no unlicensed opencast sites located within 500m of the site boundary.

There are no issues regarding opencast workings within the site.

Coal Authority Managed Tips

The Coal Authority states that there are no managed tips recorded within 500m of the site boundary. The latest guidance published by the Welsh Government and its partners include a Mining and Coal Tip Safety document, published on the 14th of November 2023, which assigns an identification number (UID), a category, and the immediate status of each disused coal tip in Wales. This document also confirms that there are no managed tips within an influencing distance of the site.

Coal Mining Subsidence

The Coal Authority states that *"The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31st October 1994".*

4.3 MINING (CONTINUED)

"There is no current Stop Notice delaying the start of remedial works or repairs to the property".

"The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991".

There are no recorded instances regarding subsidence.

Mine Gas

The Coal Authority states that with regards to mine gas, none has been recorded within 500m of the site boundary.

Due to the presence of shallow recorded workings, gas evolution from coal seams and accumulated sources such as abandoned tunnels and workings cannot be discounted and will require further assessment, conducted in accordance with CL:AIRE document Good Practice for Risk Assessment for Coal Mine Gas Emissions, dated October 2021.

A mine gas risk assessment should be undertaken to confirm the level of gas risk within the site.

Future Underground Mining and Section 46 Notices

The Coal Authority does not have any current records relating to future underground mining.

The Coal Authority states that *"No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence".*

There are no currently understood issues regarding future workings or subsidence.

Overall Assessment

Based on the information provided by the geology maps and the general knowledge of the seams in the area, namely the Swansea Five Feet, it is considered possible that shallow unrecorded workings could be present within the northern area of the site. Shallow recorded workings at depths shallower than 30m and marginally shallow recorded workings at 34m could pose a subsidence risk at the surface. It is recommended that the actual depth to the workings is confirmed physically by drilling a series of rotary boreholes. The information would also provide additional information to inform the mine gas risk assessment.

4.3 MINING (CONTINUED)

Most of the mine entries are not located within a zone of influence of the site and would not require any further investigation. It would however be prudent to geo-fix the nearest shaft location (Ref: 253201-070). It may be possible to locate shaft Ref: 253201-070 which is located within the corner of the existing car park. A risk assessment would be needed to determine the affect that the shaft could have on the proposed refurbishment of the existing adjacent building.

Further intrusive investigation in the form of deep rotary boreholes to a depth of 30m to 35m would be required to determine the potential level of risk to the development and to define the high-risk area based on-site specific data. As discussed above, It would also be prudent to geo-fix the location of the shaft (Ref: 253201-070) to confirm The Coal Authority coordinates. It should be noted that the shaft has a potential 10m departure distance. It may then become necessary to locate the shaft and confirm its condition in order to assess any potential liabilities for the existing building which is proposed for refurbishment.

5.0 ASSESSMENT OF MINING CONSTRAINTS

5.1 RISKS FROM MINING LEGACY

The desk study search of the various coal mining information and maps identifies the following site-specific coal mining legacy risks to the site, see Table 3.

Table 3: Mining Legacy Risk Table

Coal Mining Issue	Yes	No	Risk Assessment	
			Rating	Comments
Underground coal mining (recorded at shallow depths)	X		High risk	Recorded shallow workings at 26m and 34m depth within the Swansea Five Feet seam
Underground coal mining (possible at shallow depths)	X		Moderate risk	Additional unrecorded shallow workings possible beneath the northern part of the site
Mine entries (shafts)	X		Low/moderate risk	No shafts indicated within the site. One shaft located within an influencing distance of the proposed refurbishment
Mine entries (adits)		X	Low risk	No adits are located within the site or within an influencing distance
Coal mining geology (faults and fissures)		X	Low risk	No faults indicated to cross the site
Record of past mine gas emissions or potential	X		Moderate risk	All mineworkings pose a potential gas risk which should be considered in any future investigations and development.
Recorded coal mining surface hazard		X	Low risk	None recorded.
Surface mining (opencast workings)		X	Low risk	None recorded.

A summary of the risk posed by these features is summarised after thorough analysis of the information sources. Comment on each specific coal mining issue follows below:

5.2 RISKS FROM ABANDONED MINEWORKINGS

Coal mining at depths shallower than 30m beneath ground level can pose constraints to development in the form of ground stability at the surface. The magnitude of this effect depends upon the exact depth of any workings, the thickness of competent rock cover and the extraction thickness of any coal mine workings.

5.2 RISKS FROM ABANDONED MINEWORKINGS (CONTINUED)

The Coal Mining Risk Assessment shows that there are recorded shallow workings at 26m depth and marginally shallow workings at 34m depth within the Swansea Five Feet seam. There is also potential for shallow unrecorded workings to be present beneath the northern area of the site within the Swansea Five Feet seam. It is recommended that site-specific information is obtained in order to confirm the depth to the recorded mineworkings at 24m and 34m, and also to check for evidence of any additional potential shallow unrecorded mineworkings beneath the proposed new building and associated infrastructure.

To ensure that properties constructed over mineworkings are not affected by subsidence associated with past mining, a rock head cover in the order of ten times the maximum void thickness of the workings is generally required depending on the nature of the overlying rock strata.

5.3 RISKS FROM THE ABANDONED MINE ENTRIES - SHAFTS

No shafts have been recorded on site, but two are recorded within 20m of the site boundary. It should be noted that Shaft Ref: 253201-070 is located 5m southwest of the site (approximately 18m from the proposed refurbished building) and shaft Ref: 253201-071 is located 13m to the southeast of the site (approximately 35m from the proposed refurbished building). The approximate location of the shafts is shown on Figure 2B. Shaft Ref: 253201-070 would be within an influencing distance of the existing building which is due to be refurbished. Shaft Ref: 253201-071 is likely to be located below the A4138 road but not within an influencing distance of the building. Both of these shafts are not within an influencing distance of the proposed new building even when considering the potential departure distance.

Until recently, shafts were rarely treated on abandonment to any significant engineering standard. They were typically loosely backfilled, or with inferior capping constructed over them. With time, backfills may settle and caps fail, resulting in significant ground loss. Therefore, if a shaft lies partly or wholly within the site, or within a 20m buffer zone drawn outside the site boundary, then its effect should be considered in the site development. The size of buffer, or no development zone, will depend on the diameter of the shaft the depth to rockhead and an assessment of the shaft's condition.

It would be prudent to geo-fix the nearest shaft location (Ref: 253201-070). It may be possible to locate shaft Ref: 253201-070 which is located within the corner of the existing car park. A risk assessment would be needed to determine the affect that the shaft could have on the proposed refurbishment of the existing adjacent building. Allowances may also need to be made for the possibility that unrecorded features could be present on or within an influencing distance of the site.

5.3 RISKS FROM THE ABANDONED MINE ENTRIES – SHAFTS (CONTINUED)

The current new build proposals are not within an influencing distance of any shafts. However, if proposals change and development constraints require building structures to be constructed within a 15m radius of a shaft position, then pressure grouting of the shaft will be required. On completion and validation of these potential works, details of a reduced radius exclusion zone may be reported to suit the development.

The development site sits within an historical mining area and therefore there is a residual risk of unrecorded mine entries to be present on site. All site operatives should be made aware of this potential risk and a watching brief should be maintained during site works.

5.4 RISKS FROM THE ABANDONED MINE ENTRIES - ADITS

No adits have been recorded on site, or within 100m of the site boundary.

Until recently, adits were rarely treated on abandonment to any significant engineering standard. Whilst it is likely that an adit entrance itself would have been treated, the remainder of an adit roadway may still be intact. They may have been only loosely backfilled or might be partially collapsed. Therefore, if an adit is located within influencing distance of the surface, then treatment may be required. Normal procedure would be to establish a 20m buffer zone drawn parallel to the feature within a development site. The size of buffer or no development zone, will depend on the diameter of the adit, the depth to rockhead and an assessment of the adit condition.

The site sits within an historical mining area and therefore there is a residual risk of unrecorded mine entries to be present on site. All site operatives should be made aware of this potential risk and a watching brief should be maintained during site works.

5.5 COAL MINING GEOLOGY (FAULTS AND FISSURES)

The development site sits upon the bedrock of the Swansea Member.

No faults or fissures are indicated to cross the site.

5.6 RECORD OF PAST MINE GAS EMISSIONS OR POTENTIAL

Gas evolution from coal seams and accumulated sources such as abandoned tunnels and workings cannot be discounted and will require further assessment conducted in accordance with CL:AIRE document Good Practice for Risk Assessment for Coal Mine Gas Emissions, dated October 2021.

5.6 RECORD OF PAST MINE GAS EMISSIONS OR POTENTIAL (CONTINUED)

The site is located within a high-risk development area and based on the above guidelines a mine gas risk assessment should be undertaken. The initial desk-based assessment of the site will be utilised in order to develop the level of mine gas risk within the site.

There are many sources of gas in mine workings including desorption of gas from coal and rocks, oxidation of coal, decomposition of old wood (such as pit props) and acidic mine drainage reacting with carbonate in the rocks around the seam or shaft. These gases, if produced within the old workings, would need a viable pathway to the surface such as a shaft or fractured rock above the workings.

The desk study shows that the site is located within a high-risk development area, with coal workings recorded at shallow depths. There are also mine entries within 50m of the site boundary.

No faults, fissures or breaklines are known to affect the development site. It is therefore concluded that there are no viable pathways via fractured rock or fault zones.

Based on the desk-based research, the potential risk from coal mine gas emissions at the development site is considered below:

Figure 13.1 Decision Support Tool for Mine Gas Risk Assessment, included within CL:AIRE document Good Practice for Risk Assessment for Coal Mine Gas Emissions, dated October 2021 includes a flow chart to aid the risk assessment process and decision making.

Stage 1 of the flow chart asks if the site is within a Coal Authority defined Coal Mining Reporting Area. Since the site is located within a Coal Authority defined Coal Mining Reporting Area the flow chart then asks if all of the following statements are true:

- Mine entries >50m from site boundary
- Workings >150m depth
- No faults or other potential pathways connecting surface to deeper unflooded workings
- Outside area of past or probable shallow workings on Coal Authority viewer

Based on the information gained from the desk-based research, it is considered that the Stage 1 statements are not true due to the presence of recorded workings at shallow depths and mine entries within 50m of the site boundary. There are no fault pathways connecting the surface to the workings, however, the flow chart requires the next stage to be considered.

5.6 RECORD OF PAST MINE GAS EMISSIONS OR POTENTIAL (CONTINUED)

The next stage of the flow chart then asks if all of the following statements are true:

- Workings between 30m and 150m but permanently flooded or covered by 10m+ of low permeability superficial deposits,
- Mine entries >50m from site boundary

There are recorded workings at 26m depth and mine entries within 50m of the site boundary. However, the recorded workings at 26m depth would not be in the vicinity of the proposed new development. Recorded workings in this area are indicated to be at 34m depth. The two mine entries which are located within 50m of the site boundary are also not within 50m of the proposed building. Following the colliery closures when dewatering pumps were stopped groundwater levels would have recovered and it is highly likely that the workings at 34m would be flooded. However, it is recommended that rotary probeholes are drilled to check the thickness of the superficial deposits and the groundwater levels in order to assess the mine gas risk using site specific information.

5.7 RECORDED COAL MINING SURFACE HAZARD

None recorded.

5.8 SURFACE MINING (OPENCAST WORKINGS)

None recorded.

5.9 DEVELOPMENT RISK PLAN

The surrounding areas are underlain by the extensively worked Swansea Five Feet seam. The site is located within a high-risk development area associated with the shallow recorded workings in the Swansea Five Feet seam. The recorded workings at 34m depth may have sufficient rock cover but the exact depth to these workings should be confirmed with site-specific data. This information would also be required to inform the mine gas risk assessment.

The Coal Authority interactive map indicates a high-risk development area in the vicinity of the recorded shallow workings as shown on Figures 3A and 3B. Our desk-based research confirms this assessment due to the outcrop of the Swansea Five Feet seam to the north of the site, and the shallow southerly dip of the strata. It is considered that there is potential for the risk to be lowered or removed by conducting a site investigation. Intrusive works may discount any potential risk or may highlight remediation work which would be required to be undertaken prior to the site being developed.

5.9 DEVELOPMENT RISK PLAN (CONTINUED)

It would be prudent to geo-fix the nearest shaft location (Ref: 253201-070). It may be possible to locate shaft Ref: 253201-070 which is located within the corner of the existing car park. A risk assessment would be needed to determine the affect that the shaft could have on the proposed refurbishment of the existing adjacent building.

The coal mining legacy issues outlined in this report, including the potential for shallow unrecorded workings and unrecorded mine entries to be present within the site, could have implications for the proposed development.

Therefore, at this early stage, as a minimum precaution against potential localised subsidence over localised remnant voids, for preliminary purposes only, it is recommended that the foundations of the proposed building should be reinforced such that they are capable of spanning potential voids of up to 3m diameter, with cantilever effects of 1.5m at the edges/corners.

Although the above-described reinforced foundations would be capable of protecting against potential localised subsidence incidents, they would not be sufficient to protect against more widespread subsidence which could result if more significant or widespread remnant voids are still present beneath the site.

5.10 DEVELOPMENT PRECAUTIONS

Site Investigation and/or Remediation

Due to the known presence of recorded shallow workings and potential additional shallow unrecorded workings within the Swansea Five Feet seam, an intrusive site investigation will be required. These recommended works should confirm the thickness of the superficial soils, the depth to bedrock and the depth to any shallow recorded or unrecorded workings. The information would also inform the mine gas risk assessment.

The site investigation works should be carried out in accordance with the guidance Section 12 of CIRIA Report C758 - Abandoned Mine Workings Manual.

The extent, depth and condition of the coal seam should be proved across the development area by drilling a series of boreholes. Where voids/workings are found the degree of extraction can be estimated with more certainty to determine the potential abnormal costs for development.

5.10 DEVELOPMENT PRECAUTIONS (CONTINUED)

The site investigations will need to be carried out by a competent contractor, considering the findings of this report. The results should be interpreted by a qualified and competent person so that an appropriate remedial strategy can be developed.

Due to the difficulties in identifying coal related gas hazards and the proximity to other developments, it will be necessary to complete a mine gas risk assessment for the development site or undertake a programme of gas monitoring if required. This may recommend basic gas protection measures within the foundation design, which are resistant to permanent gases (carbon dioxide, methane, carbon monoxide).

If any of these recommended boreholes should encounter significant voids, then the above assessments may need to be reviewed and drilling and grouting stabilisation measures, or more proof drilling may become required. Bearing in mind the nature of the shallow workings, the most likely ground remediation/stabilisation strategy would be grout injection to fill any mine void spaces that could lead to ground instability in or around the proposed development. This strategy would have to be designed by a qualified and competent engineer and carried out by a qualified and competent contactor.

Attempts may need to be made using either intrusive or non-intrusive methods to locate shaft ref: 253201-070. If required, the scope of any recommended treatment/stabilisation works could be determined using the information from the intrusive works.

The occurrence of unrecorded mine entries across the whole of the site cannot be discounted and consequently in areas of new build development a watching brief should be maintained throughout the site works to identify this risk. As a result, all site operatives should be made aware of this potential risk.

Coal Authority Permit

Any intrusive activities, including initial site investigation boreholes and any subsequent treatment of coal mine workings/coal mine entries for ground stability purposes require the prior written permission of the Coal Authority.

6.0 ENVIRONMENTAL RISK ASSESSMENT

There are several environmental hazards associated with the grouting of mine workings and a hazard assessment is presented in Table 4 overleaf.

Risk mitigation measures will need to be implemented to manage groundwater and mine gasses that may be encountered during the works. Consideration will also need to be given to the impact of PFA grouts on groundwater quality. A CIRIA 552 risk assessment table is presented below and demonstrates how these risks can be addressed.

6.0 ENVIRONMENTAL RISK ASSESSMENT (CONTINUED)

Table 4: Preliminary Conceptual Site Model / Conceptual Exposure Model

Source	Pathway	Receptor	Consequence of risk being realised	Probability of risk being realised	Risk Classification	Potential risk management requirements / options
Displacement of groundwater by grout or fill	Mineworkings and fractures / discontinuities	Secondary aquifer	Minor	Unlikely	Very Low risk	Research suggests groundwater constituent monitoring in the Coal Measures has not indicated the presence of contamination. An assessment of groundwater constituent fate and transport may be required. Unlikely that the site is impacting off site receptors. It may be necessary to undertake a programme of physical and chemical groundwater monitoring of voids during and after any grouting works.
		Culverts	Minor	Unlikely	Very Low risk	Research suggests groundwater constituent monitoring in the Coal Measures has not indicated the presence of contamination. An assessment of groundwater constituent fate and transport may be required. Unlikely that the site is impacting off site receptors. It may be necessary to undertake a programme of physical and chemical groundwater monitoring of voids during and after any grouting works.

6.0 ENVIRONMENTAL RISK ASSESSMENT (CONTINUED)

Source	Pathway	Receptor	Consequence of risk being realised	Probability of risk being realised	Risk Classification	Potential risk management requirements / options
PFA based grout	Groundwater	Secondary aquifer	Minor	Unlikely	Very Low risk	Check quality of proposed PFA sources.
Sediment laden drilling flush	Surface water run-off, overland flow	Drains and water courses	Medium	Likely	Moderate risk	The drilling contractor must have a methodology to reduce the risk of overland flow developing to a practical minimum and if overland flow does develop a procedure to stop and or mitigate any harmful impacts
Displacement and or release of mine gases	Boreholes, mineworkings, discontinuities in the rock mass and superficial deposits. Accumulation in enclosed spaces of future buildings on site, or migration to buildings off site, leading to asphyxiation, or risk of explosion Inhalation	Future site residents/ neighbouring residents	Severe	Medium	Moderate risk	Risk assess in accordance with CL:AIRE document 'Good Practice for Risk Assessment for Coal Mine Gas Emissions dated October 2021
		Construction workers	Severe	Low likelihood	Moderate risk	Personal monitoring to be implemented by site operatives during the investigation and drilling and grouting works. Boundary monitoring in boreholes containing monitoring standpipes.
Shallow soil and groundwater contamination	Dermal contact, ingestion, and inhalation hazardous soil constituents	Construction workers	Medium	Low likelihood	Moderate risk	Gross contamination unlikely on site but precautions in line with those set out in HSG66 and in accordance with a yellow site under BDA guidelines should be followed. All construction workers should be provided with appropriate levels of PPE to mitigate the risk of contact with potentially contaminated soils.

APPENDIX A

HISTORY AND GEOLOGY MAPS

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
Electricity Transmission Line
Sloping Masonry
Pylon
Pole
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

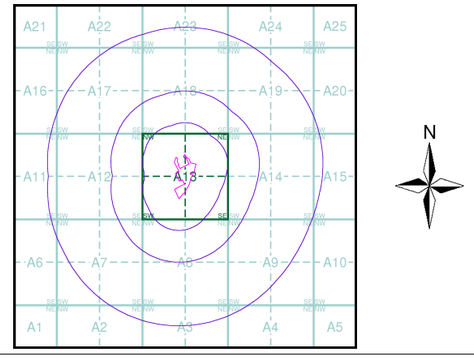
Gravel Pit
Refuse tip or slag heap
Rock
Rock (scattered)
Boulders
Boulders (scattered)
Shingle
Mud
Sand
Sand Pit
Slopes
Top of cliff
General detail
Underground detail
Overhead detail
Narrow gauge railway
Multi-track railway
Single track railway
County boundary (England only)
Civil, parish or community 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

Intégral Géotechnique

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Glamorganshire	1:10,560	1884	2
Carmarthenshire	1:10,560	1889	3
Carmarthenshire	1:10,560	1907 - 1908	4
Carmarthenshire	1:10,560	1921 - 1922	5
Carmarthenshire	1:10,560	1938 - 1951	6
Carmarthenshire	1:10,560	1953	7
Ordnance Survey Plan	1:10,000	1965	8
Ordnance Survey Plan	1:10,000	1973 - 1975	9
Ordnance Survey Plan	1:10,000	1992	10
10K Raster Mapping	1:10,000	1999 - 2000	11
10K Raster Mapping	1:10,000	2006	12
VectorMap Local	1:10,000	2024	13

Historical Map - Slice A



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National Grid Reference:	253110, 201260
Slice:	A
Site Area (Ha):	2.5
Search Buffer (m):	1000

Site Details

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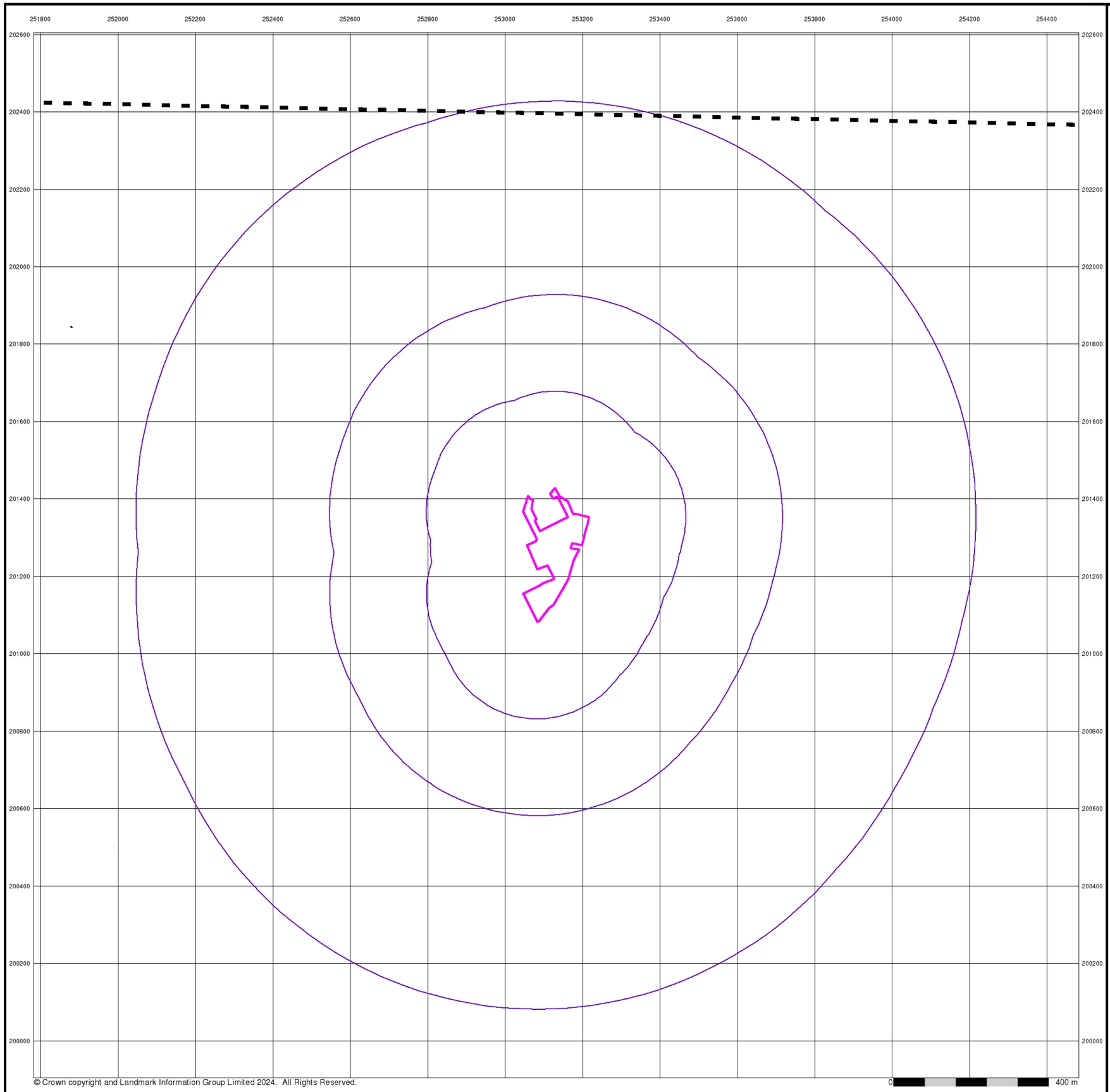

