

**DAVID KELLY LEGACY CAR DISMANTLERS /
SCRAP YARD,
ESCLUSHAM MILL,
LLWYNEINION**

**Stage 1 and 2 Supplementary Contamination
Investigation and
Assessment**

For: The Paletta Pension Scheme

December 2018

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DAVID KELLY LEGACY CAR DISMANTLERS / SCRAP YARD, ESCLUSHAM MILL, LLWYNEINION

STAGE 1 & 2 SUPPLEMENTARY CONTAMINATION INVESTIGATION & ASSESSMENT

December 2018

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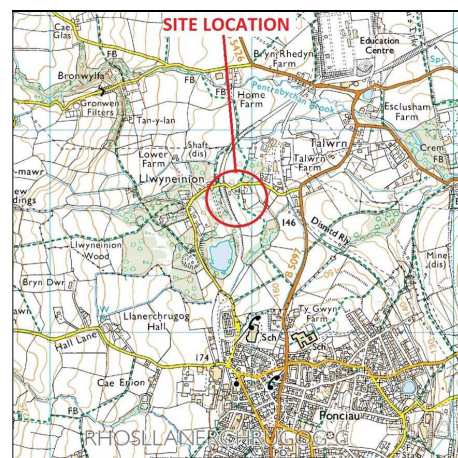
1. Introduction

- 1.1. The Paletta Pension Scheme (PPS), instructed Smith Grant LLP (SGP) to undertake a Stage 1 and 2 Contamination Investigation and Assessment of the former David Kelly Legacy Car Dismantlers / Scrap Yard located at Esclusham Mill on Llwyneinion Road, Rhosllanerchrugog in 2015 (Report R2122-R01 September 2015). Additional works were undertaken in 2018 to further assess risks to future development from internal and external hazardous ground gas sources (R2499-L20180215 Ground Gas RA (Final)), and to assess ground conditions and soil contamination status to the south of the original investigation area which is now under consideration for an extension to the original scheme.
- 1.2. The assessment has been undertaken to determine any potential liabilities and constraints with regard to contamination and ground conditions associated with the historical use of the site and surrounding land that may impact future residential redevelopment of the site. Site details are:

Table 1.1: Site Details

Address	Former David Kelly Legacy Car Dismantlers / Scrap Yard, Esclusham Mill, Llwyneinion Road, Rhosllanerchrugog, LL14 1TN.
National Grid Reference	328950 347650
Local Authority	Wrexham County Borough Council (WCBC)
Site Area	~1.2ha
Current Use of Site	former car dismantlers & scrap yard; cleared of all vehicles and scrap at time of SGP investigations other than single residual building
Proposed Use	demolition of existing property; residential development (7 units) with gardens and associated infrastructure; additional outbuilding and external area of hardstanding; new garage and garden area to adjoining Bush House

Figure 1.1: Site Location



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- 1.3. This report describes the combined Stage 1 and 2 Contamination Investigation and Assessment undertaken by SGP in accordance with the brief agreed with the client. The aim of the investigation was to determine the ground conditions at the site with respect to ground contamination. The assessment methodology follows the framework described in the EA / DEFRA Contaminated Land Report 11: 'Model Procedures for the Management of Land Contamination' 2004.
- 1.4. The previous study (2015) comprised a review of readily available information on the environmental setting of the site, a review of the site's previous and current uses with respect to potential risks to the environment or human health; a preliminary site inspection; an intrusive investigation comprising the excavation of trial pits and cable percussion boreholes; the collection of soil samples; and groundwater and gas monitoring. The associated report contains a qualitative and quantitative risk assessment and where appropriate makes recommendations for further intrusive investigations and remedial actions appropriate to the future use of the site.
- 1.5. The supplementary investigation comprised the excavation of trial pits, the collection of samples and consequent laboratory testing in order to update the findings of the previous investigation.

2. Information Sources

2.1. The principle sources of information consulted in the preparation of this report include:

Table 2.1: Information Sources

date and reference	author and source	purpose and information content
Topography, geology, hydrogeology and hydrology		
Sheet 121: Wrexham SOLID and DRIFT	British Geological Survey	distribution of geological units at surface including drift and artificial deposits, faults and mineral outcrops
Explorer 256: Wrexham & Llangollen Map	Ordnance Survey	topography, water courses and public rights of way
May 2015, BGS Geo Index	British Geological Survey	general mapping information including location of borehole and water well records
Satellite imagery	various	site setting
HPA-RPD-033	Radon Atlas of England and Wales	mapping defining radon affected areas in England & Wales
BRE 211	Radon: Guidance on Protective Measures for New Buildings, 2007	mapping identifying required radon protective measures in England & Wales
51000908546001, dated 23 rd June 2015	The Coal Authority	ground stability information, including mining and ground hazards
Historical data		
satellite imagery	various	recent historical features (2000 onwards)
67639020_1_1, dated 18 th May	Envirocheck: Landmark Information Group	historical mapping at 1:2,500, 1:10,000, and 1:10,560 from 1875 onwards.
Information review		
www.environment-agency.gov.uk; May 2015 ¹	Environment Agency	general information on source protection zones, flood risk zones, pollution hazards, current and historical landfills, water quality information
www.magic.gov.uk; May 2015	DEFRA	web-based interactive map containing information on nature conservation areas

Note 1: Environmental Agency Wales (EAW) now within Natural Resources Wales (NRW); at the time of preparation of the report background information on landfills, aquifers, water resources etc for the Wales region continued to be provided on Environment Agency (EA) website

2.2. Site Inspection

2.2.1. A site inspection was undertaken by B Harvey, Senior Consultant, on 28 April 2015 concurrently with the site investigation. The second site inspection was undertaken by B Thomas, Partner, and C Salwa, consultant, on 15 November 2018 concurrently with the site investigation.

2.3. Previous Investigations

2.3.1. The area surrounding the site has been subject to a long history of mineral extraction and waste disposal activities. A number of desk studies and intrusive investigations have been undertaken on the nearby land by WCBC in undertaking its duties with regards to Contaminated Land under Part 2A of the Environmental Protection Act 1990. The location of the site of interest in relation to other sites considered by WCBC is provided in Drawings D01 and D02. In undertaking the investigation and assessment of the site SGP has reviewed the following reports regarding these nearby sites which are available in the public domain:

Table 2.1: Summary of Reports Prepared on the Locality and Referred To

Author & Date	Title & Reference	Description
Entec, 10 April 2007; draft	Part IIA Inspection of Former Cable Tip, Llwyneinion: Desk Study & Limited Sampling Report	desk study; limited surface soil & sediment sampling and analysis (<i>copy of report provided by WCBC does not include plans or chemical analysis results</i>)
AMEC, January 2009	B20(c) Detailed Inspection of Potential Contaminated Land Site under Part IA EPA 1990: Former Cable Tip, Llwyneinion; ref: 5788001554/v2	drilling of window sampler boreholes, cable percussion boreholes, excavation of trial pits, gas and groundwater monitoring, surface water monitoring, soil chemical analysis (<i>copy of report provided by WCBC does not include plans or chemical analysis results</i>)
WYG Environment; August 2011; prepared for WCBC	Cable Tip: Part IIA B20c Investigation and Interpretative Report; A58952_SI_V1	excavation of hand-dug and machine excavated trial pits, rotary drilling and installation of gas / groundwater monitoring wells, gas monitoring, groundwater and surface water monitoring, Part IIA assessment
WYG Environment; March 2011; prepared for WCBC	Monsanto Chemical Waste Tip, Part IIA B20c Investigation and Interpretative Report; A065259-2	excavation of hand-dug and machine excavated trial pits, window sampling and installation of gas / groundwater monitoring wells, gas monitoring, groundwater and surface water monitoring, Part IIA assessment

Note: A large number of reports have been prepared on the locality; only those considered to be of direct relevance to informing the investigation and assessment of the specific site have been referred to and are detailed above.

3. Development History and Current Status

3.1. Historical Development

3.1.1. A summary of significant features, developments and land uses shown on historical Ordnance Survey maps is provided in Table 3.1 below. The complete set of available historical mapping, as provided by Envirocheck, is provided in Appendix A; copies of selected maps are provided in Drawings R2122-R01 D03-D08.

Table 3.1: Summary of Development History

map	site	surrounds
1873-4, 1:2,500 (see Drawing R2122-R01 D03) 1879, 1:10,560	The site, and surrounding land, is shown as rough ground. The site is crossed by a northwest-southeast trending path; a second north-south trending path runs along the eastern boundary.	The site is mapped as being bound by a field boundary (trees indicated) to the east, and an east-west running track to the north. There are no distinct boundaries to the south or west. A northwest-southeast trending railway line runs 25m to the west of the site; the line terminates 85m northwest of the site alongside a series of building marked as a Tile & Pipe Works. Rough ground lies to the north, southeast, south and east of the site along with a number of buildings and limekilns 110m to the southwest. A number of quarries are marked in the vicinity including 10m to the south / southeast and 72m to the north. A raised mound of 'rough ground' is marked to the immediate north beyond the track; a second mound lies 115m to the northwest. A number of old shafts (coal & iron) are marked in the area including 85m to the southeast, 80m to the southwest and 110m to the west.
1899-1900, 1:2,500; (see Drawing R2122-R01 D04) 1900, 1:10,560	No significant changes identified	Quarry to immediate south is mapped as being wooded. Talwrn Pumping Station (Wrexham Water Works) is mapped to the immediate northeast. Llwyneinion Brick Works, with associated clay pit and tramway, has been developed to the southwest beyond the railway line. The buildings associated with the Tile & Pipe Works to the northwest are no longer present.