Intégral Géotechnique

Glamorganshire

Published 1884

Source map scale - 1:10,560

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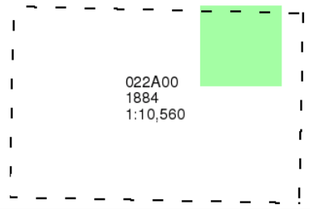
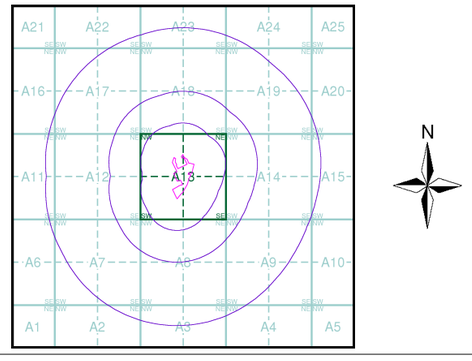
Map Name(s) and Date(s)



Historical Map - Slice A



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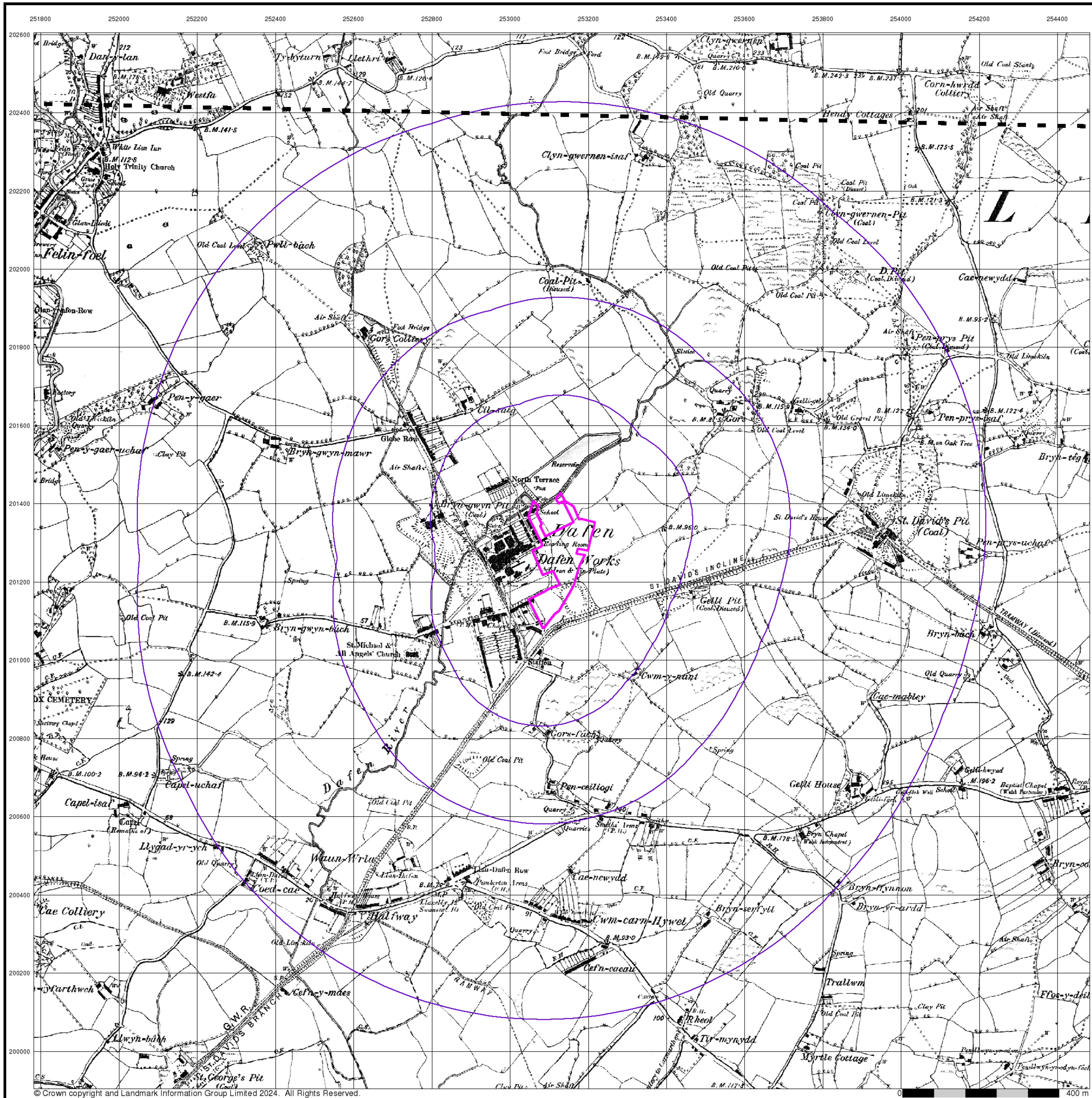

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Intégral Géotechnique

Carmarthenshire

Published 1889

Source map scale - 1:10,560

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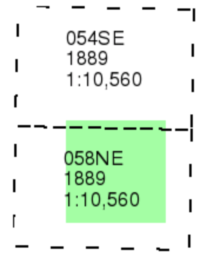

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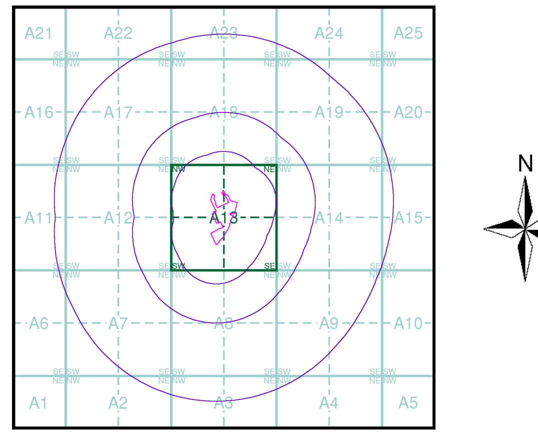

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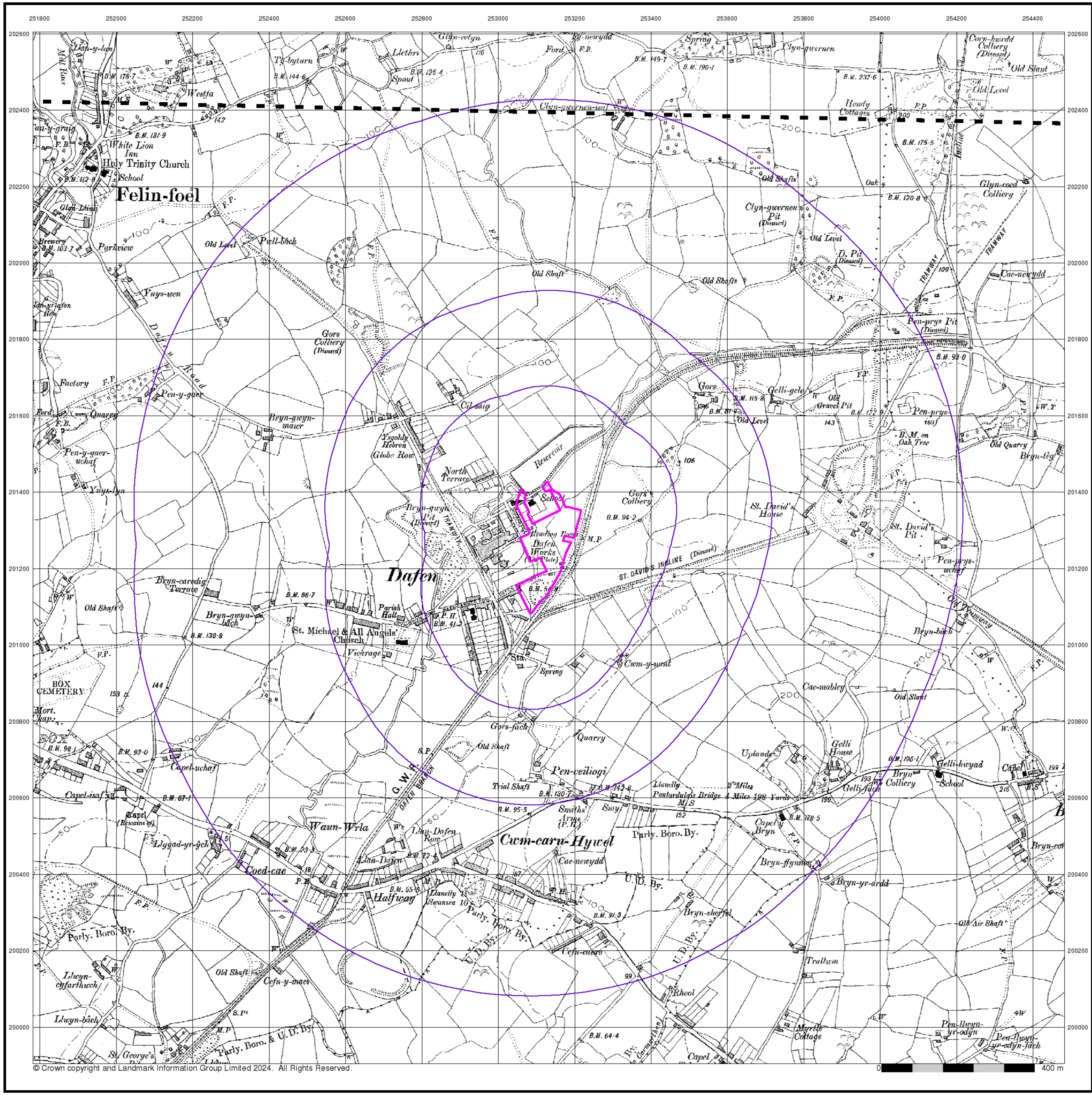

Intégral Géotechnique

Carmarthenshire

Published 1907 - 1908

Source map scale - 1:10,560

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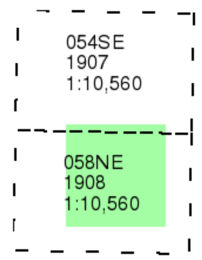
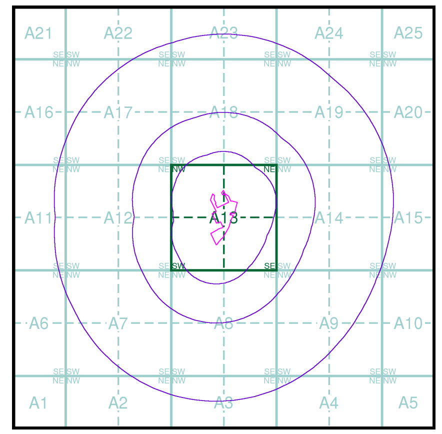
Map Name(s) and Date(s)



Historical Map - Slice A



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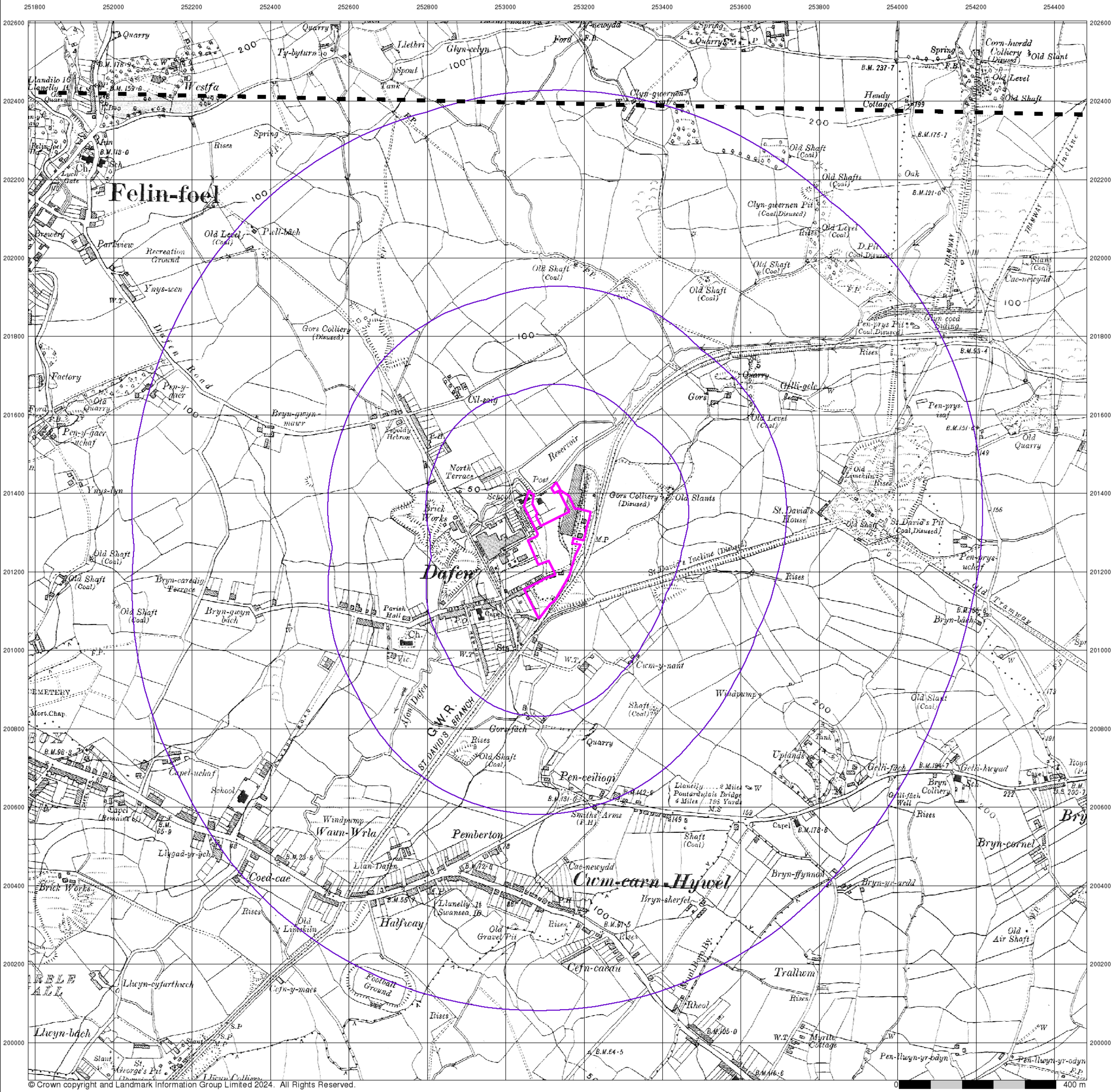

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Intégral Géotechnique

Carmarthenshire

Published 1921 - 1922

Source map scale - 1:10,560

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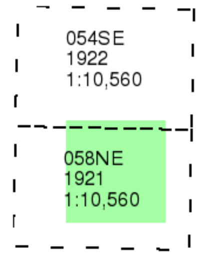

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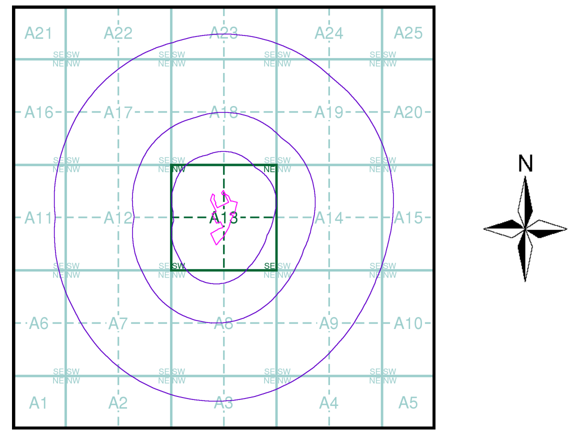

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Search Buffer (m):	1000

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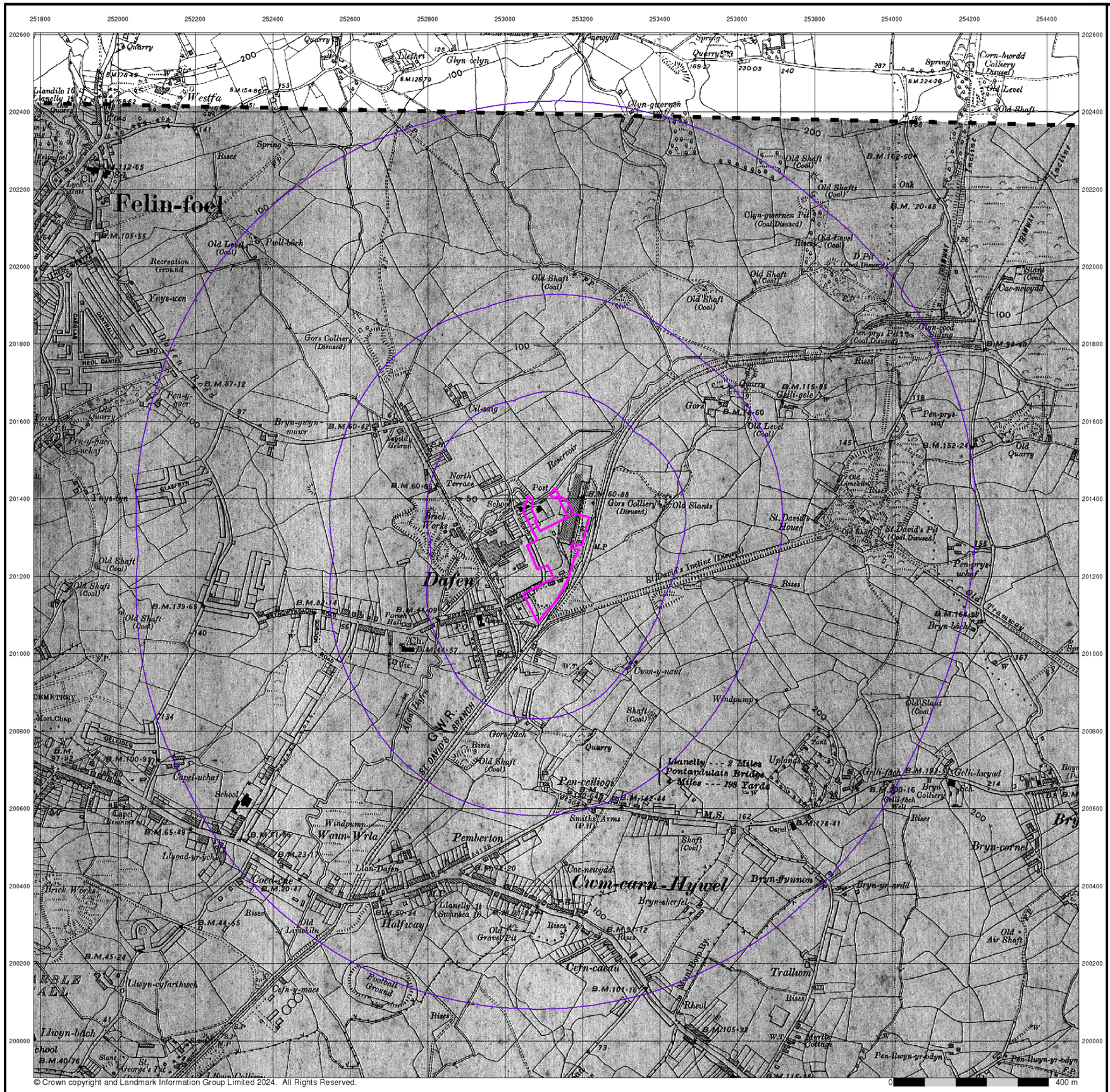

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Intégral Géotechnique

Carmarthenshire

Published 1938 - 1951

Source map scale - 1:10,560

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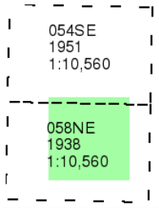
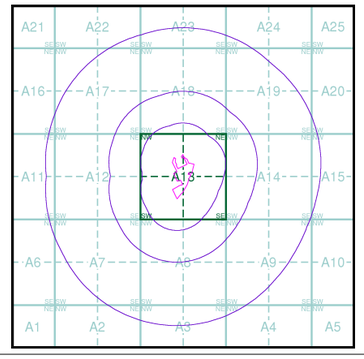
Map Name(s) and Date(s)



Historical Map - Slice A



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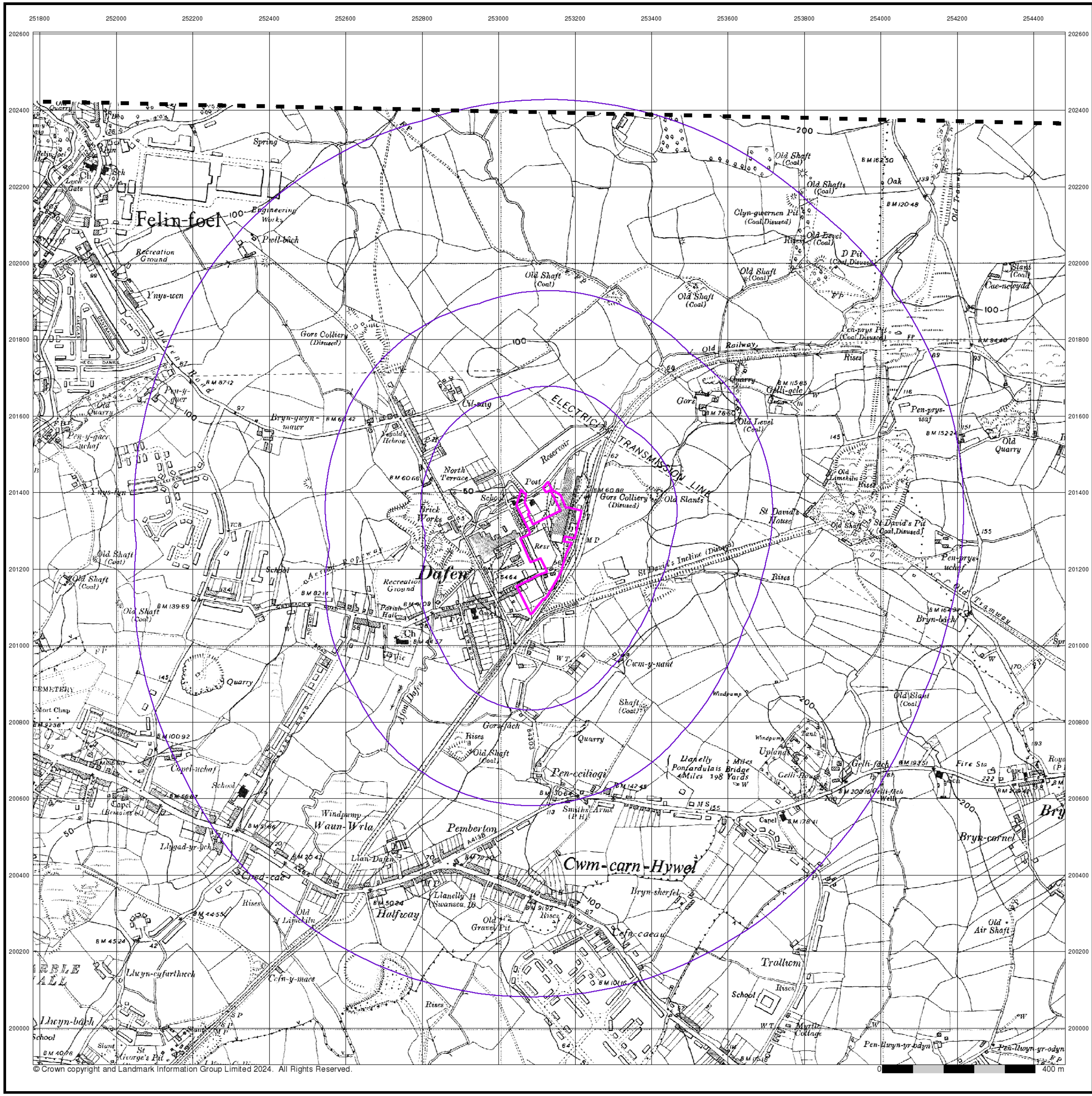

Intégral Géotechnique

Carmarthenshire

Published 1953

Source map scale - 1:10,560

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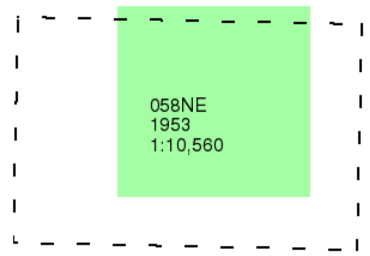
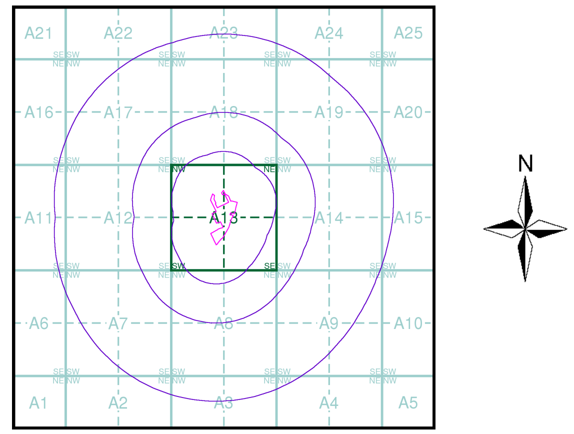
Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

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Site Area (Ha): 2.5
Search Buffer (m): 1000

Site Details

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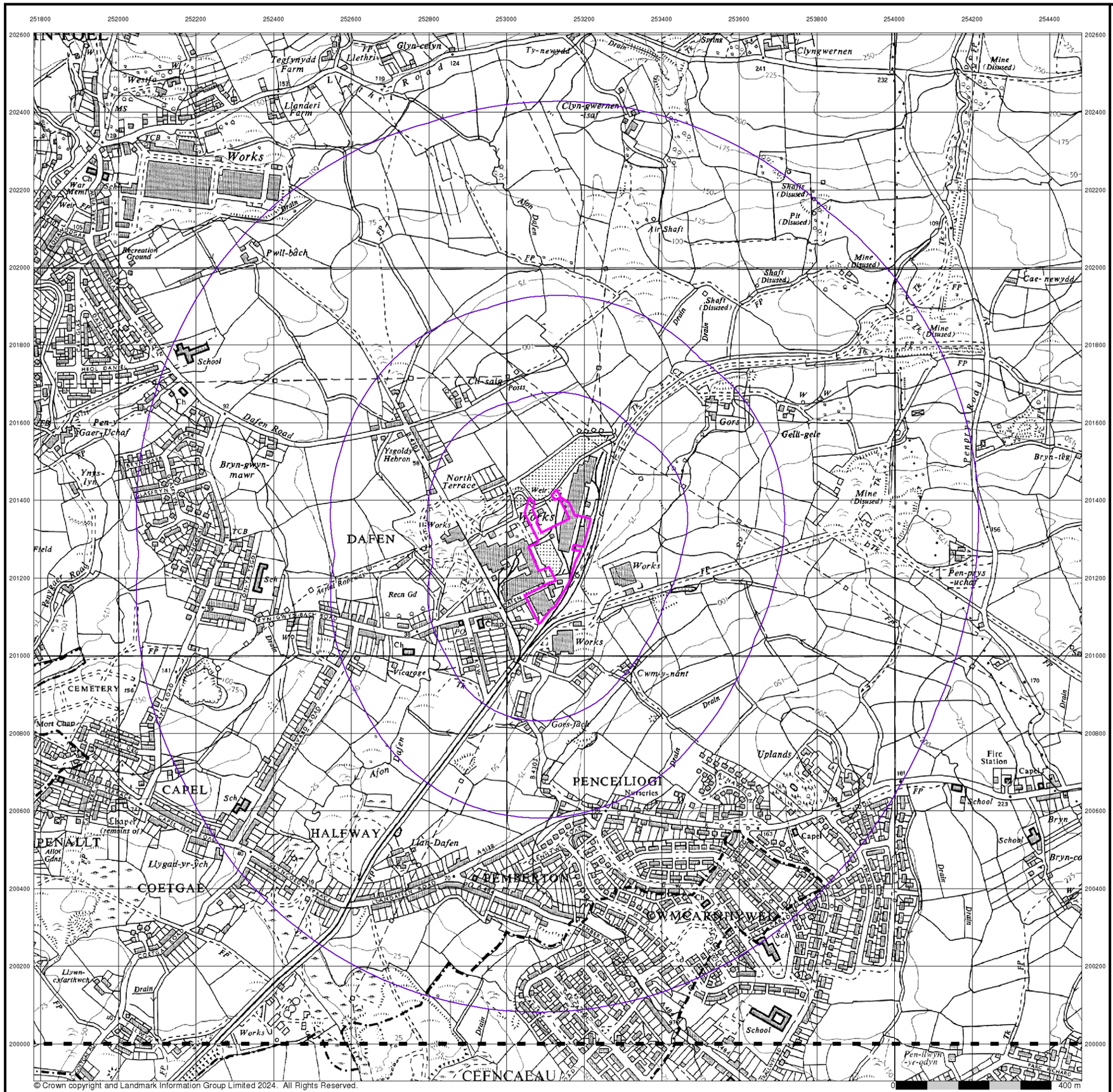

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Intégral Géotechnique

Ordnance Survey Plan

Published 1965

Source map scale - 1:10,000

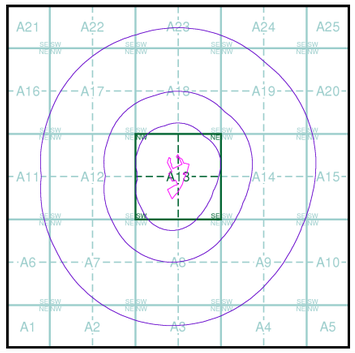
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

SN50SW
1965
1:10,560

SS59NW
1965
1:10,560

Historical Map - Slice A



Order Details

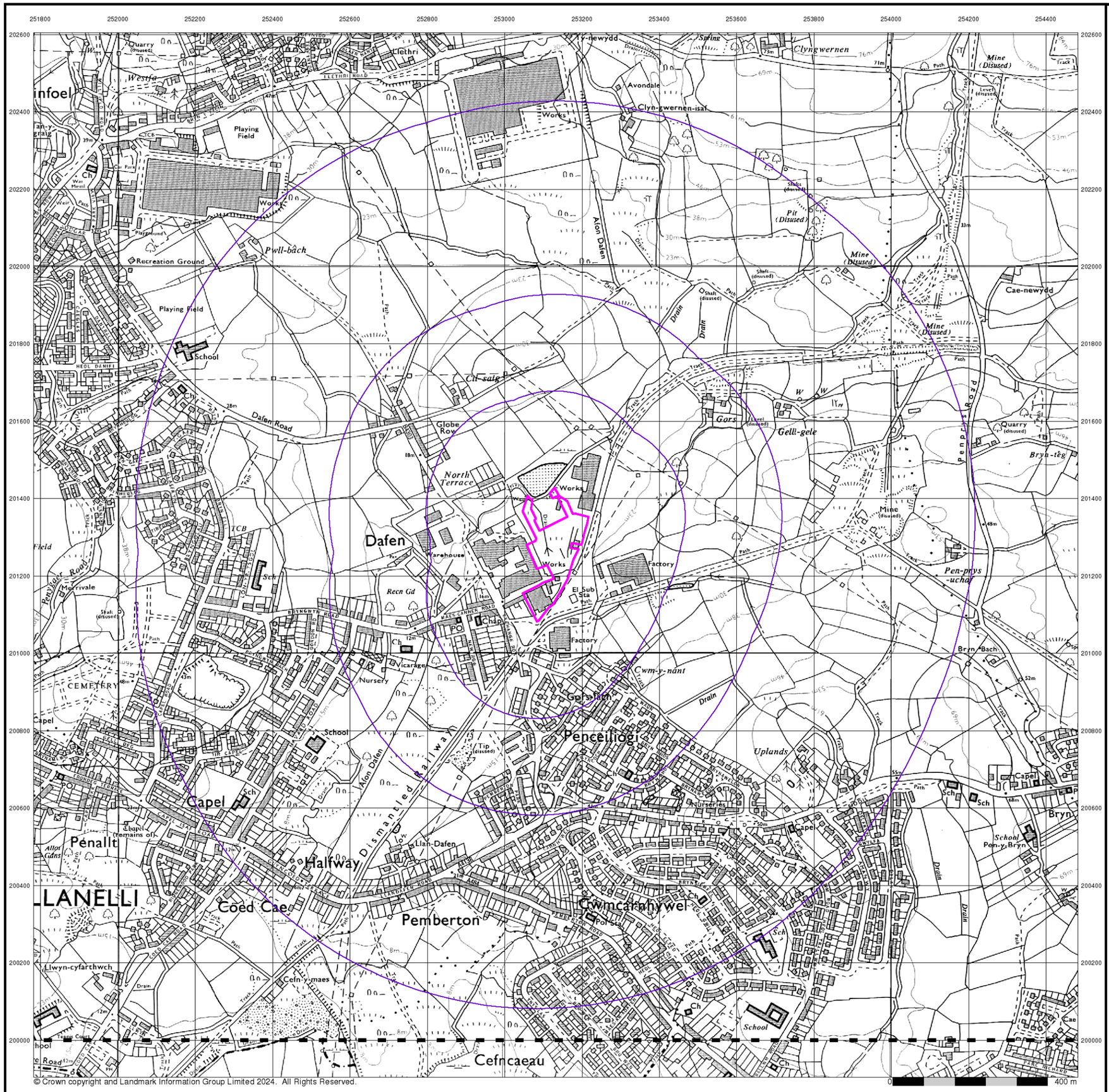
Order Number:	346449928_1_1
Customer Ref:	14316/LP
National Grid Reference:	253110, 201260
Slice:	A
Site Area (Ha):	2.5
Search Buffer (m):	1000

Site Details

Dyfed Steel, Dafen, Llanelli, SA14 8NW

Landmark INFORMATION GROUP

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



Intégral Géotechnique

Ordnance Survey Plan

Published 1973 - 1975

Source map scale - 1:10,000

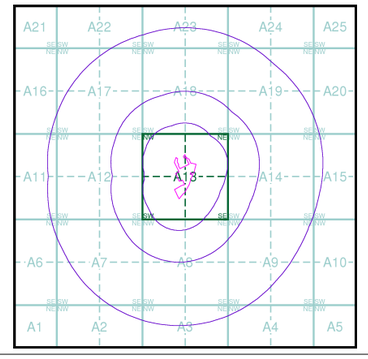
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

SN50SW
1975
1:10,000

SS59NW
1973
1:10,000

Historical Map - Slice A



Order Details

Order Number:	346449928_1_1
Customer Ref:	14316/LP
National Grid Reference:	253110, 201260
Slice:	A
Site Area (Ha):	2.5
Search Buffer (m):	1000

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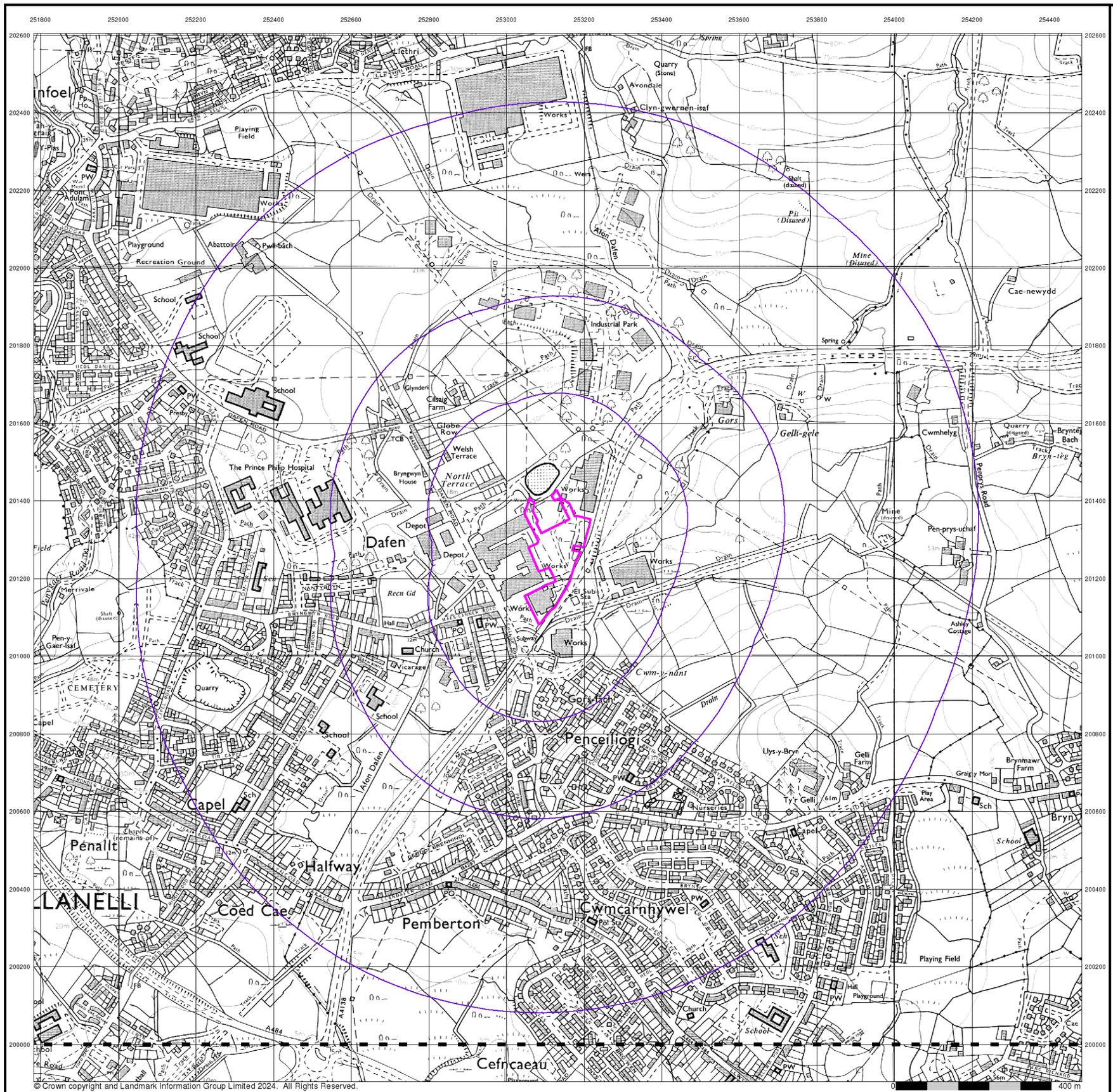


Intégral Géotechnique

Ordnance Survey Plan

Published 1992

Source map scale - 1:10,000

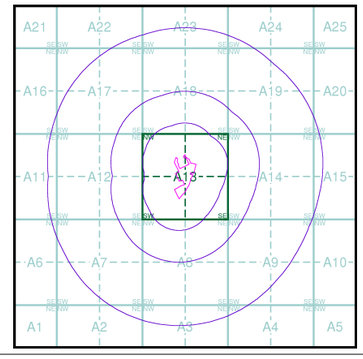
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840`s. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some 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)

SN50SW
1992
1:10,000

SS59NW
1992
1:10,000

Historical Map - Slice A



Order Details

Order Number:	346449928_1_1
Customer Ref:	14316/LP
National Grid Reference:	253110, 201260
Slice:	A
Site Area (Ha):	2.5
Search Buffer (m):	1000

Site Details

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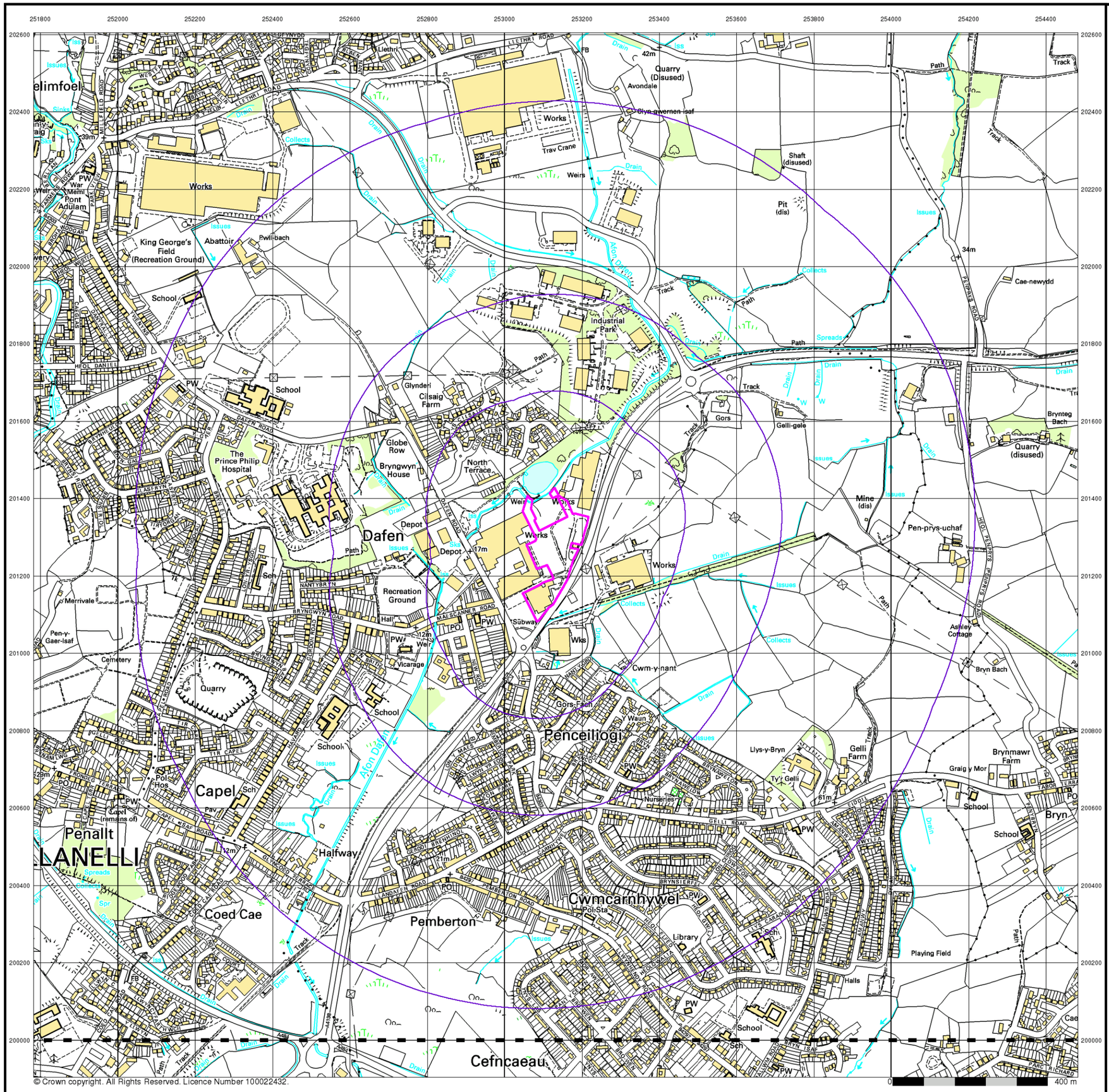


0 400 m

Intégral Géotechnique

10k Raster Mapping

Published 1999 - 2000

Source map scale - 1:10,000

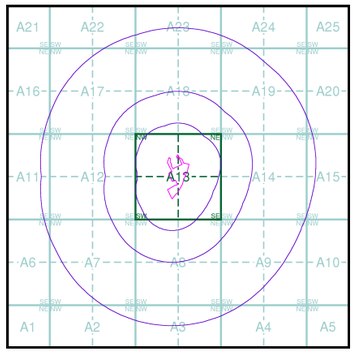
The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks 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)

SN50SW
2000
1:10,000

SS59NW
1999
1:10,000

Historical Map - Slice A



Order Details

Order Number:	346449928_1_1
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Slice:	A
Site Area (Ha):	2.5
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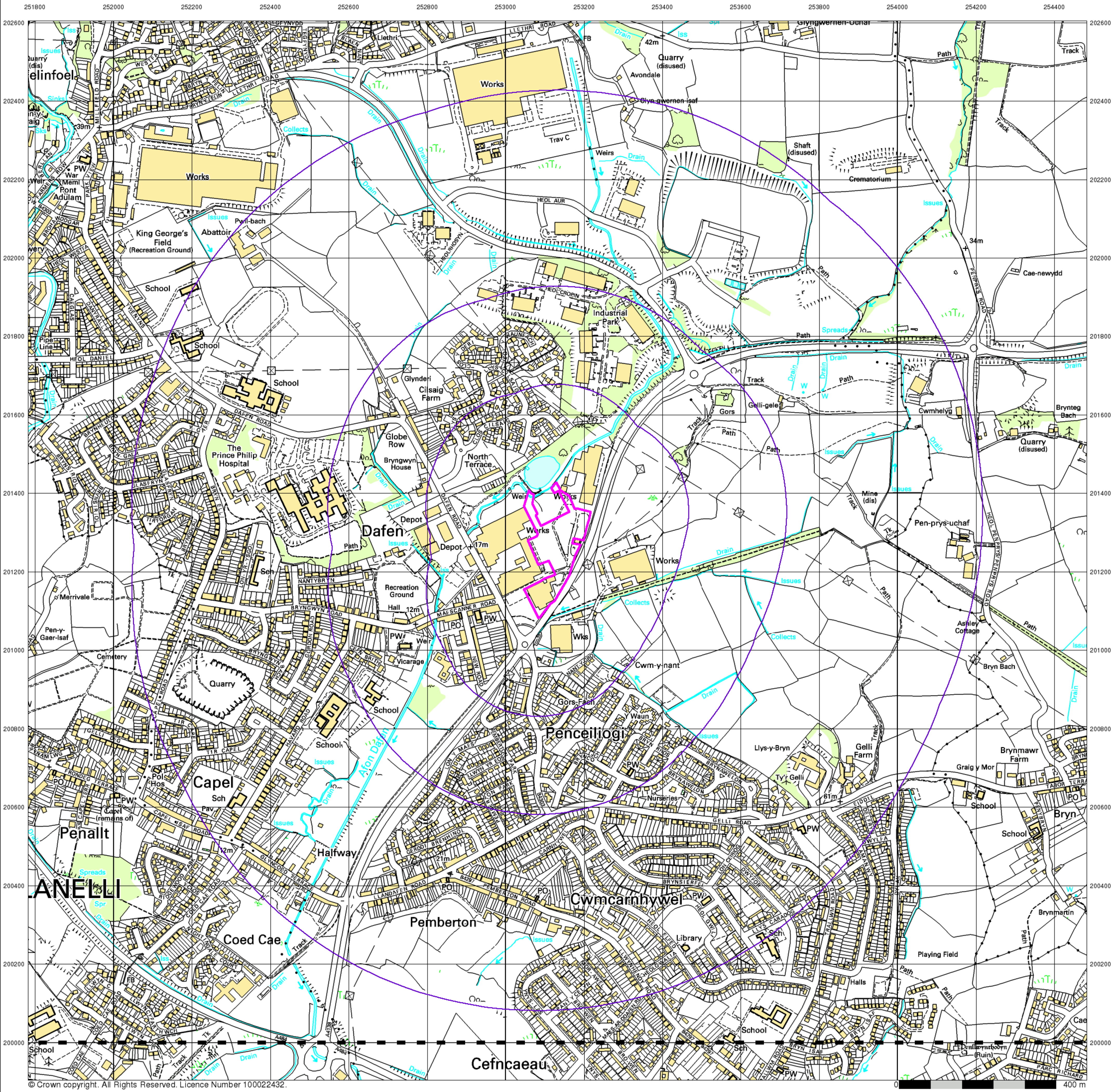


Intégral
Géotechnique

10k Raster Mapping

Published 2006

Source map scale - 1:10,000

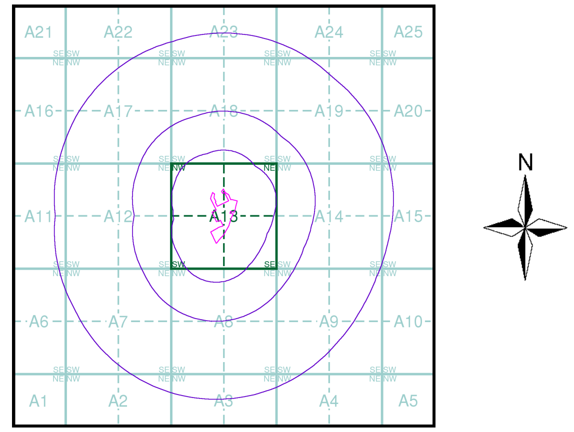
The historical maps shown were produced from the Ordnance Survey`s 1:10,000 colour raster mapping. These maps are derived from Landplan which replaced the old 1:10,000 maps originally published in 1970. The data is highly detailed showing buildings, fences and field boundaries as well as all roads, tracks 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)