1912, 1:2,500 (see Drawing R2122-R01 D05) 1914, 10,560	Track / footpath on eastern boundary now cuts into the eastern part of the site; northwest-southeast track / path no longer marked. A defined boundary (probable wall) is now mapped to the northwest.	Expansion of the Talwrn Pumping Station to the northeast has occurred (now indicated as the Wrexham & Denbighshire Water Co). Additional railway line (Rhos Branch of the G.W.R.) has been constructed in a cutting to the immediate west of the site, forming the western boundary. Llwyneinion Brick Works to the southwest has expanded, as has the associated clay pit.
1938, 1:10,560	Mapping indistinct – no significant changes identified	A single building has been constructed to the northeast. Track extending westwards from the railway line now called Llwyneinion Road.
1953-54, 1:10,560	Mapping indistinct – single building indicated in northwest corner of site	Expansion of clay pit associated with Llwyneinion Brick Works has occurred.
1963, 1:2,500 (see Drawing R2122-R01 D06) 1963-64, 1:10,000	Single rectangular building is mapped in northwest corner of site. Western part of site remains mapped a rough ground; eastern and southern areas marked as part of 'refuse tip' which extends to the south / southeast.	Building to the northeast is marked as 'Bush House'. Talwrn Pumping Station marked as Works; residential & works development has occurred further east. Clay pit to southwest marked as 'refuse tip', as is land further southwest. Residential development has occurred to west and northwest along Llwyneinion Road. Former mineral railway to west has been dismantled.
1974, 1:2,500	No significant changes identified	Railway line to west marked as dismantled.
1978, 1:10,000	No significant changes identified	No significant changes identified
1993, 1:2,500 (see Drawing R2122-R01 D08)	Site marked as scrap yard	'Refuse tip' to southwest marked as 'pond'. No other significant changes identified.
2006, 1:10,000	No significant changes identified	No significant changes identified
2014, 1:10,000	No significant changes identified	No significant changes identified

3.2. Additional Information

- 3.2.1. The site is located within an area that has been associated with industrial use since at least the late 1800's. The site itself is mapped as part of an area of rough ground associated with a nearby Tile and Pipe Works in the late 1800s. Little change is indicated on the site between the late 1800s and mid-1900s other than the appearance of a single building between 1938 and 1953/54. By the early 1960s the site is shown to form part of a larger 'refuse tip' which extended to the south / southeast.

WCBC reports for the area indicate this was a Local Authority landfill. By 1993 the site and adjoining land to the south is mapped as a scrap yard.

- 3.2.2. The land to the southeast, east and further south is referred to by WCBC as 'Llwyneinion Old Refuse Tip No 1' and encompasses the area marked on mapping as a refuse tip on the 1963, 1974 and 1978 OS mapping on the site and adjoining land to south. An area within the Llwyneinion Old Refuse Tip No 1 is referred to by WCBC as the 'Cable Tip'. Demarcation of the boundaries of these sites is unclear but the reports provided by WCBC indicate that the Cable Tip boundary has been defined through discussions with a former foreman who worked at the tip, as external to the site and some distance to the south.
- 3.2.3. The reports suggest the Cable Tip was active for 18-24 months in 1974 / 75 following temporary closure of another local landfill (Llwyneinion Old Refuse Tip No 2; located 18m to the north of the site). Wastes reportedly deposited at the Cable Tip, over the earlier Local Authority waste, include cable waste from BICC (reportedly accounted for 50% of the waste), paint and tins, insecticide, food waste, paper and sawdust, capacitors, soap and resin. Information on the nature of wastes encountered during investigations of the Cable Tip is provided below in Section 4.
- 3.2.4. The wider area has also been subject to extensive mineral extraction and quarrying activities, with subsequent infilling / waste disposal activities as shown on drawings R2122-R01 D01 and R2122-R01 D02. Further information on these sites is presented in Section 4.