SN50SW
2006
1:10,000

SS59NW
2006
1:10,000

Historical Map - Slice A



Order Details

Order Number: 346449928_1_1
Customer Ref: 14316/LP
National Grid Reference: 253110, 201260
Slice: A
Site Area (Ha): 2.5
Search Buffer (m): 1000

Site Details

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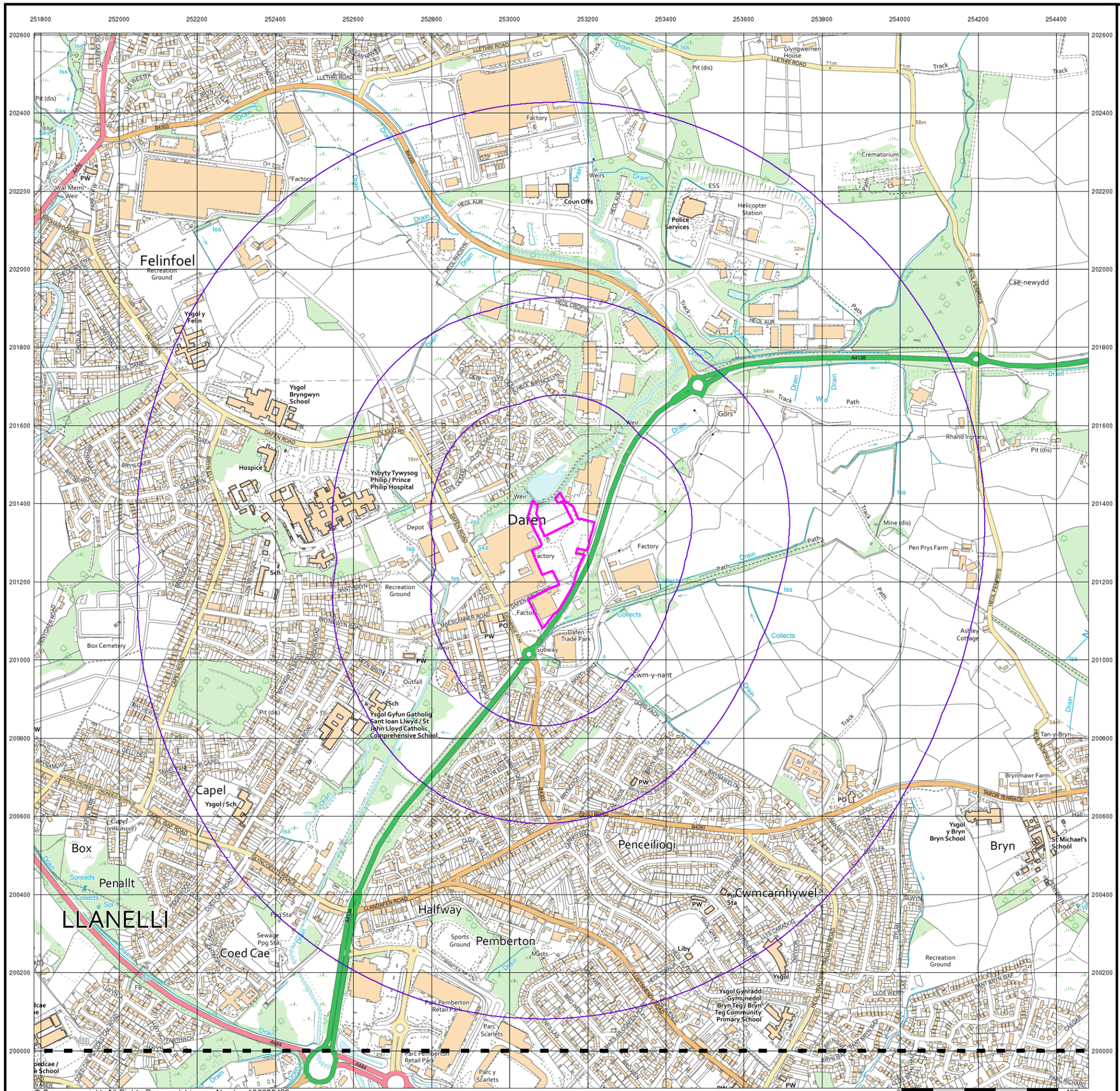


Intégral Géotechnique

VectorMap Local

Published 2024

Source map scale - 1:10,000

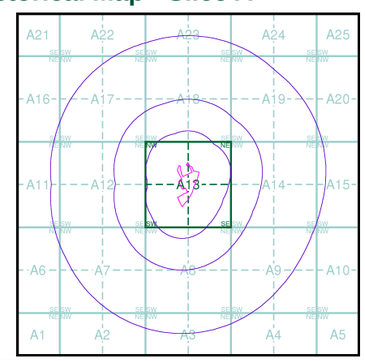
VectorMap Local (Raster) is Ordnance Survey's highest detailed 'backdrop' mapping product. These maps are produced from OS's VectorMap Local, a simple vector dataset at a nominal scale of 1:10,000, covering the whole of Great Britain, that has been designed for creating graphical mapping. OS VectorMap 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)

SN50SW
2024
Variable

SS59NW
2024
Variable

Historical Map - Slice A



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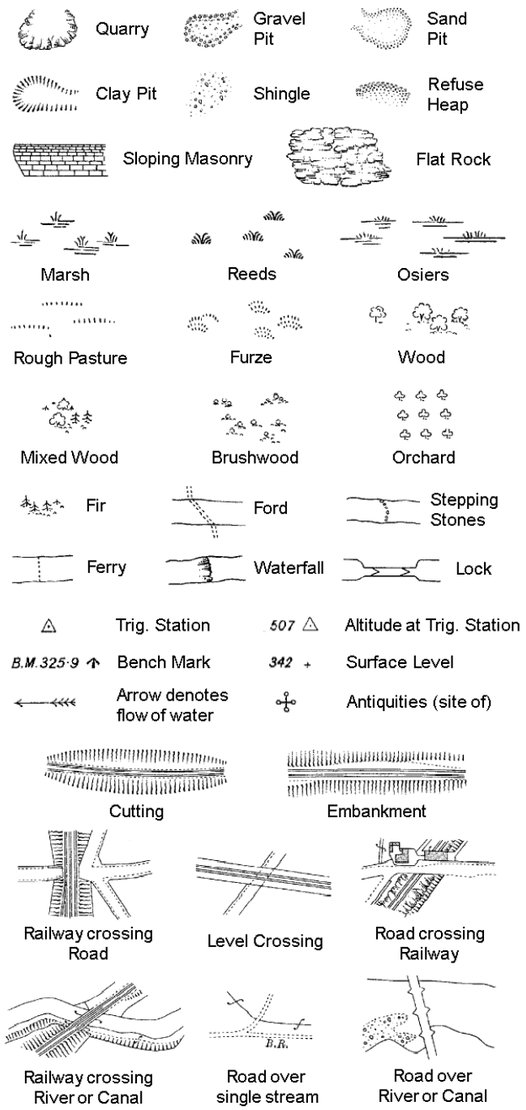
Site Details

Dyfed Steel, Dafen, Llanelli, SA14 8NW

Historical Mapping Legends

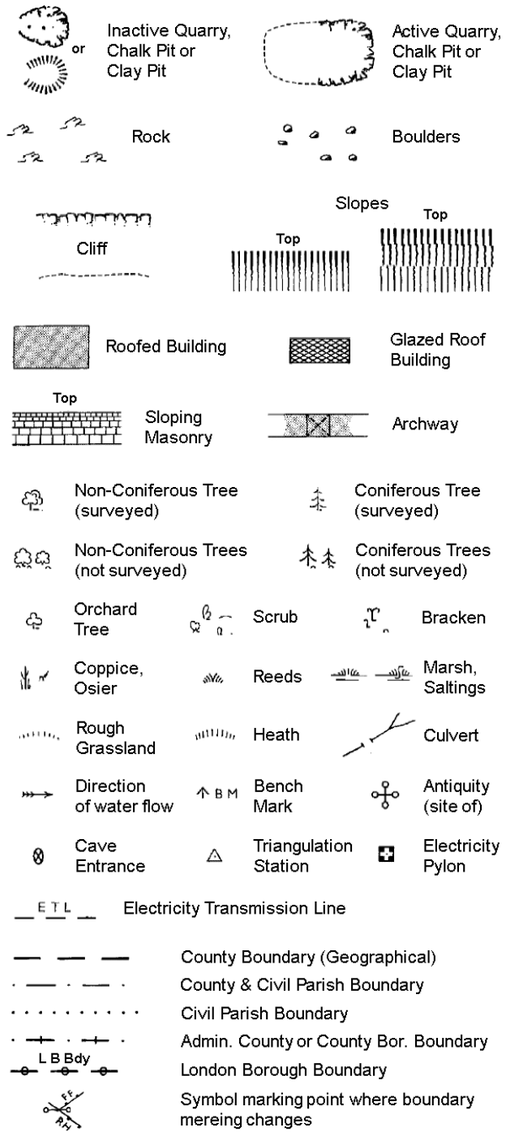
Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



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

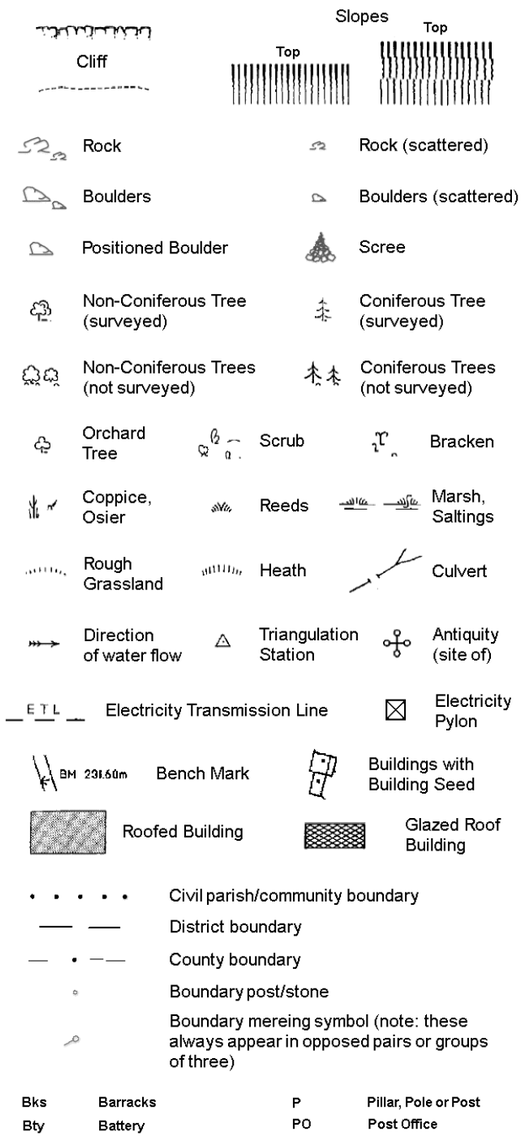
Ordnance Survey Plan, Additional SIMs and Supply of Unpublished Survey Information 1:2,500 and 1:1,250



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



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)

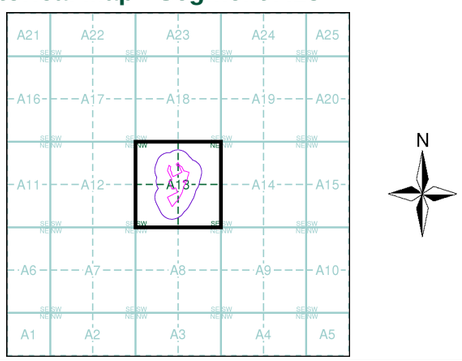
Bks	Barracks	P	Pillar, Pole or Post
Bty	Battery	PO	Post Office
Cemy	Cemetery	PC	Public Convenience
Chy	Chimney	Pp	Pump
Cis	Cistern	Ppg Sta	Pumping Station
Dismtd Rly	Dismantled Railway	PW	Place of Worship
El Gen Sta	Electricity Generating Station	Sewage Ppg Sta	Sewage Pumping Station
El P	Electricity 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

Intégral Géotechnique

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Carmarthenshire	1:2,500	1880	2
Carmarthenshire	1:2,500	1907	3
Carmarthenshire	1:2,500	1916	4
Ordnance Survey Plan	1:1,250	1953 - 1987	5
Ordnance Survey Plan	1:2,500	1954 - 1959	6
Ordnance Survey Plan	1:1,250	1962 - 1973	7
Ordnance Survey Plan	1:1,250	1970	8
Supply of Unpublished Survey Information	1:1,250	1973	9
Additional SIMs	1:1,250	1977 - 1987	10
Additional SIMs	1:2,500	1978	11
Additional SIMs	1:1,250	1991	12
Large-Scale National Grid Data	1:1,250	1993	13
Large-Scale National Grid Data	1:1,250	1994	14
Large-Scale National Grid Data	1:1,250	1995	15
Historical Aerial Photography	1:2,500	2001	16

Historical Map - Segment A13



Order Details

Order Number:	346449928_1_1
Customer Ref:	14316/LP
National Grid Reference:	253110, 201260
Slice:	A
Site Area (Ha):	2.5
Search Buffer (m):	100

Site Details

Dyfed Steel, Dafen, Llanelli, SA14 8NW

Landmark INFORMATION GROUP
Tel: 0844 844 9952
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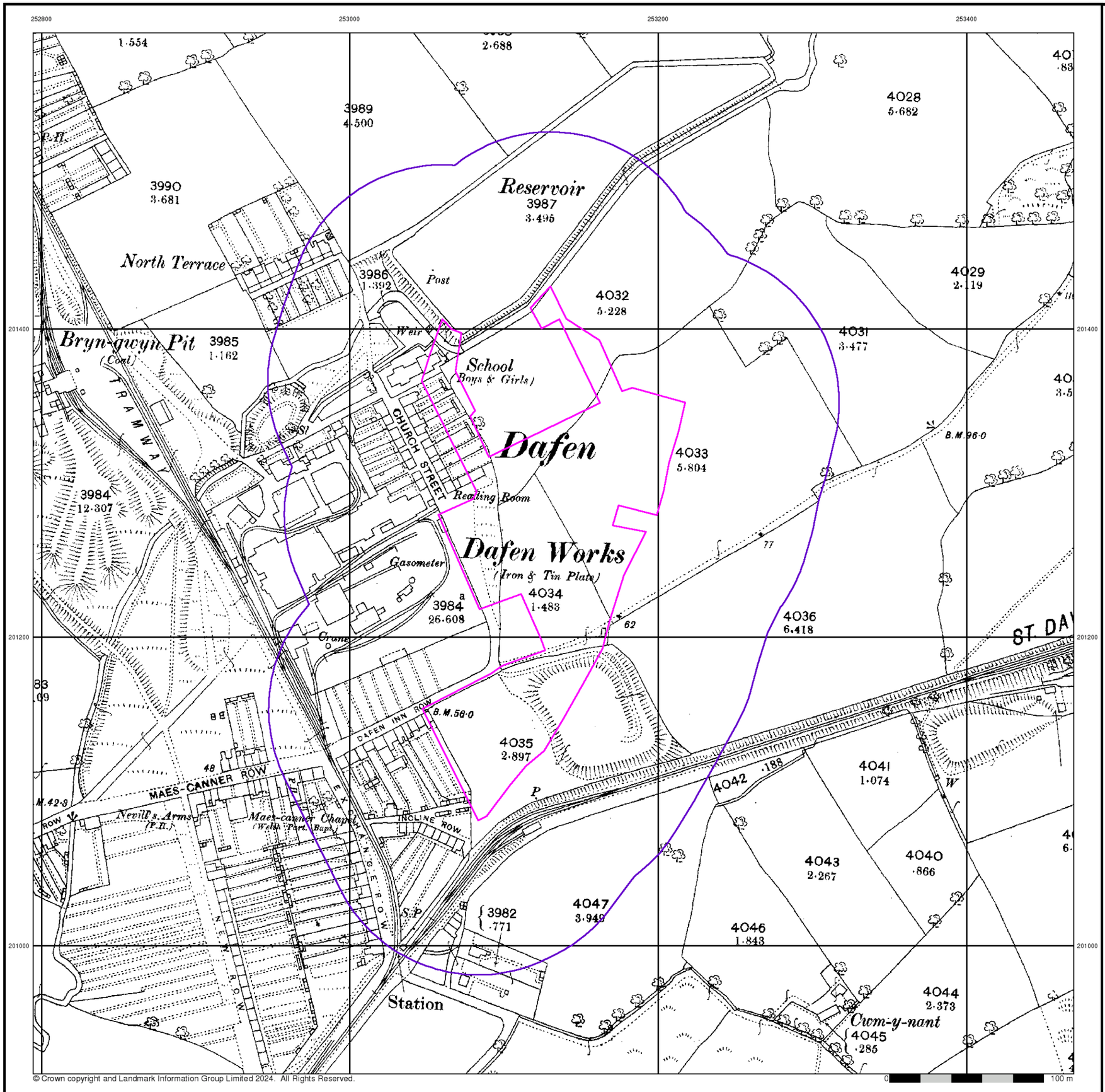


Intégral Géotechnique

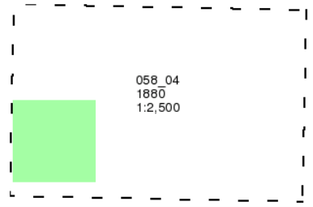
Carmarthenshire

Published 1880

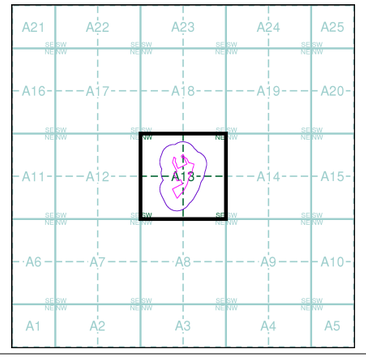
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	346449928_1_1
Customer Ref:	14316/LP
National Grid Reference:	253110, 201260
Slice:	A
Site Area (Ha):	2.5
Search Buffer (m):	100

Site Details

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Intégral Géotechnique

Carmarthenshire

Published 1907

Source map scale - 1:2,500

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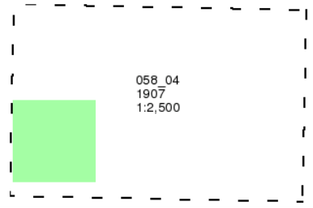
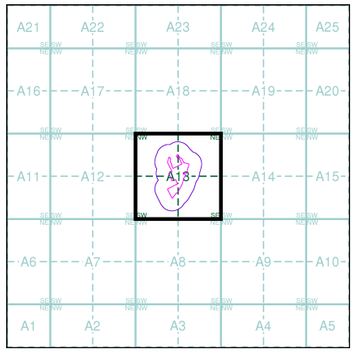


Historical Map - Segment A13



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Slice:	A
Site Area (Ha):	2.5
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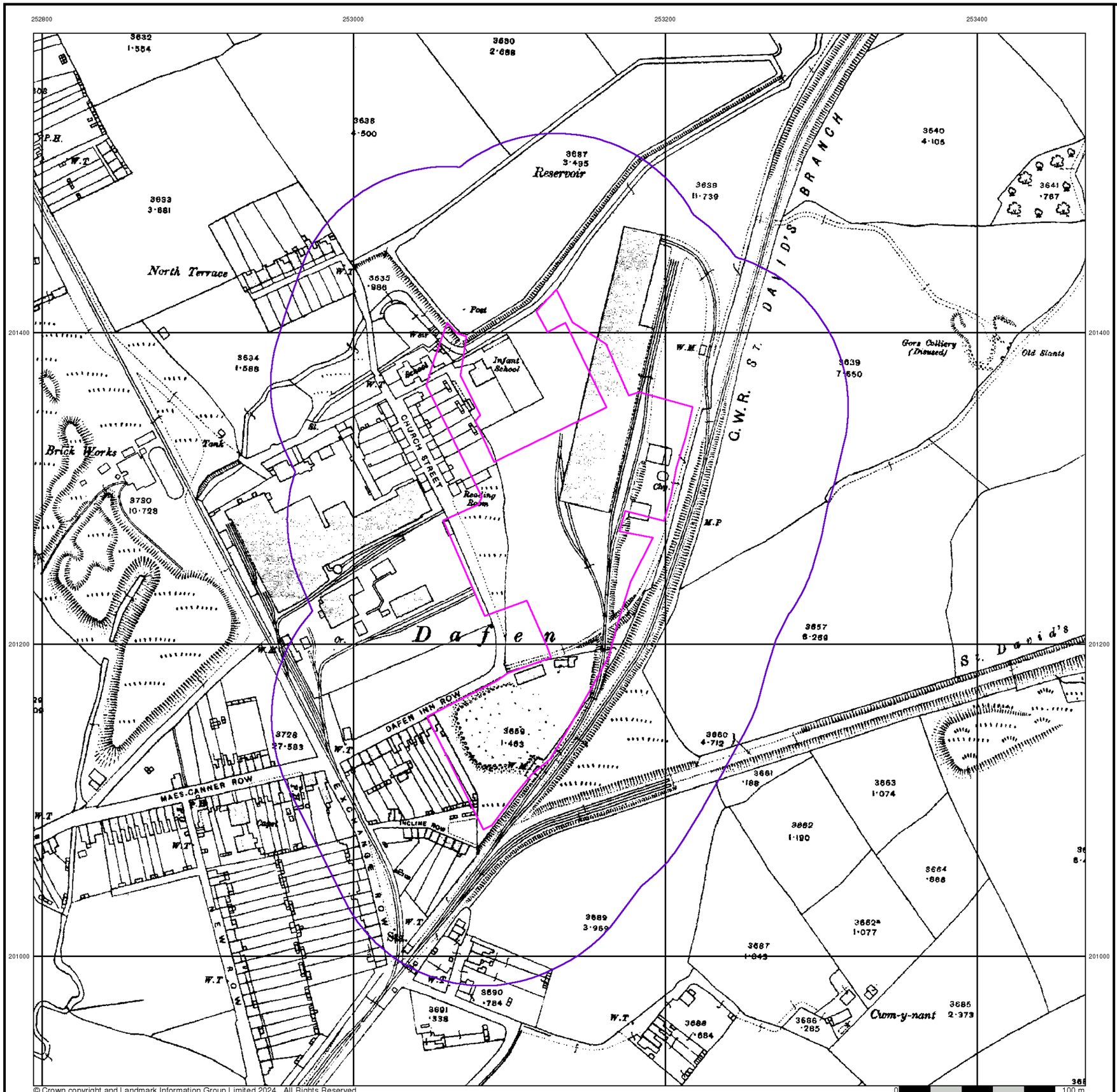


Intégral Géotechnique

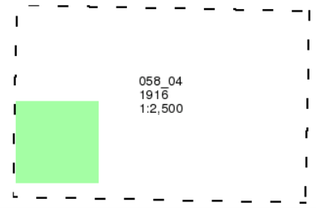
Carmarthenshire

Published 1916

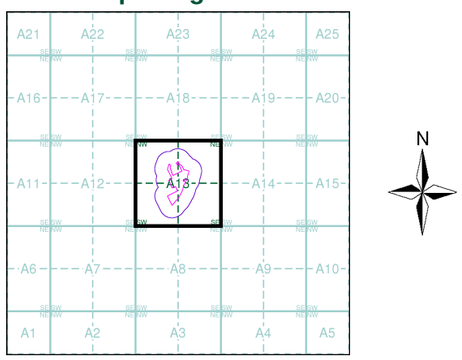
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



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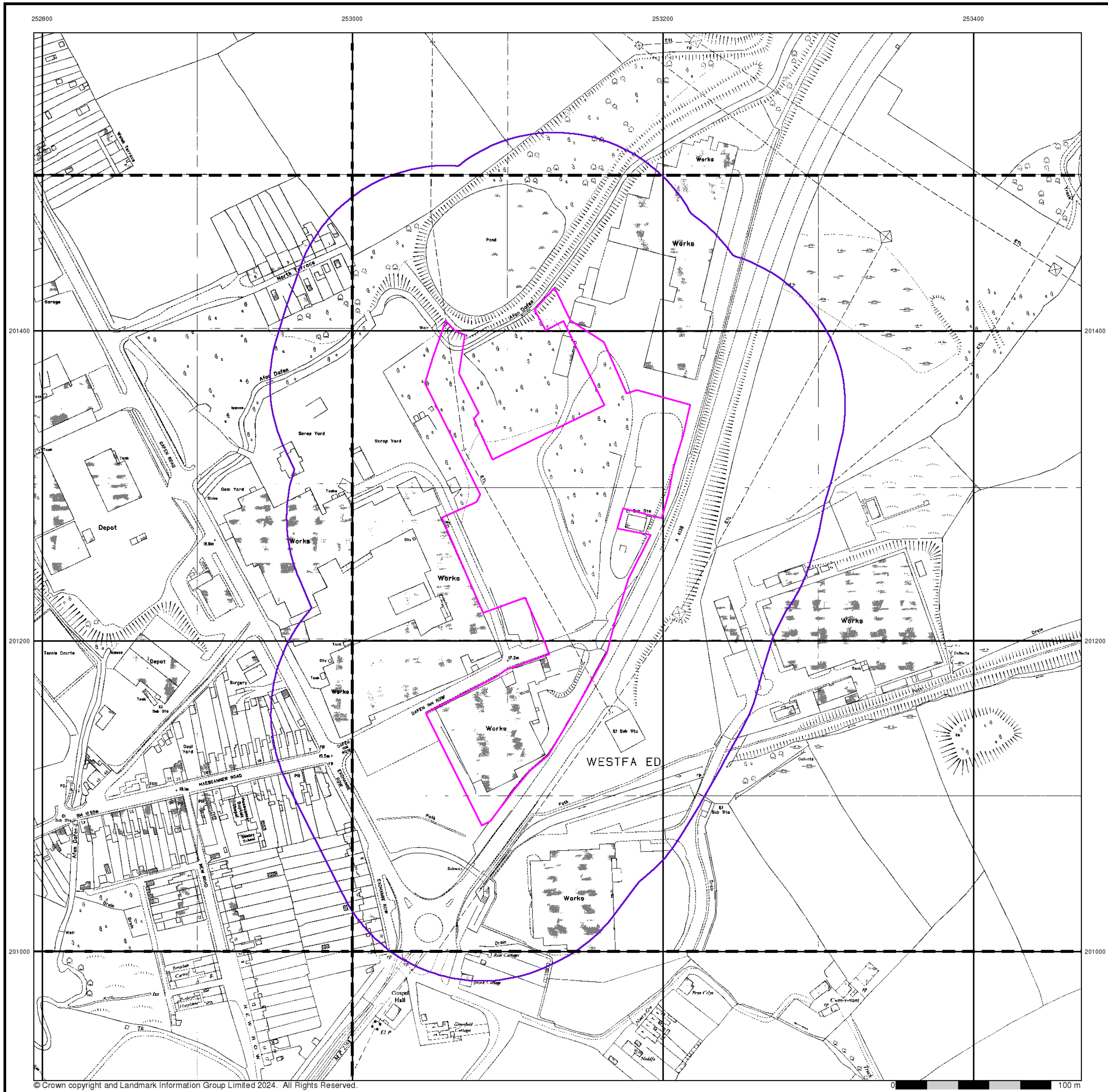


Intégral Géotechnique

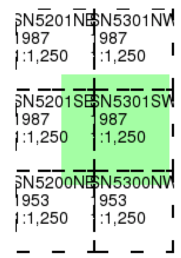
Ordnance Survey Plan

Published 1953 - 1987

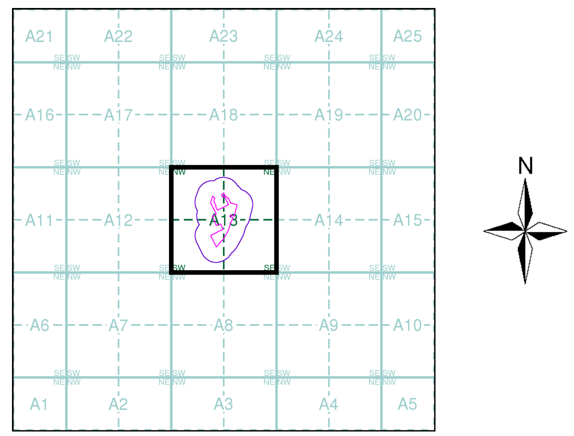
Source map scale - 1:1,250

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



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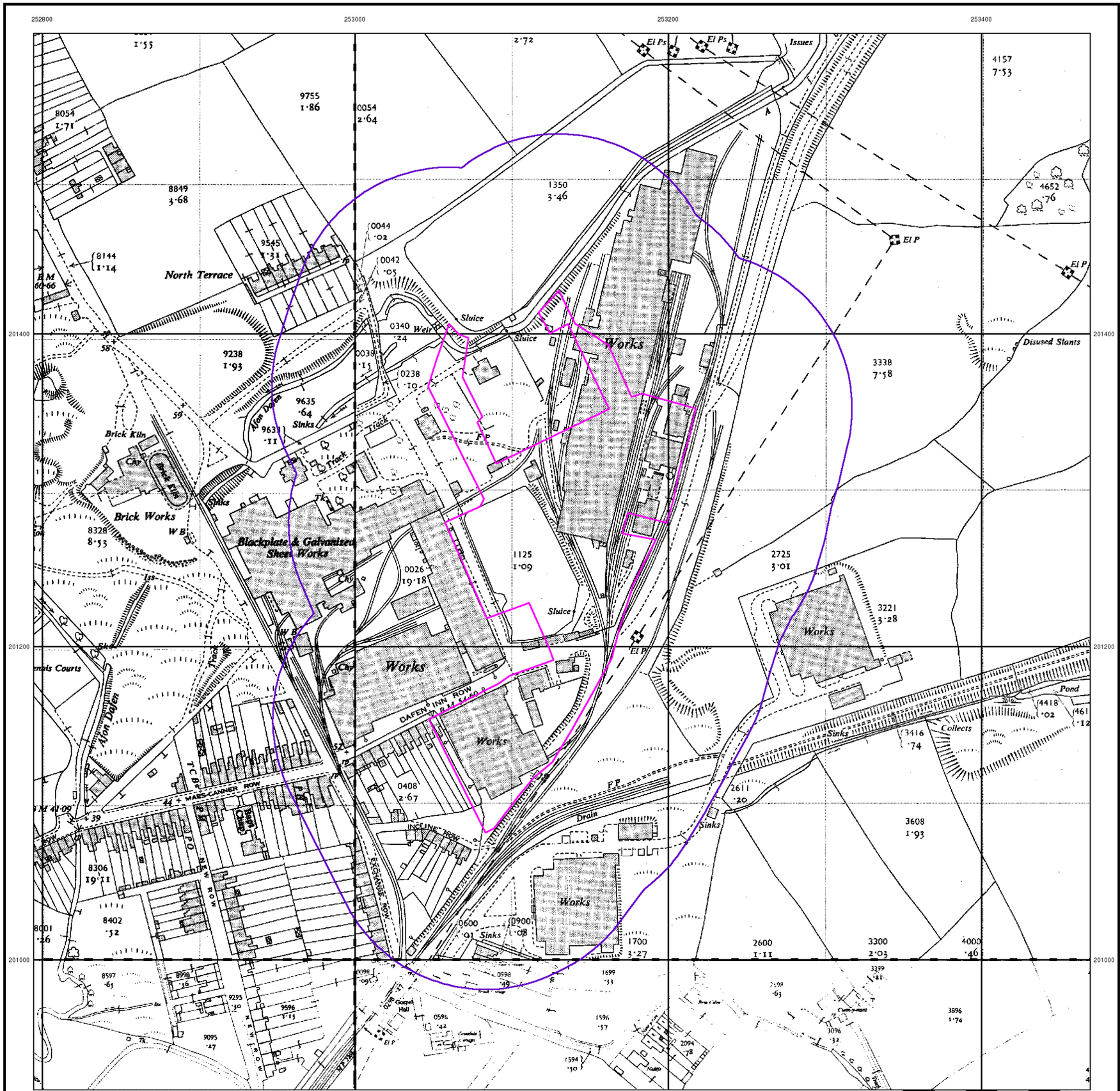


Intégral Géotechnique

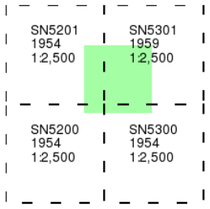
Ordnance Survey Plan

Published 1954 - 1959

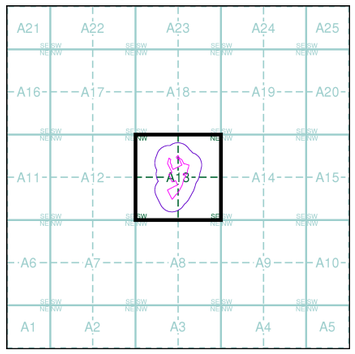
Source map scale - 1:2,500

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



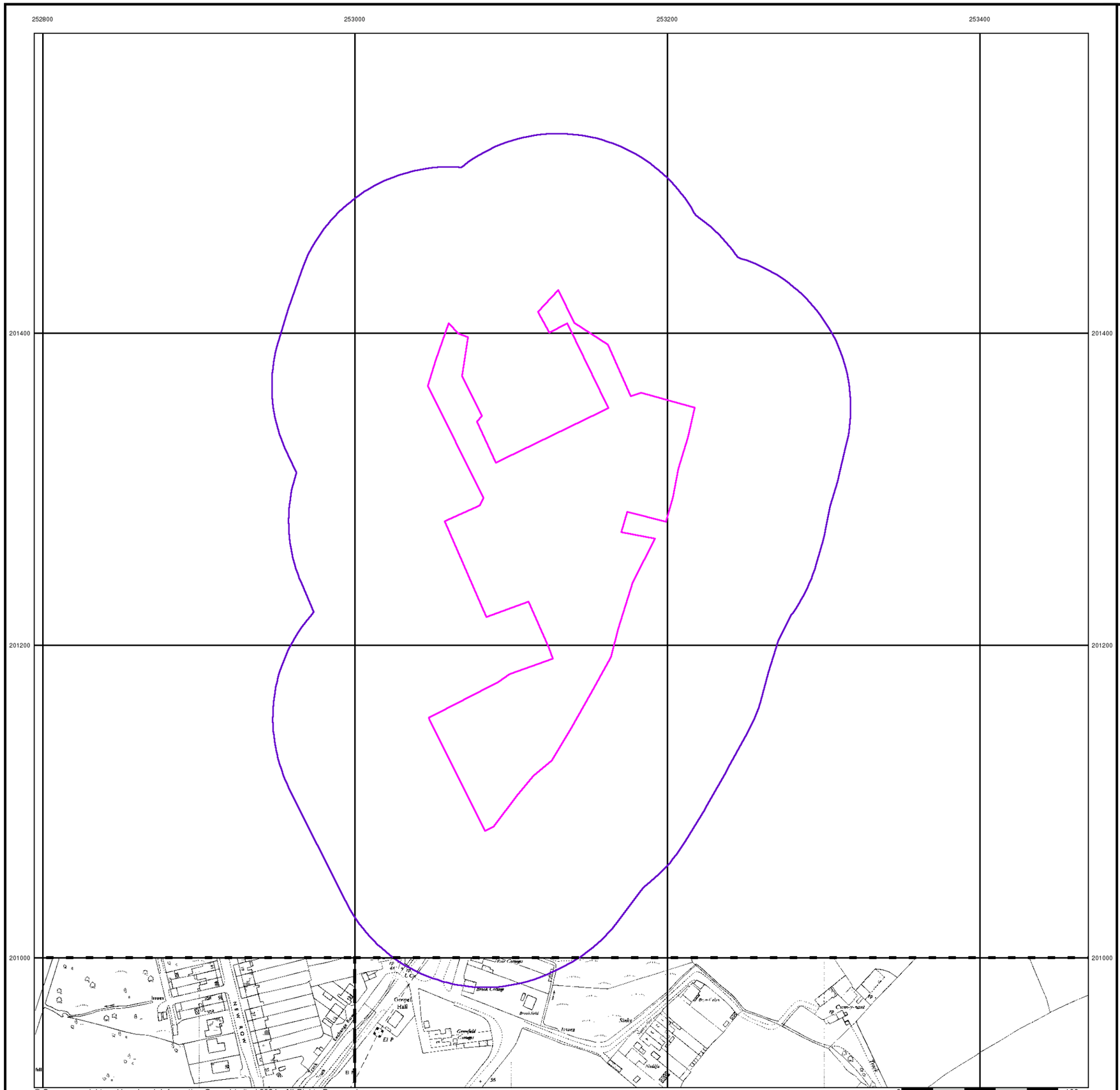
Order Details

Order Number:	346449928_1_1
Customer Ref:	14316/LP
National Grid Reference:	253110, 201260
Slice:	A
Site Area (Ha):	2.5
Search Buffer (m):	100

Site Details

Dyfed Steel, Dafen, Llanelli, SA14 8NW

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



Intégral Géotechnique

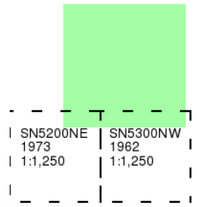
Ordnance Survey Plan

Published 1962 - 1973

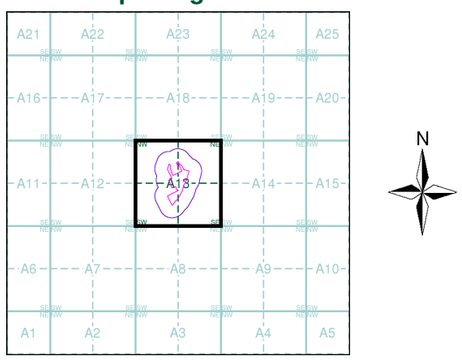
Source map scale - 1:1,250

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	346449928_1_1
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National Grid Reference:	253110, 201260
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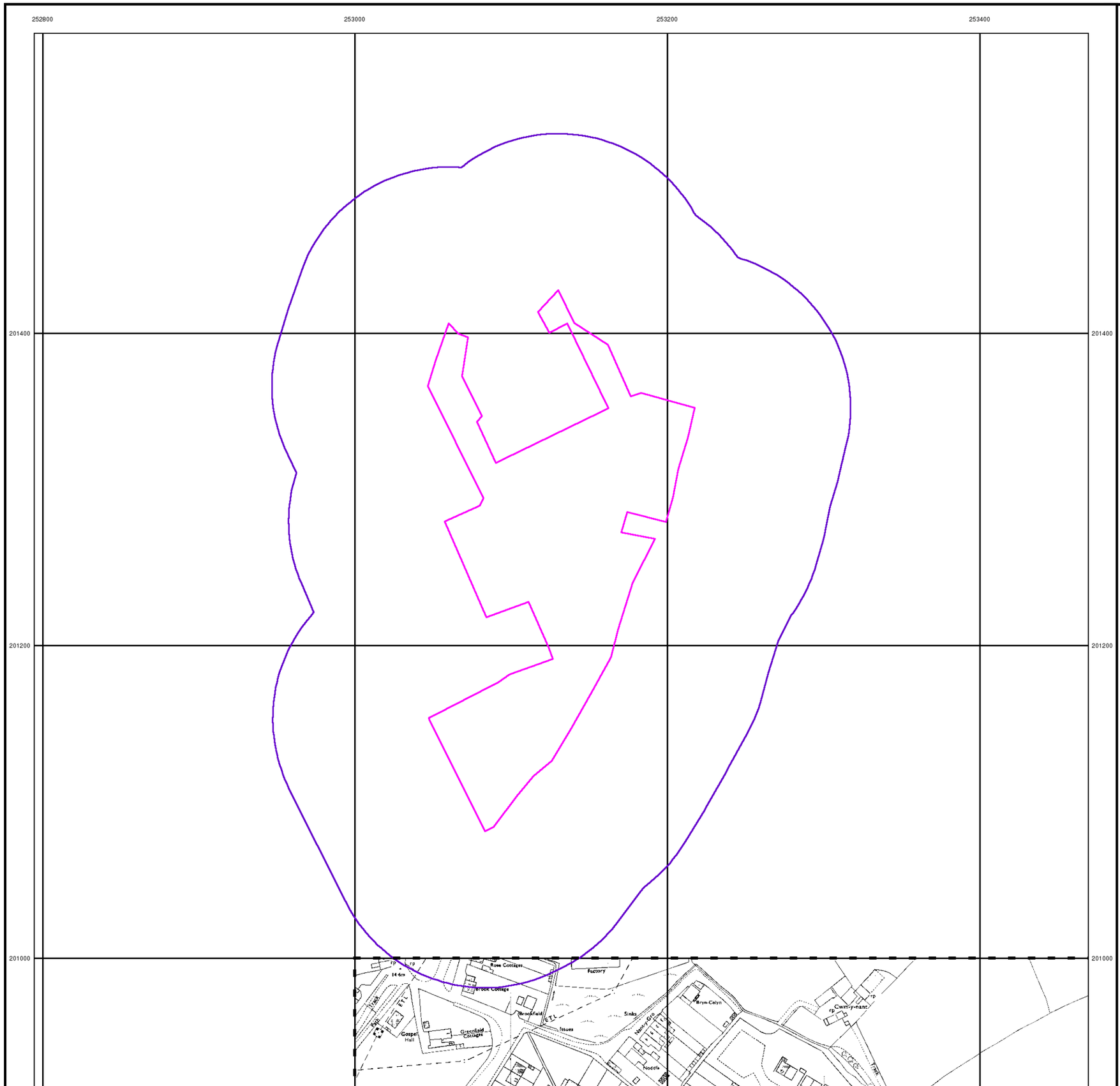


Intégral Géotechnique

Ordnance Survey Plan

Published 1970

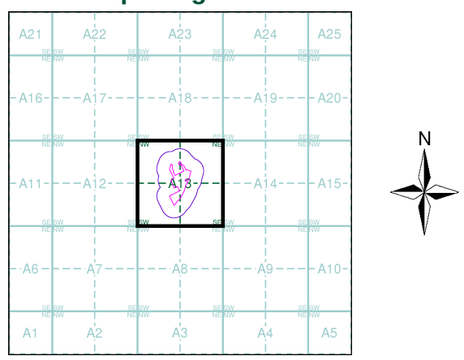
Source map scale - 1:1,250

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 and by 1896 it covered the whole of what were considered to be the cultivated parts of Great Britain. The published date given below 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.

Map Name(s) and Date(s)

SN5300NW
1970
1:1,250

Historical Map - Segment A13



Order Details

Order Number:	346449928_1_1
Customer Ref:	14316/LP
National Grid Reference:	253110, 201260
Slice:	A
Site Area (Ha):	2.5
Search Buffer (m):	100

Site Details

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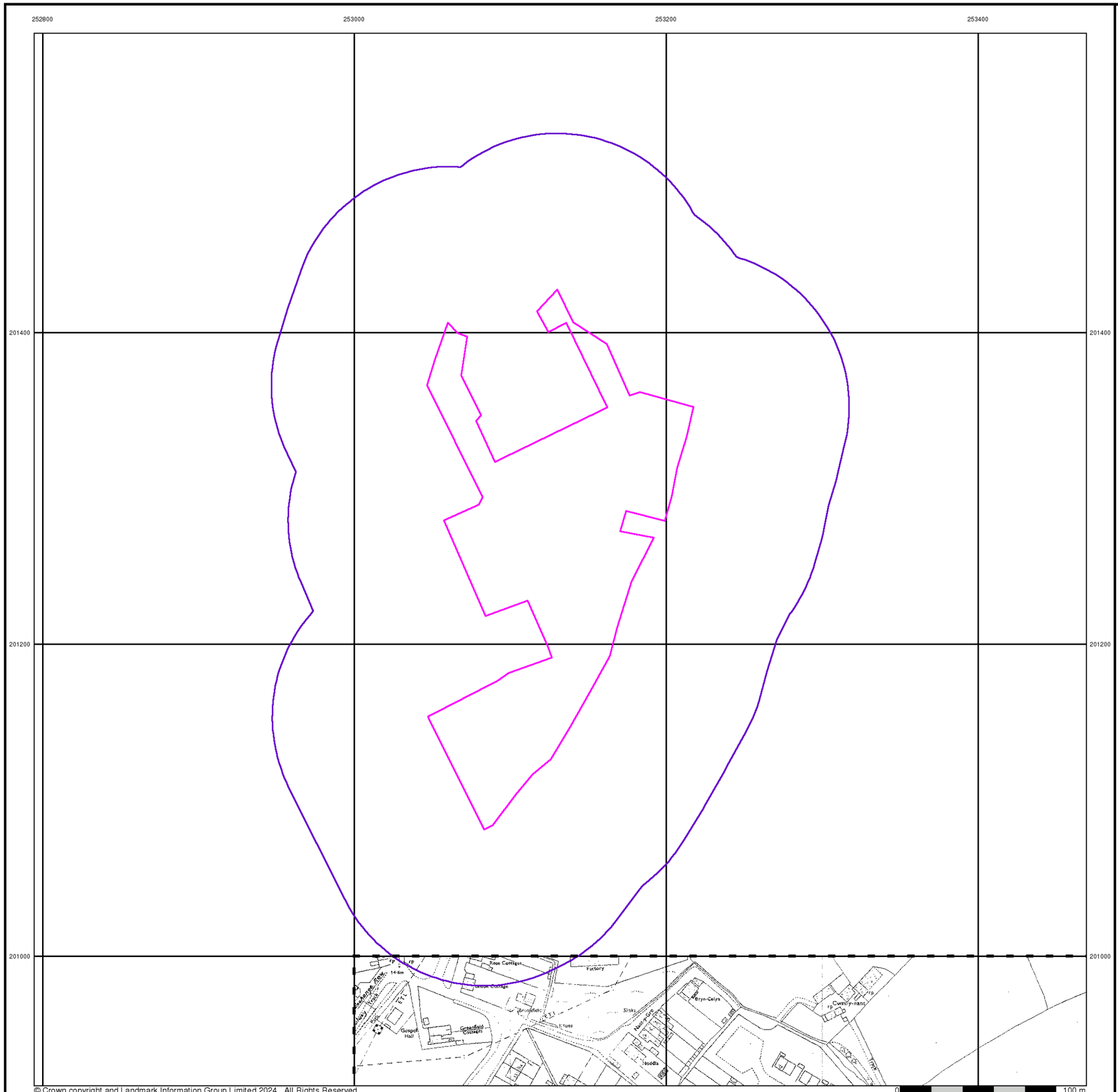


Intégral Géotechnique

Supply of Unpublished Survey Information

Published 1973

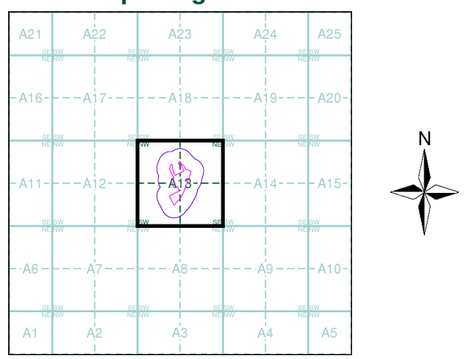
Source map scale - 1:1,250

SUSI maps (Supply of Unpublished Survey Information) were produced between 1972 and 1977, mainly for internal use at Ordnance Survey. These were more of a `work-in-progress' plan as they showed updates of individual areas on a map. These maps were unpublished, and they do not represent a single moment in time. They were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)

SN5300NW
1973
1:1,250

Historical Map - Segment A13



Order Details

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Intégral Géotechnique

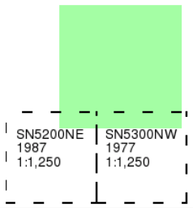
Additional SIMs

Published 1977 - 1987

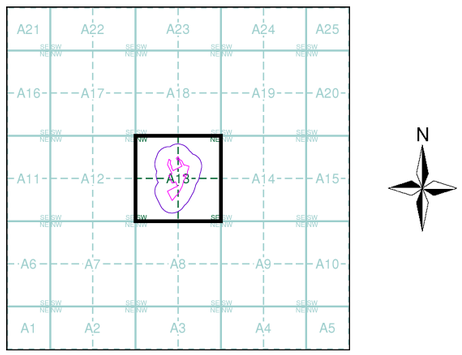
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

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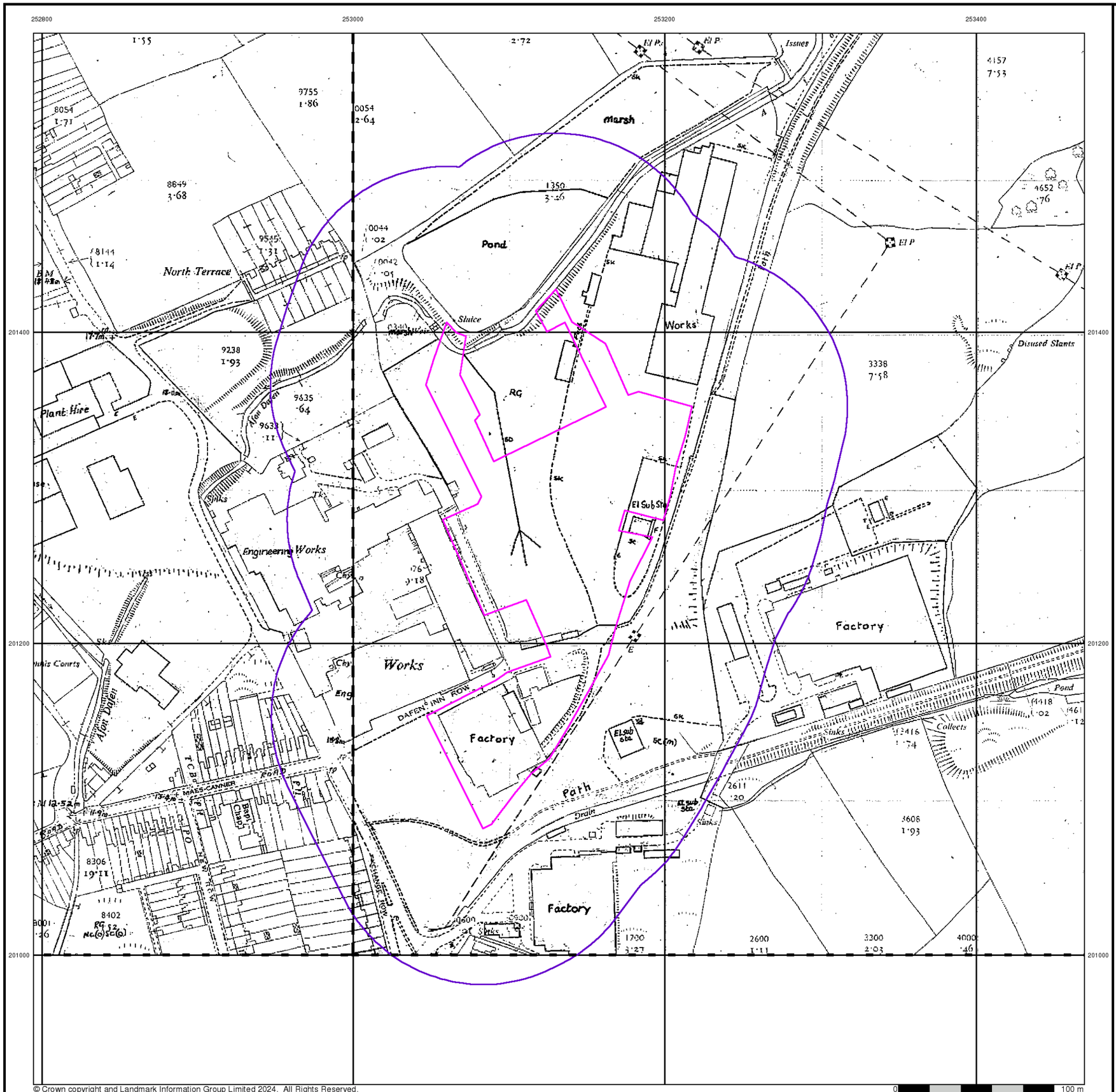


0 100 m

Intégral Géotechnique

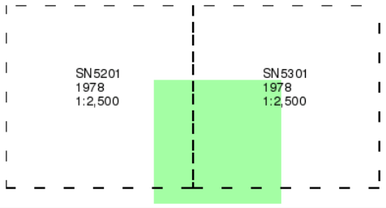
Additional SIMs

Published 1978

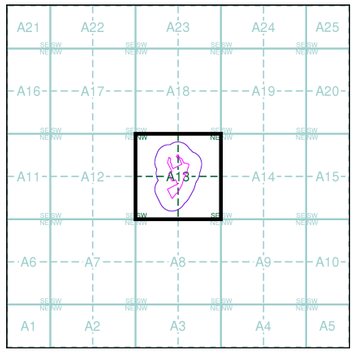
Source map scale - 1:2,500

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	346449928_1_1
Customer Ref:	14316/LP
National Grid Reference:	253110, 201260
Slice:	A
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Search Buffer (m):	100

Site Details

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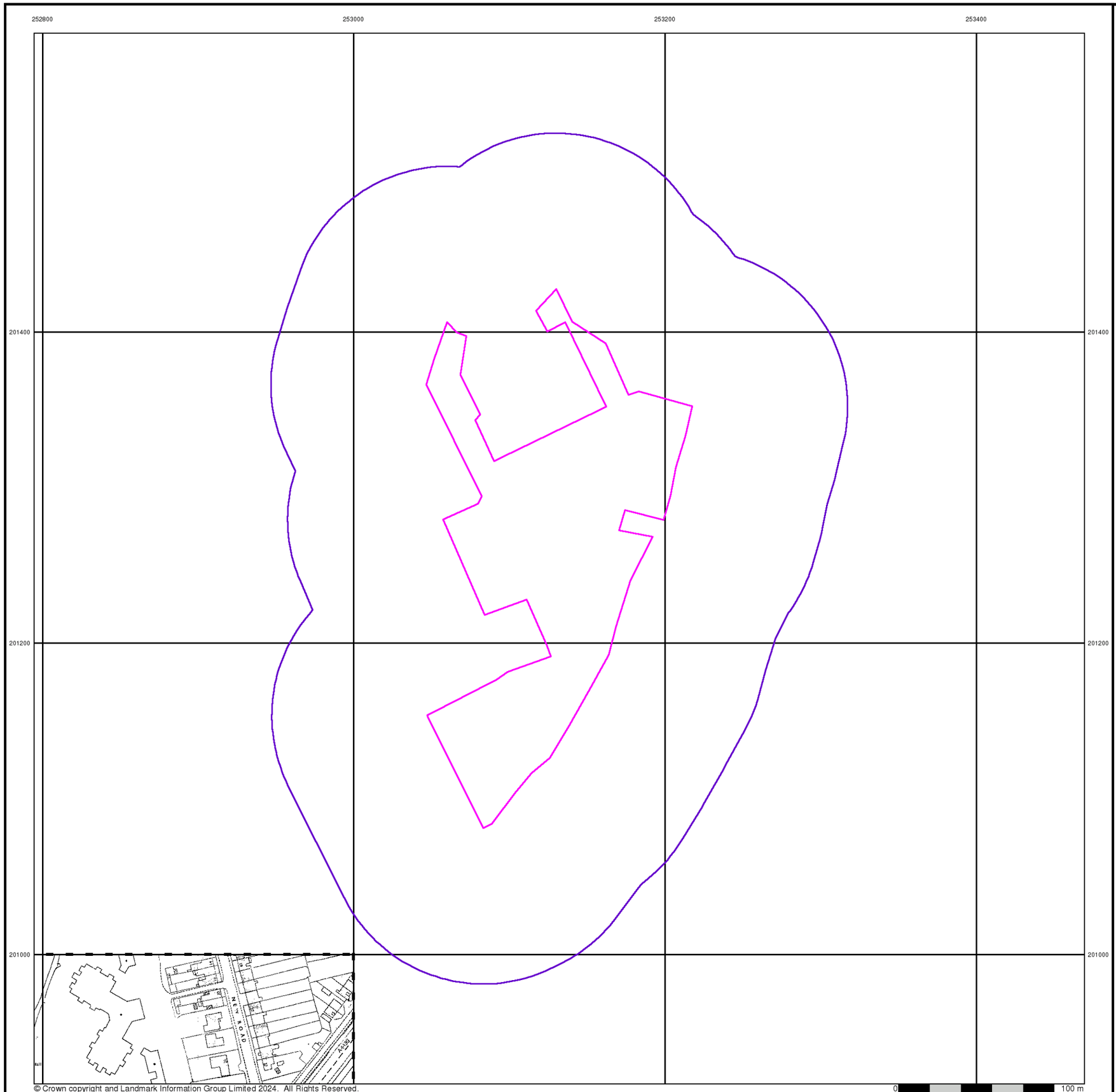


0 100 m

Intégral Géotechnique

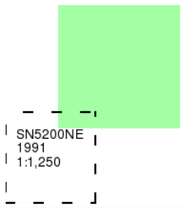
Additional SIMs

Published 1991

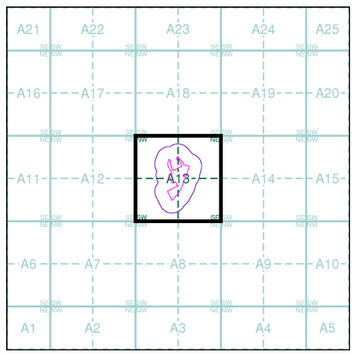
Source map scale - 1:1,250

The SIM cards (Ordnance Survey's `Survey of Information on Microfilm') are further, minor editions of mapping which were produced and published in between the main editions as an area was updated. They date from 1947 to 1994, and contain detailed information on buildings, roads and land-use. These maps were produced at both 1:2,500 and 1:1,250 scales.

Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	346449928_1_1
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National Grid Reference:	253110, 201260
Slice:	A
Site Area (Ha):	2.5
Search Buffer (m):	100

Site Details

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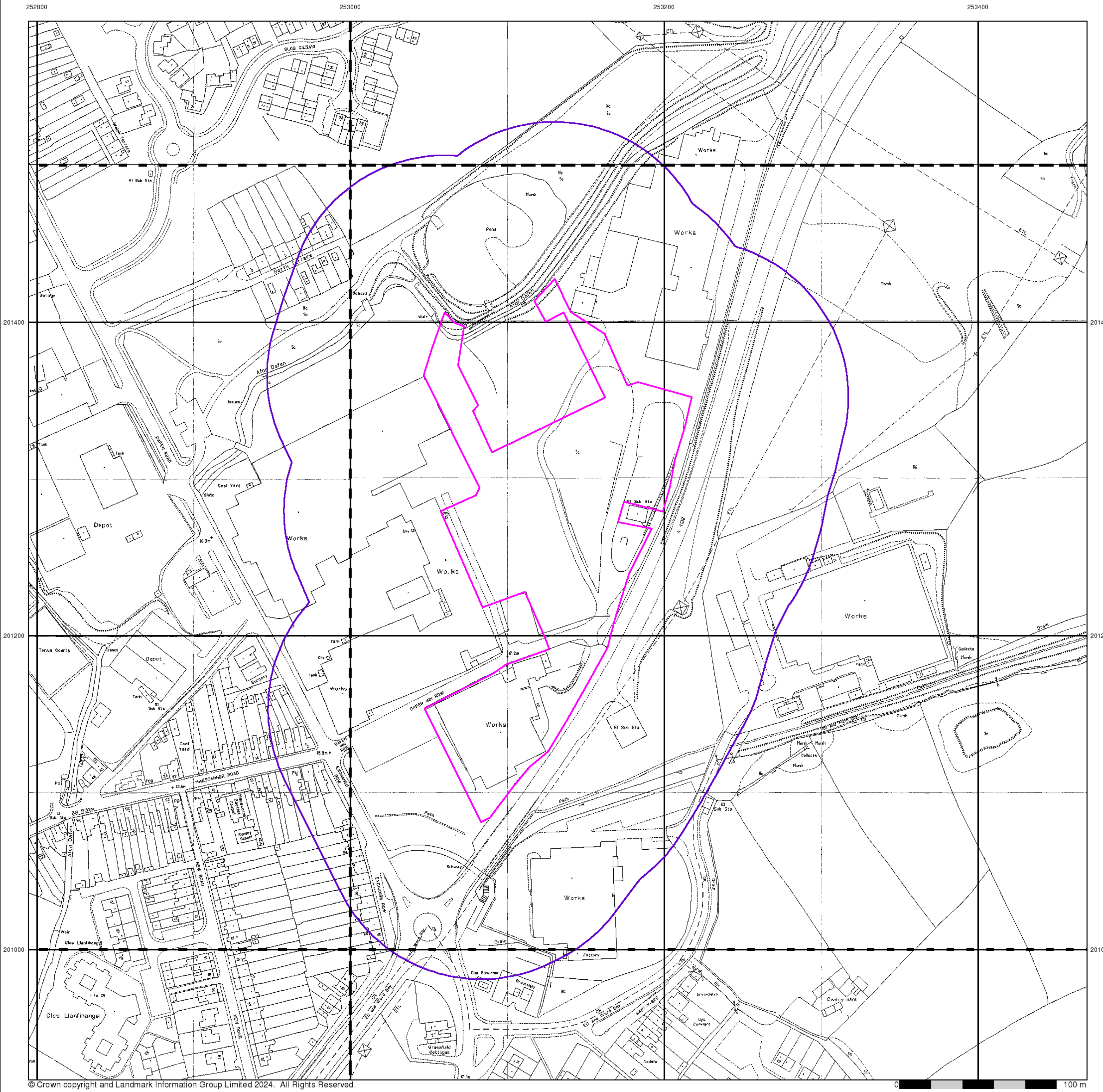
Intégral Géotechnique

Large-Scale National Grid Data

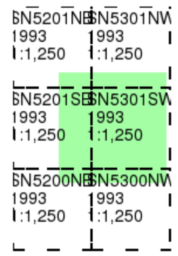
Published 1993

Source map scale - 1:1,250

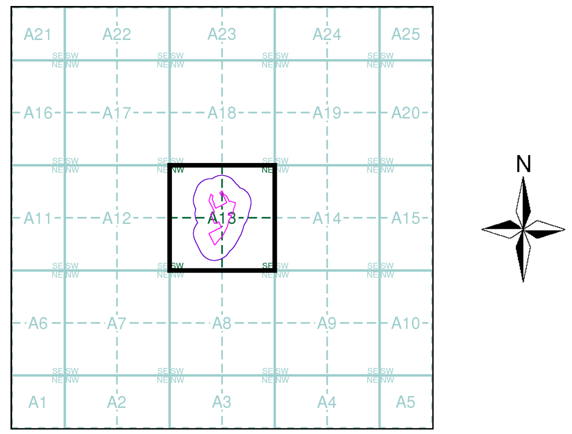
'Large Scale National Grid Data' superseded SIM cards (Ordnance Survey's 'Survey of Information on Microfilm') in 1992, and continued to be produced until 1999. These maps were the fore-runners of digital mapping and so provide detailed information on houses and roads, but tend to show less topographic features such as vegetation. These maps were produced at both 1:2,500 and 1:1,250 scales.



Map Name(s) and Date(s)



Historical Map - Segment A13



Order Details

Order Number:	346449928_1_1
Customer Ref:	14316/LP
National Grid Reference:	253110, 201260
Slice:	A
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Site Details

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Intégral Géotechnique

Large-Scale National Grid Data

Published 1994

Source map scale - 1:1,250

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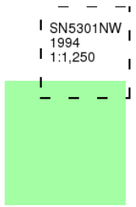
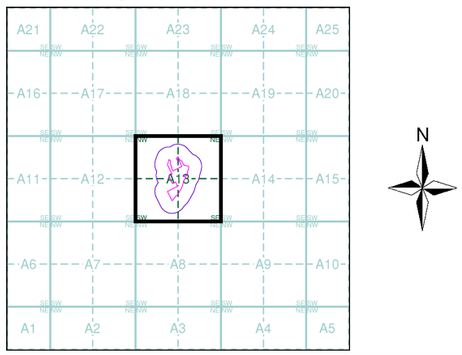


Historical Map - Segment A13



Order Details

Order Number:	346449928_1_1
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Intégral Géotechnique

Large-Scale National Grid Data

Published 1995

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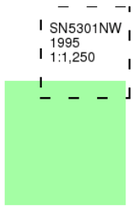
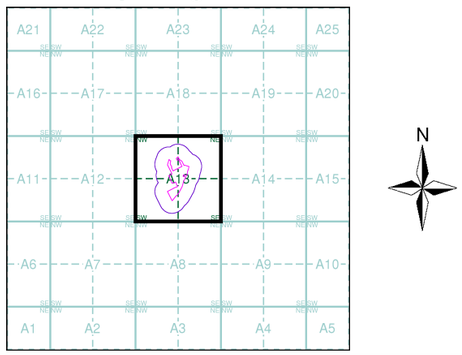


Historical Map - Segment A13



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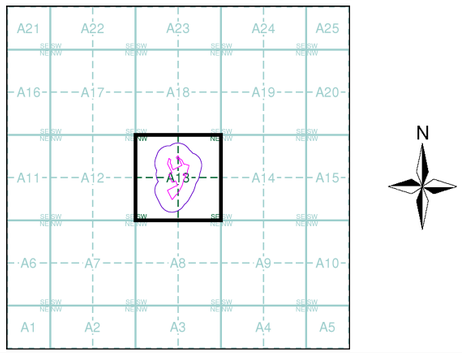
Intégral Géotechnique

Historical Aerial Photography

Published 2001

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 A13



Order Details

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National Grid Reference:	253110, 201260
Slice:	A
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Geology 1:50,000 Maps Legends

Artificial Ground and Landslip

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	LSGR	Landscaped Ground (Undivided)	Artificially Modified Ground	Not Supplied - Holocene
	WGR	Worked Ground (Undivided)	Void	Not Supplied - Holocene
	MGR	Made Ground (Undivided)	Artificial Deposit	Not Supplied - Holocene

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
			Sandstone	
		Faults		
		Rock Segments		

Superficial Geology

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	ALV	Alluvium	Clay, Silt, Sand and Gravel	Not Supplied - Holocene
	TILLD	Till, Devensian	Diamicton	Not Supplied - Devensian
	GFSDD	Glaciofluvial Sheet Deposits, Devensian	Sand and Gravel	Not Supplied - Devensian
	GFICD	Glaciofluvial Ice Contact Deposits, Devensian	Sand and Gravel	Not Supplied - Devensian
	GFDUD	Glaciofluvial Deposits, Devensian	Sand and Gravel	Not Supplied - Devensian
	RSBD	Raised Storm Beach Deposits	Sand and Gravel	Not Supplied - Quaternary

Bedrock and Faults

Map Colour	Lex Code	Rock Name	Rock Type	Min and Max Age
	SW	Swansea Member	Mudstone, Siltstone and Sandstone	Not Supplied - Westphalian
	GDB	Grovesend Formation	Mudstone, Siltstone and Sandstone	Not Supplied - Westphalian
	GDB	Grovesend Formation	Sandstone	Not Supplied - Westphalian
	SW	Swansea Member	Sandstone	Not Supplied - Westphalian
	H	Hughes Member	Mudstone, Siltstone and Sandstone	Not Supplied - Westphalian
	H	Hughes Member	Sandstone	Not Supplied - Westphalian
	BD	Brithdir Member	Sandstone	Not Supplied - Westphalian
	BD	Brithdir Member	Mudstone, Siltstone and	Not Supplied - Westphalian

Intégral Géotechnique

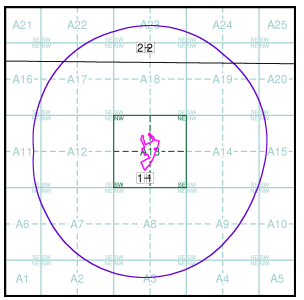
Geology 1:50,000 Maps

This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.
The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

Map ID:	**2**	**Map ID:**	**1**
Map Sheet No:	**230**	**Map Sheet No:**	**247**
Map Name:	**Ammanford**	**Map Name:**	**Swansea**
Map Date:	**1977**	**Map Date:**	**2011**
Bedrock Geology:	**Available**	**Bedrock Geology:**	**Available**
Superficial Geology:	**Available**	**Superficial Geology:**	**Available**
Artificial Geology:	**Available**	**Artificial Geology:**	**Available**
Faults:	**Not Supplied**	**Faults:**	**Not Supplied**
Landslip:	**Available**	**Landslip:**	**Available**
Rock Segments:	**Not Supplied**	**Rock Segments:**	**Not Supplied**

Geology 1:50,000 Maps - Slice A



Order Details:

Order Number:	346449928_1_1
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Site Details:

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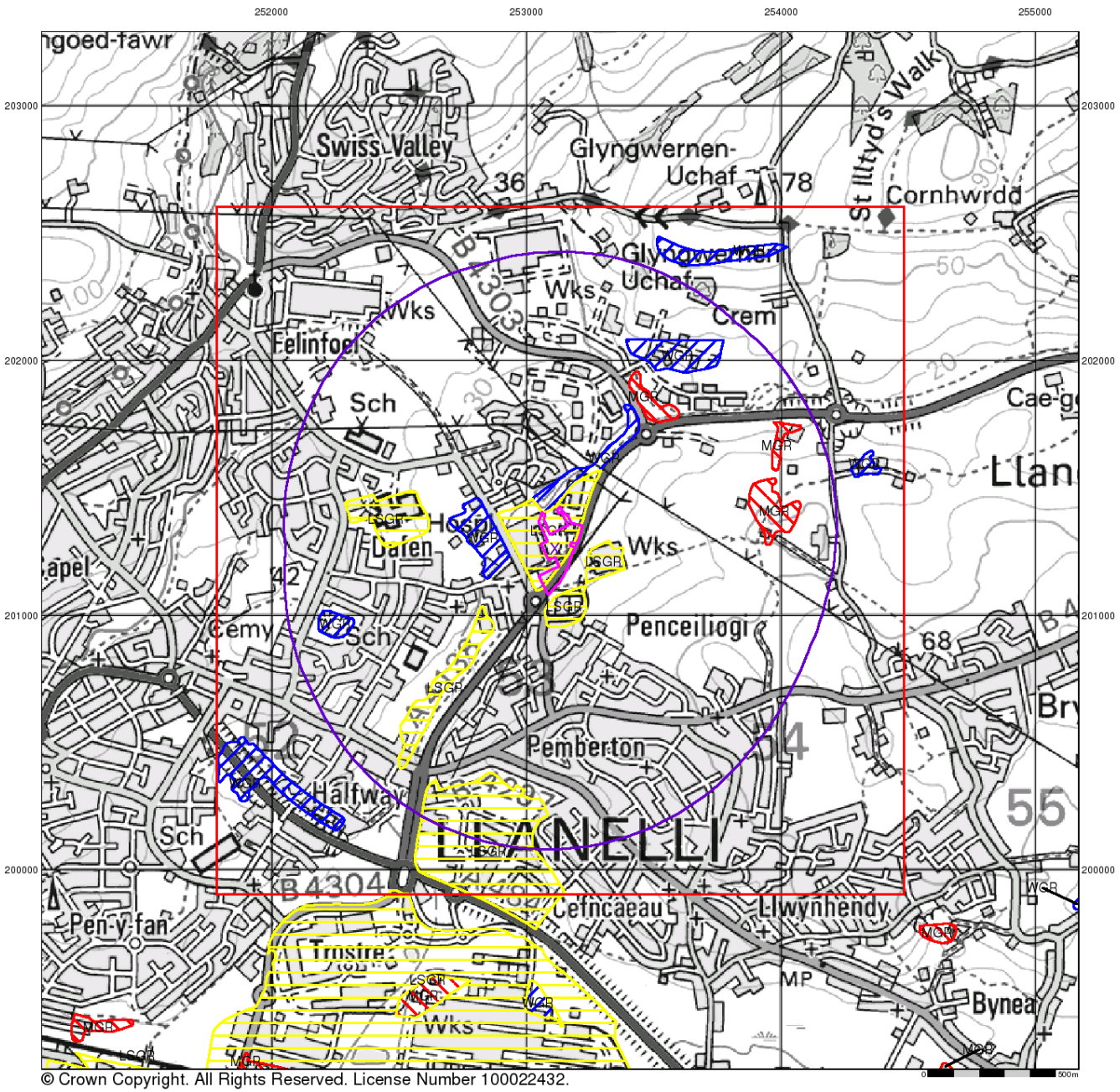


Intégral Géotechnique

Artificial Ground and Landslip

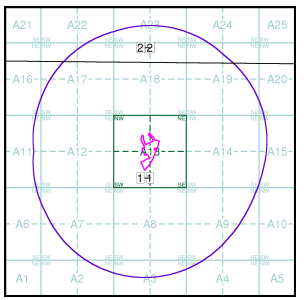
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



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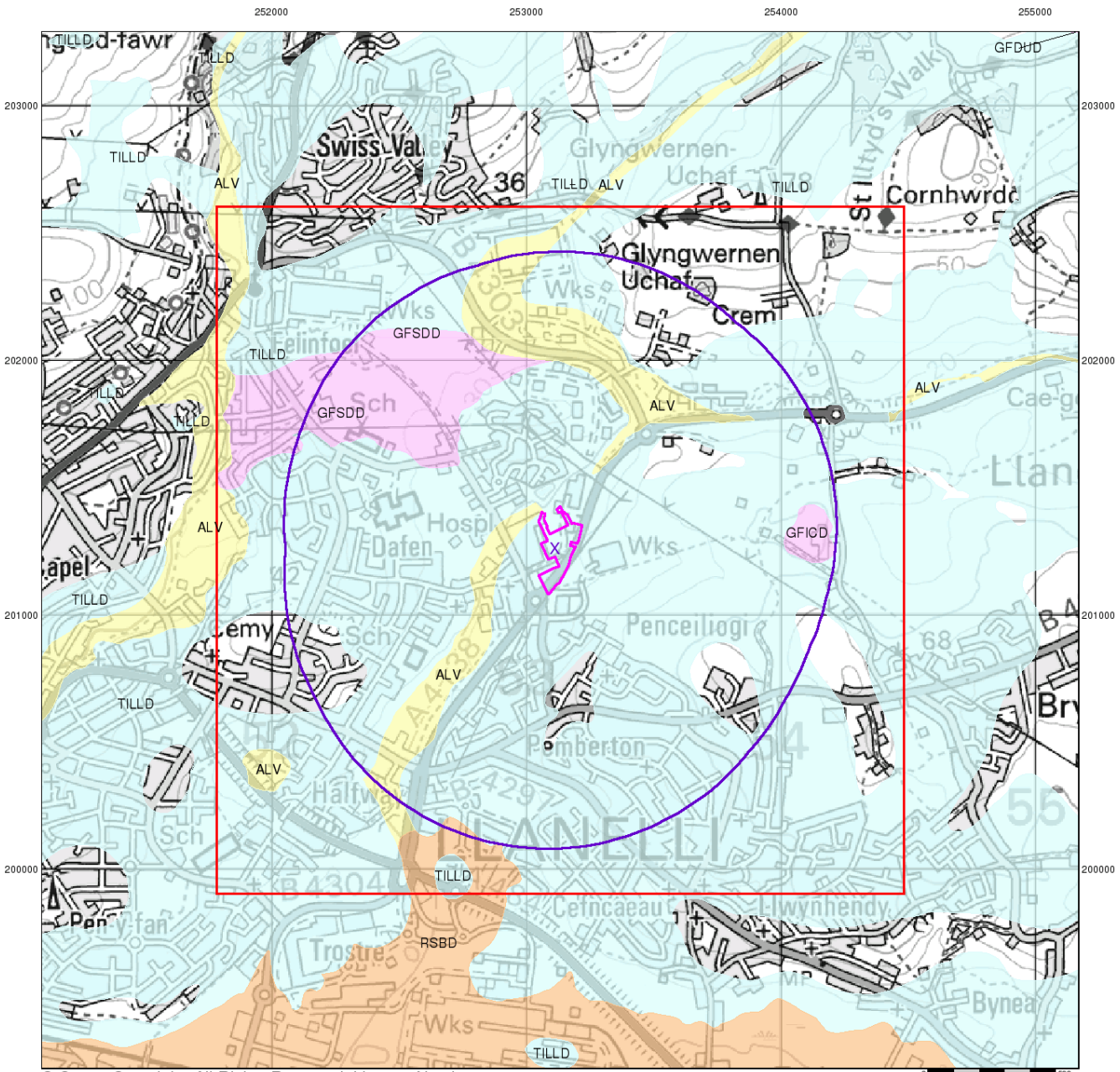
Fax: 0844 844 9951
Web: www.envirocheck.co.uk



Intégral
Géotechnique

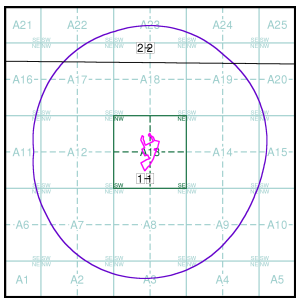
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



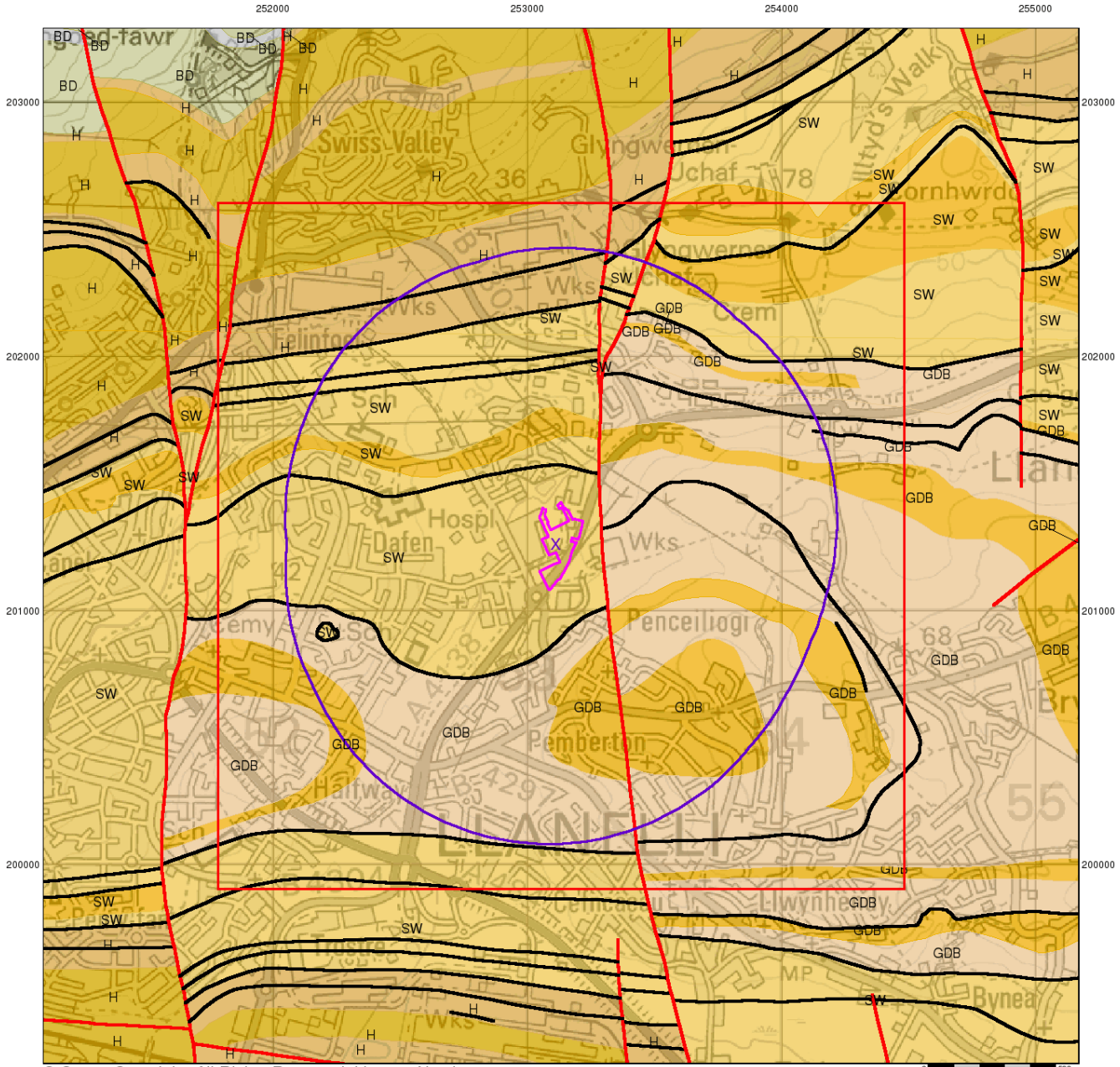
Order Details:

Order Number:	346449928_1_1
Customer Reference:	14316/LP
National Grid Reference:	253110, 201260
Slice:	A
Site Area (Ha):	2.5
Search Buffer (m):	1000

Site Details:

Dyfed Steel, Dafen, Llanelli, SA14 8NW

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



Intégral
Géotechnique

Bedrock and Faults

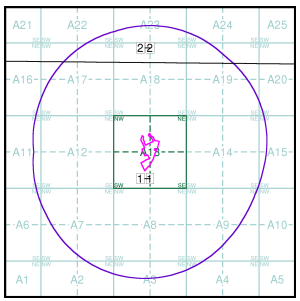
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A



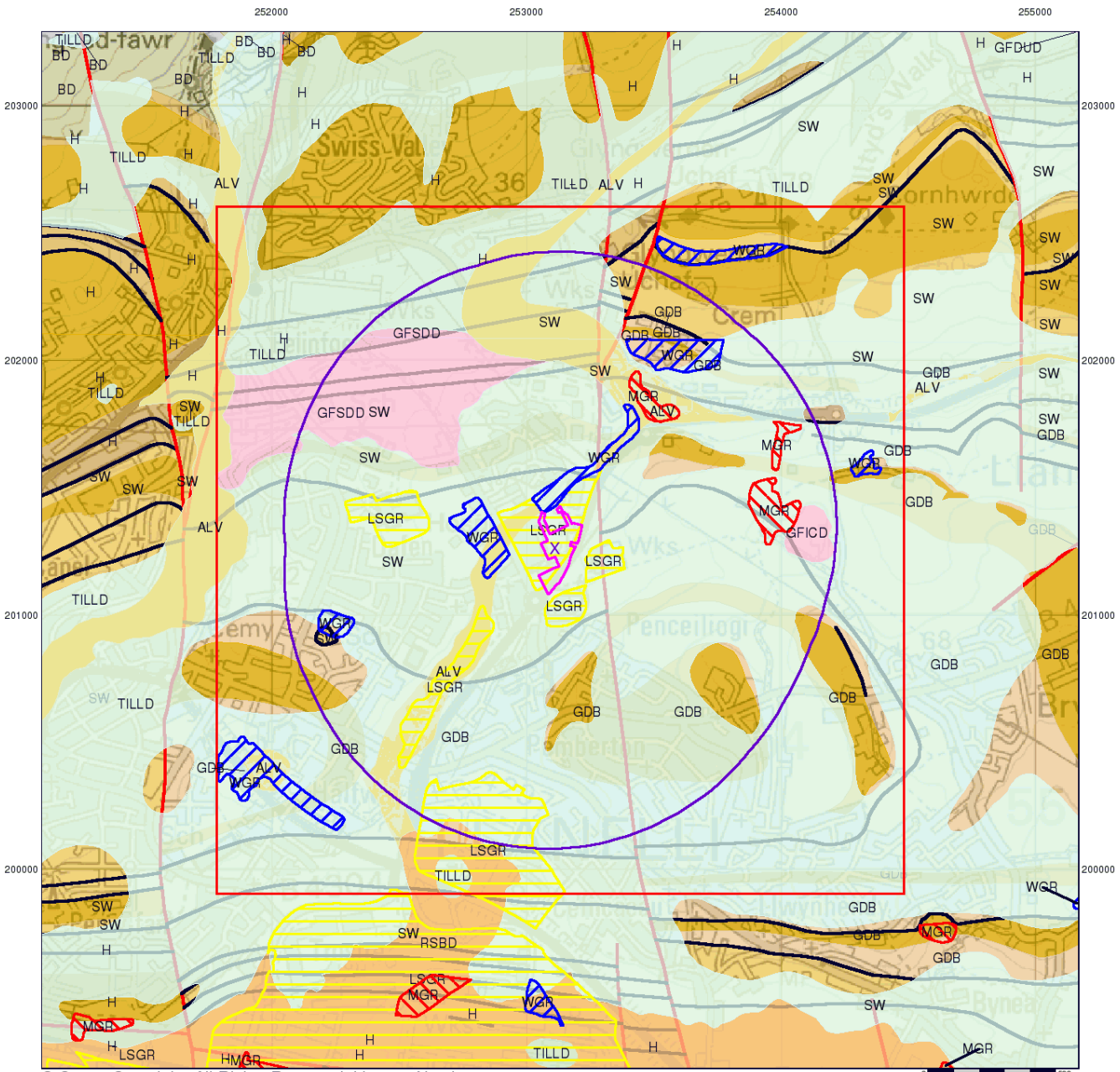
Order Details:

Order Number:	346449928_1_1
Customer Reference:	14316/LP
National Grid Reference:	253110, 201260
Slice:	A
Site Area (Ha):	2.5
Search Buffer (m):	1000

Site Details:

Dyfed Steel, Dafen, Llanelli, SA14 8NW

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



Intégral
Géotechnique

Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

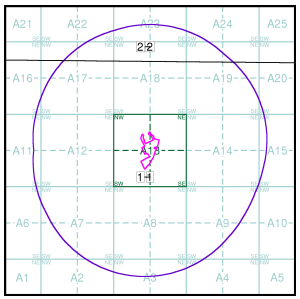
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
Kingsley Dunham Centre
Keyworth
Nottingham
NG12 5GG
Telephone: 0115 936 3143
Fax: 0115 936 3276
email: enquiries@bgs.ac.uk
website: www.bgs.ac.uk

Combined Geology Map - Slice A



Order Details:

Order Number:	346449928_1_1
Customer Reference:	14316/LP
National Grid Reference:	253110, 201260
Slice:	A
Site Area (Ha):	2.5
Search Buffer (m):	1000

Site Details:

Dyfed Steel, Dafen, Llanelli, SA14 8NW

APPENDIX B

CONSULTANTS COAL MINING REPORT FROM THE COAL AUTHORITY

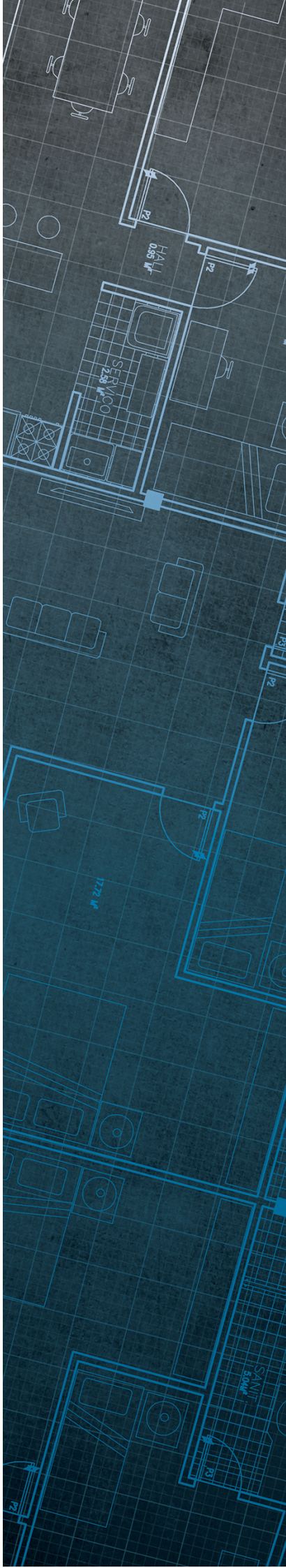
The Coal Authority

Consultants

Coal Mining Report

Dyfed Steel
Dafen
Llanelli
Carmarthenshire
SA14 8NW

Date of enquiry:	**13 May 2024**
Date enquiry received:	**13 May 2024**
Issue date:	**13 May 2024**
Our reference:	**51003424033001**
Your reference:	**14316/LP**



Consultants

Coal Mining Report

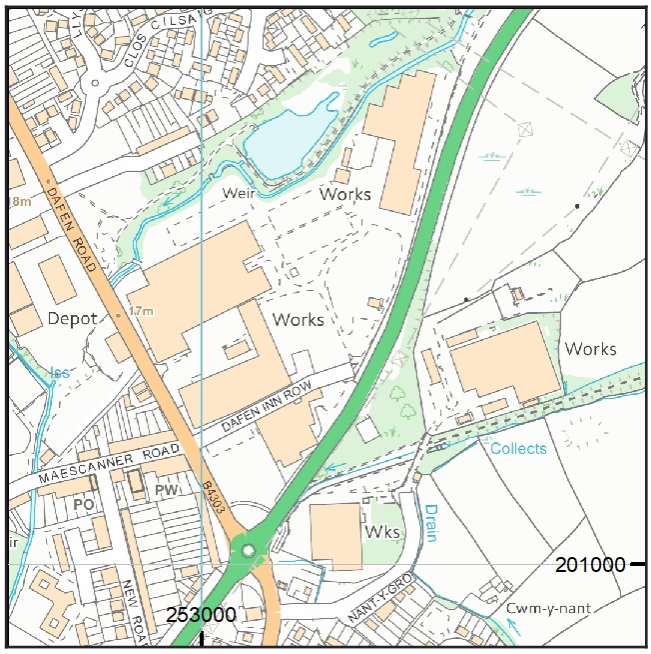
This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

INTEGRAL GEOTECHNIQUE (WALES) LTD.

Enquiry address

Dyfed Steel
Dafen
Llanelli
Carmarthenshire
SA14 8NW



Approximate position of property

How to contact us

0345 762 6848 (UK)
+44 (0)1623 637 000 (International)

200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

www.groundstability.com

@coalauthority
/company/the-coal-authority
/thecoalauthority
/thecoalauthority

Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	UNNAMED	Coal	4I9Z	26	Beneath Property	14.0	South	120	1910
unnamed	UNNAMED	Coal	4IA0	34	Beneath Property	8.1	South	120	1858
unnamed	UNNAMED	Coal	4I9X	39	North	18.4	South	120	1858
unnamed	UNNAMED	Coal	4I9R	134	Beneath Property	14.0	South	110	1860
unnamed	UNNAMED	Coal	4I9S	148	Beneath Property	8.1	South	110	1867
unnamed	UNNAMED	Coal	4OI4	165	South	8.7	South	110	1877
unnamed	SWANSEA NO.3	Coal	4IAA	179	West	14.0	South	61	1877
unnamed	SWANSEA NO.3	Coal	4IAC	185	Beneath Property	8.1	South	61	1877
unnamed	UNNAMED	Coal	4IAD	198	North-West	13.5	South	61	1872
unnamed	SWANSEA NO.3	Coal	4OI2	235	South	8.1	South	61	1892

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Shaft	252201-040	252951 201154	Subsequent to a reported ground collapse this shaft was exposed to a depth of 3m bgl and found to have been filled at some time in the past. The shaft was found to be brick lined and 2m in diameter. Using 6 cu.m of concrete, an inverted cone was cast in situ, measuring 2.5m at the base and 3.5m some 0.75m bgl. The remaining void was backfilled with soils to the	Coal	
Shaft	253201-068	253270 201250		Coal	
Shaft	253201-069	253248 201419		Coal	
Shaft	253201-070	253052 201133		Coal	
Shaft	253201-071	253148 201138		Coal	

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

SWR2173	LPL387	LPL371
SW2668	LPL10	SWR1448
LPL192	5278	SWR2596

Our records show we have more plans than those shown above which could affect the enquiry boundary.

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

No faults, fissures or breaklines recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

Distance to site investigation (m)	Direction
35.5	East

See Section 4 for further information.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31 October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining
None recorded.

Coal mining licensing
None recorded within 200 metres of the enquiry boundary.

Court orders
None recorded.

Section 46 notices
No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices
The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land
The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Future development

If development proposals are being considered, technical advice relating to both the investigation of coal and former coal mines and their treatment should be obtained before beginning work on site. All proposals should apply specialist engineering practice required for former mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or coal mines without first obtaining the permission of the Coal Authority.

MINE GAS: Please note, if there are no recorded instances of mine gas within 500m of the enquiry boundary, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded. Developers should be aware that the investigation of coal seams, mine workings or mine entries may have the potential to generate and/or displace underground gases. Associated risks both to the development site and any neighbouring land or properties should be fully considered when undertaking any ground works. The need for effective measures to prevent gases migrating onto any land or into any properties, either during investigation or remediation work, or after development must also be assessed and properly addressed. In these instances, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

Site investigations

The site is within an area of previous interest. It is close to where the Coal Authority has received information relating to past site investigations.

The site requires further investigation and may influence how you approach your risk assessment.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk.**

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines
Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips
Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations
Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites
Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence
Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas
Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission. Please note, if there are no recorded instances of mine gas reported, this does not mean that mine gas is not present within the vicinity. The Coal Authority Mine Gas data is limited to only those sites where a Mine Gas incident has been recorded.

Mine water treatment schemes
Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining
Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing
Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders
Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices
Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices
Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land
Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.

The Coal Authority

Summary of findings

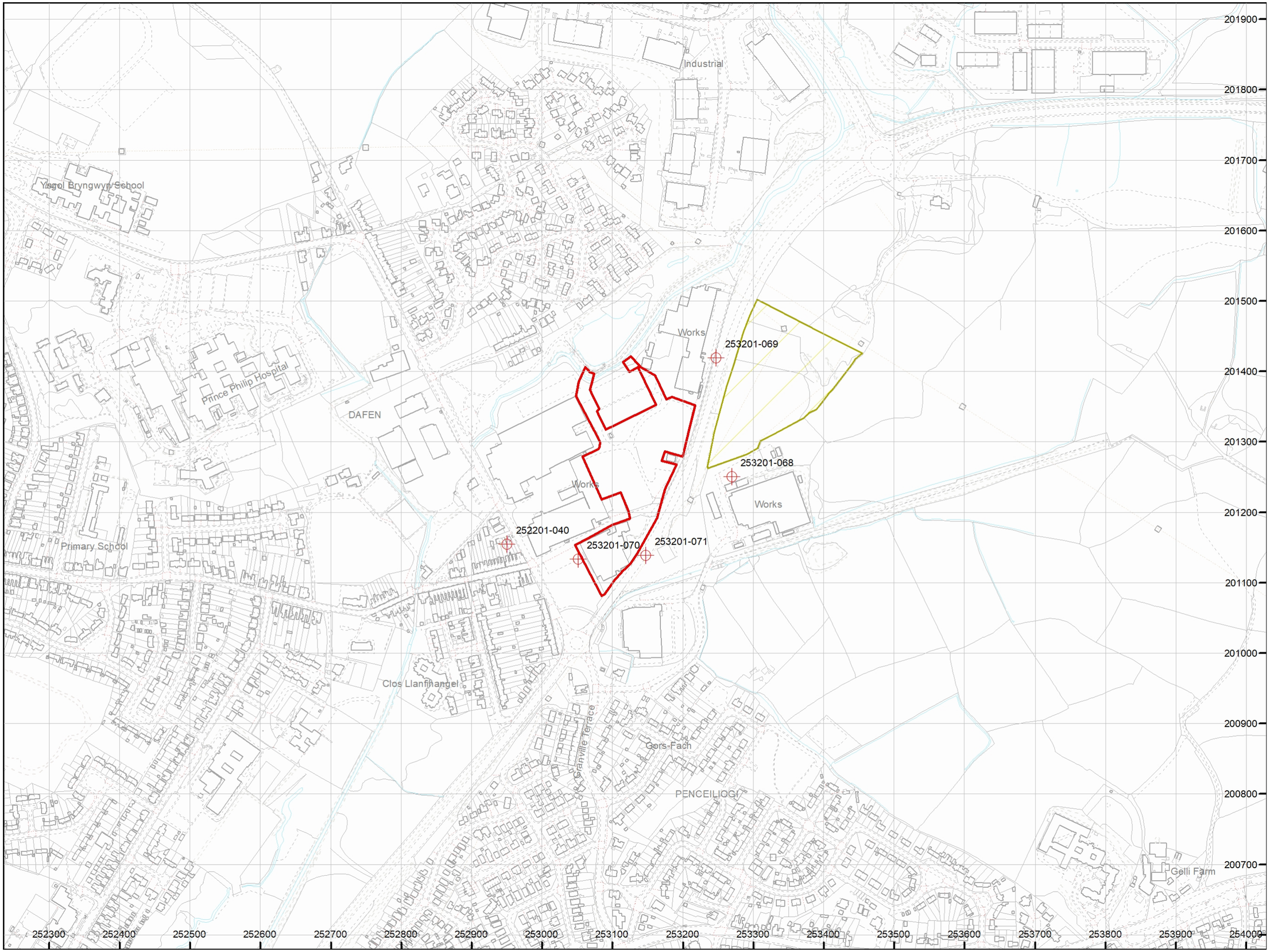
The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

Approximate position of the enquiry boundary shown

Disused mine shaft

Site investigations



How to contact us
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com

FIGURES

NORTH

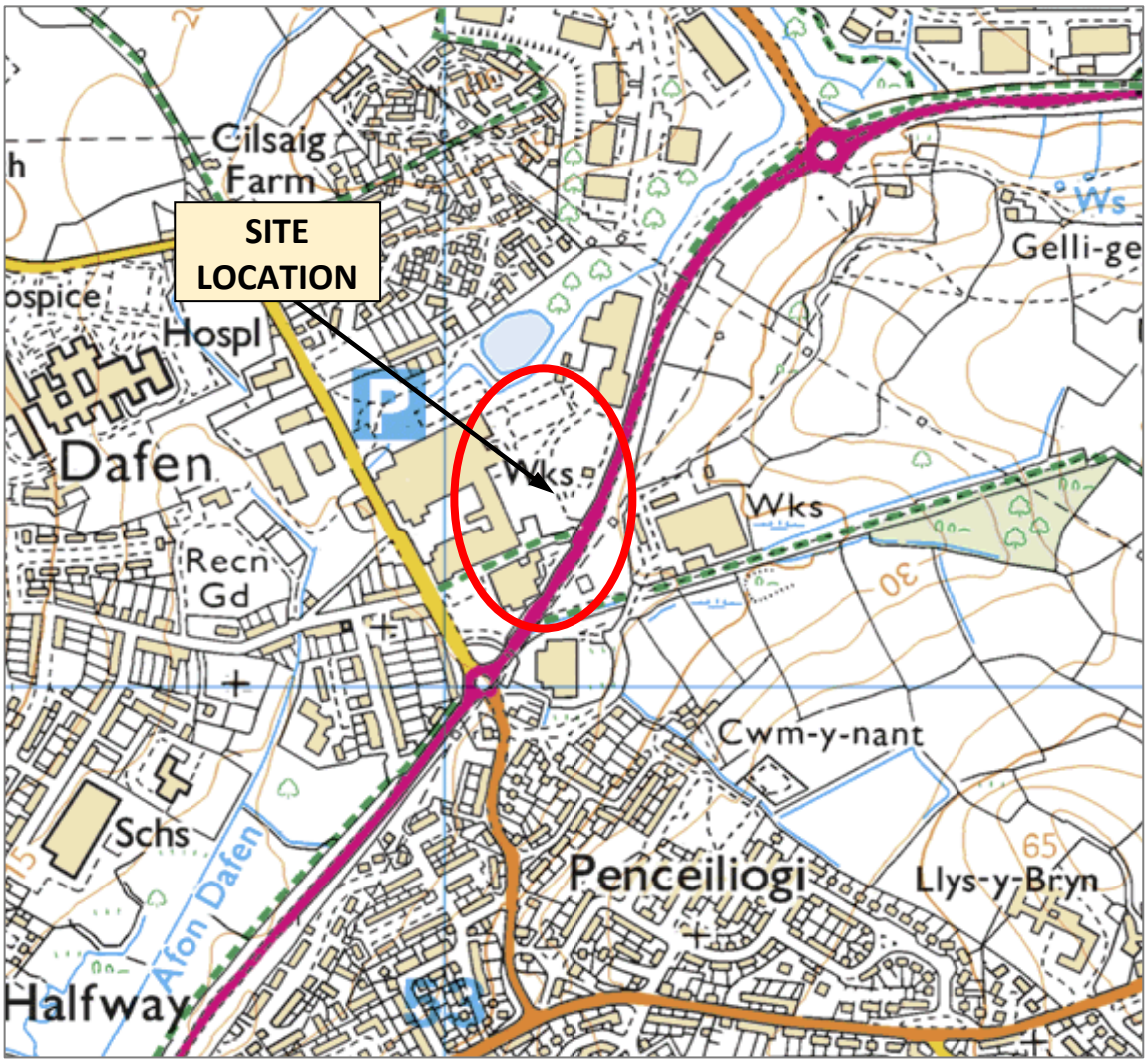
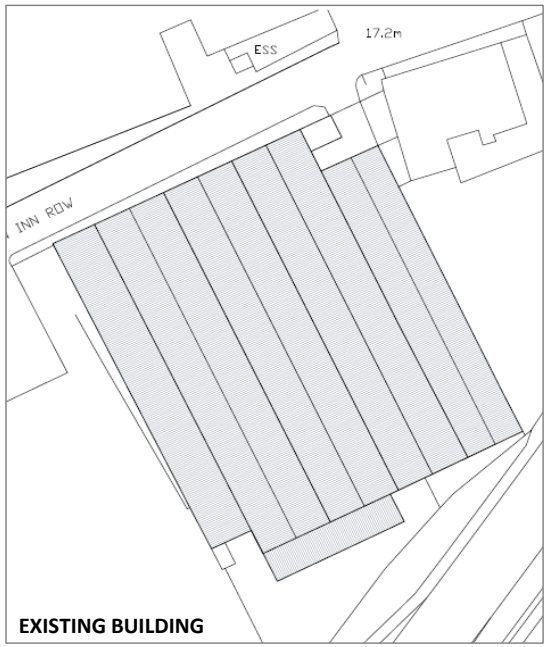


FIGURE 1: SITE LOCATION

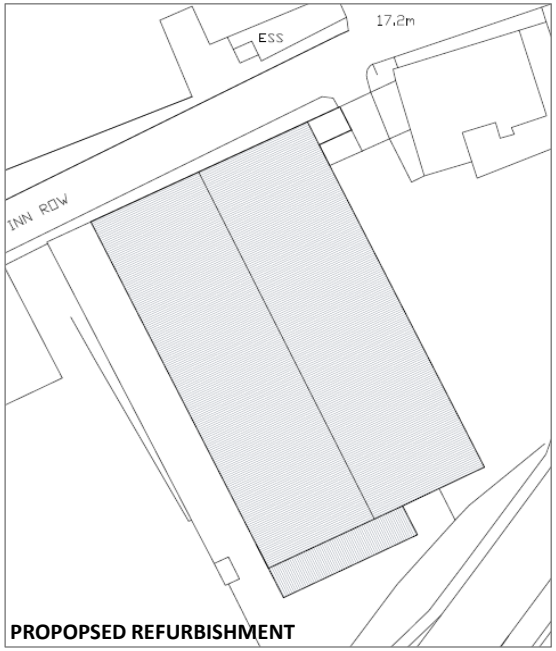
Dyfed Steels, Dafen, Llanelli

Intégral Géotechnique

Intégral House
7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 2080 7991



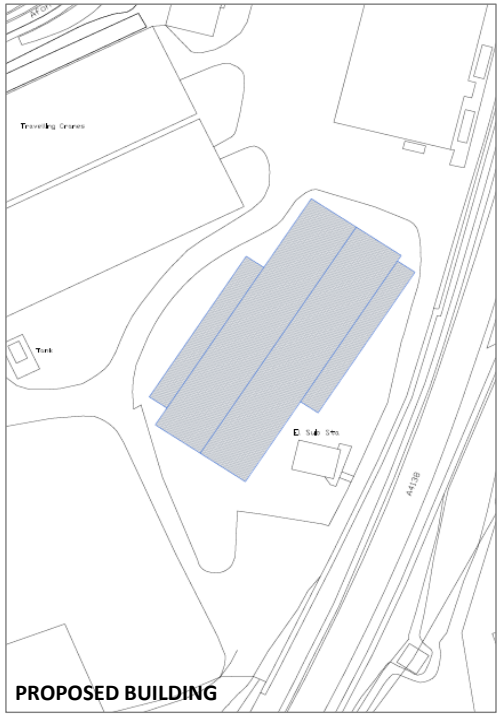
EXISTING BUILDING



PROPOPSED REFURBISHMENT

NORTH

EXISTING SITE AREA



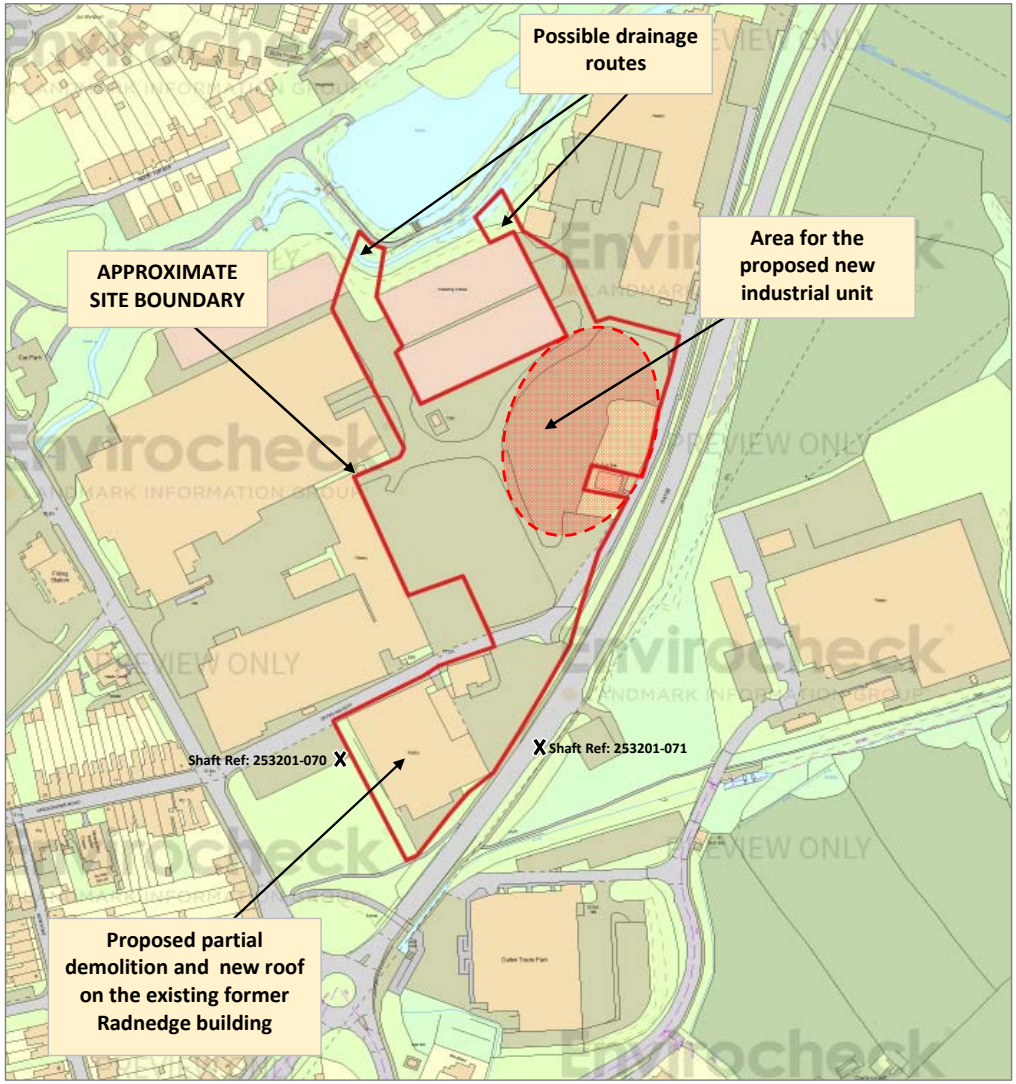
PROPOSED BUILDING

FIGURE 2A: PROPOSED DEVELOPMENT

Dyfed Steels, Dafen, Llanelli

Intégral Géotechnique

Intégral House
7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 2080 7991



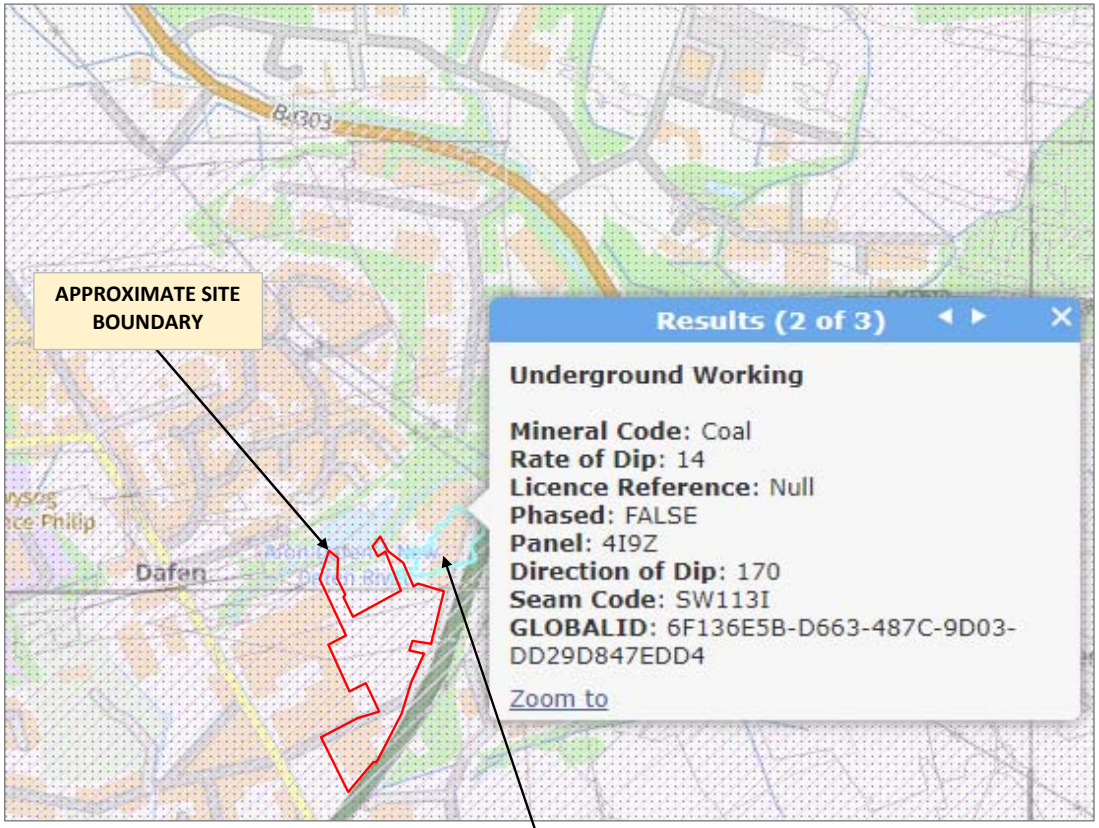
NORTH

FIGURE 2: SITE PLAN

Dyfed Steels, Dafen, Llanelli

Intégral Géotechnique

Intégral House
7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 2080 7991



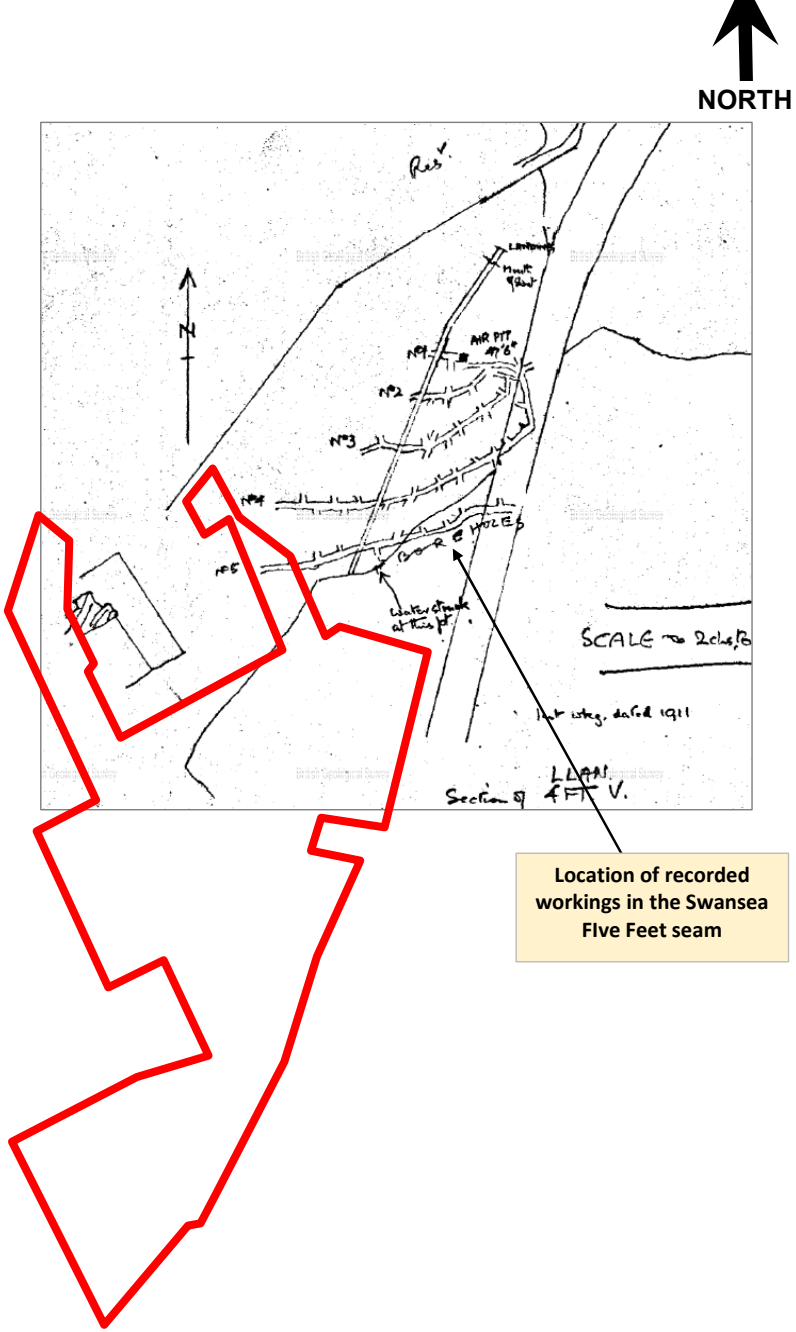
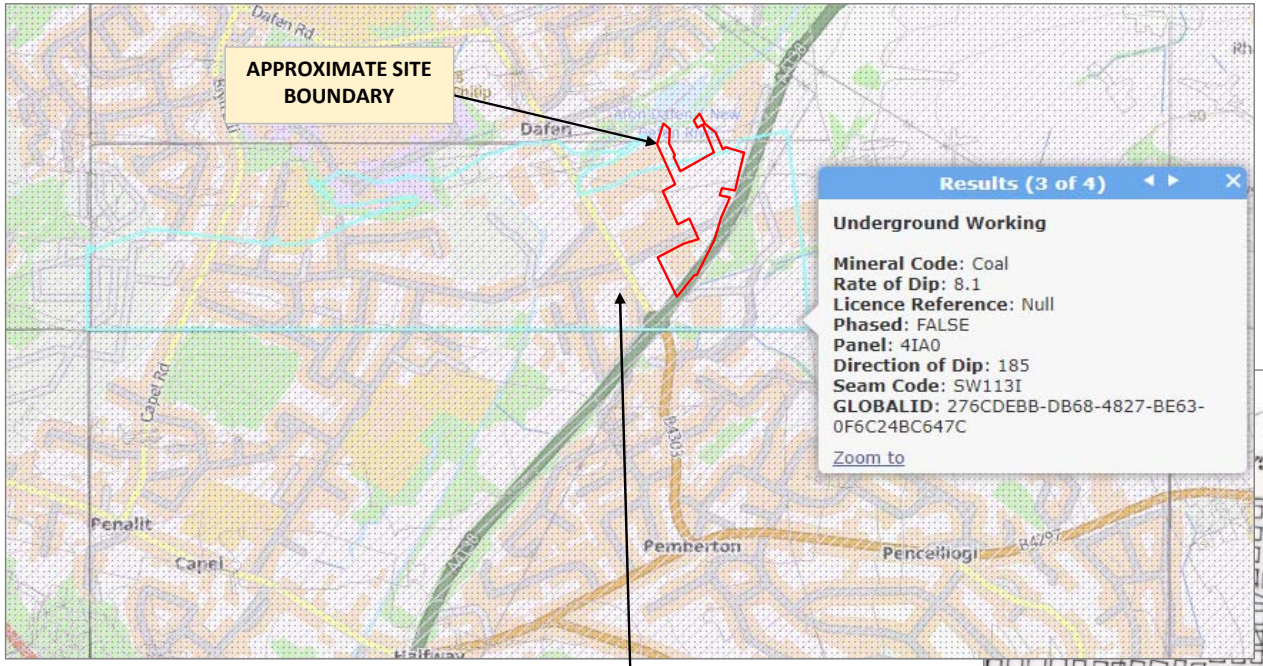


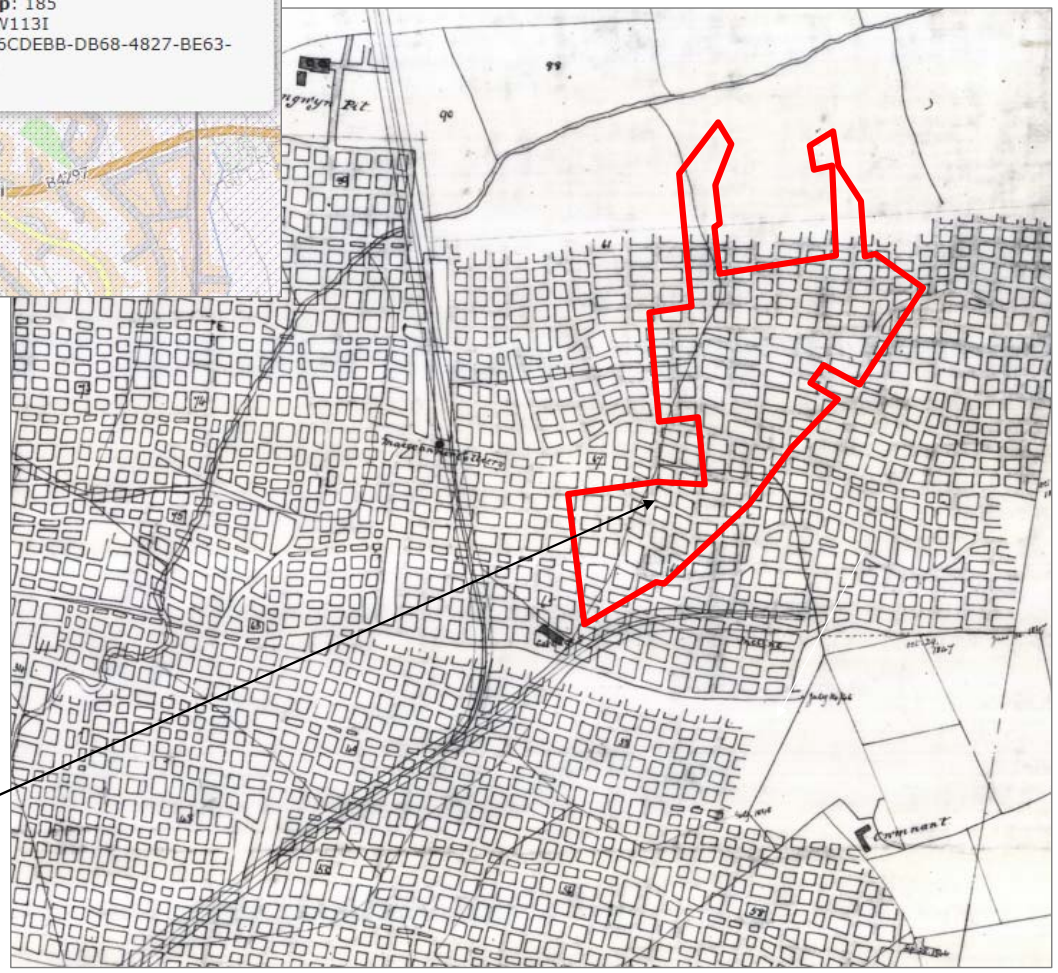
FIGURE 3A: ABANDONMENT PLAN EXTRACT (BGS)

Dyfed Steels, Dafen, Llanelli

Intégral Géotechnique
Intégral House
7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 2080 7991



NORTH



Location of Panel 4IA0 showing recorded workings in the Swansea FIve Feet seam at 34m depth

Location of recorded workings in the Swansea FIve Feet seam

FIGURE 3B: ABANDONMENT PLAN EXTRACT (REF: LPL387)

Dyfed Steels, Dafen, Llanelli

Intégral Géotechnique

Intégral House
7 Beddau Way
Castlegate Business Park
Caerphilly
CF83 2AX
Tel: 029 2080 7991