3.3. Present Land Condition

Table 3.2: Present Land Condition

Site Description	A single brick 2-storey building (Esclusham Mill) remains in the northwest corner of the site alongside the site access. At the time of the site visit the remainder of the site had been cleared of all structures, scrap vehicles and machinery and tree clearance were on-going offsite to the south.
Access	Site access is gained via a single entrance to the north off Llwyneinion Road.
Boundaries	north: the northern extent of the site is open to the road. A metal palisade fence and gate is present approximately 8m back from the road alongside the mill building controlling access to the main site. northeast: wooden fencing to driveway and gardens of Bush House east: vegetated boundary (trees) with steep drop down to adjacent depot site. south: no clear boundary, former scrapyard area extended beyond the site boundary to the south. west: fencing to former railway cutting
Services / Wayleaves	A public footpath is mapped as running north-south across the eastern part of the site, no evidence of this was noted on site. Plans were obtained in 2015 for BT apparatus, electricity, gas and drainage for the site.

	Overhead electricity lines enter the site from the north to the existing building. No other services are mapped on the Utility provider plans on site although it is presumed the building is served by water and drainage.
Surfaces / Vegetation	Trees located along the western and eastern edges of the site had been recently cleared at the time of the intrusive investigations and the ground reworked to create a plateau area that falls southwest to northeast towards Esclusham Mill, Bush House and the adjacent depot. The site is elevated above the adjoining Bush House property to the northeast and depot site to the east. Beyond the site boundary to the south mature trees and mixed scrub vegetation were present. Soils visible on the site comprised a mixture of sands and colliery spoil (shales). Stockpiled soils were present outside the site boundary to the south of the site comprising a mixture of soils and stones.

3.4. Adequacy of Information

- 3.4.1. Whilst there are gaps in the historical map coverage, and there is limited information of former activities undertaken at the site, it is considered that the available information provides reasonable coverage of the history of the site and immediate surroundings and is adequate to inform intrusive investigation requirements.

4. Site Characterisation

4.1. Topography and Setting

4.1.1. The site is located in an area of mixed land-use with a residential property to the immediate northeast, Bush House, and a transport depot adjoining to the east. An area of wooded land to the southeast extends over part of the former scrap yard. Ground to the southwest and west is also heavily wooded and comprises a former railway cutting, and area of infilled quarries / clay pits etc. The Llwyneinion Acid Tar Lagoon lies 65m to the southwest. To the north, beyond Llwyneinion Road, lies further areas of former infilling.

4.1.2. The site lies at about 160m aod from which ground falls sharply to the east by approximately 3m, and gently to the north by approximately 1m. To the immediate south of the site there is no noticeable change in topography and to the immediate west is a small cutting (formerly a railway) beyond which the land rises slightly again.

4.2. Soils and Geology

Mapped Geology

4.2.1. Published BGS mapping shows the site, and land to the south / southeast, to be underlain by made ground. Superficial deposits are not mapped within the site.

4.2.2. Bedrock is mapped as the Bettisfield Formation (productive Coal Measures) of the Carboniferous Westphalian Period comprising a cyclic sequence of sandstones, mudstones, siltstones and coal seams. The general dip is 5° to the southeast. The Coal Measure strata are further underlain by the Gwespwr Sandstone, Holywell Shales and Cefn-y-Fedw Sandstones of the Namurian Period.

4.2.3. The Premier Coal seam is mapped as sub-cropping at or near the surface of the bedrock and running southwest to northeast across the southern part of the site.

4.2.4. The wider area is extensively faulted; however no faults are mapped in the immediate vicinity of the site.

Site Investigations and Other Information Sources

4.2.5. The surrounding area has been subject to extensive intrusive investigations. Available information from these investigations has been referred to in order to obtain information potentially of pertinence to the site to inform the potential ground conditions.

4.2.6. A number of boreholes have been installed along the line of the former railway cutting to the west / southwest of the site, the closest of which are BH3, 17m to the west, and BH10, 13m to the west. Made ground in the form of a brick and stone rubble fill was encountered in each of these boreholes to a maximum depth of 1m in BH10; consistent with the location within the railway cutting. BH3

encountered a thin layer of Glacial Till underlying the made ground to 1.6m bgl onto cyclic sequences of mudstones, siltstones and sandstones of the Coal Measures. The Half Yard Coal seam was encountered at 18.5m bgl (138.4m aod). BH10 similarly encountered a relatively thin layer of Glacial Till (to 2.20m bgl) onto the mudstones of the Coal Measures. The Premier Coal seam was encountered at 3.5m depth within the mudstones, consistent with the mapped location of the seam outcrop.

4.2.7. Variable made ground was encountered across the Cable Tip site to the south, and is described as comprising industrial wastes, municipal solid wastes and colliery / quarry spoil. The industrial wastes were encountered to a maximum depth of 2.7m and included a variety of waste components in a typically sand and gravel matrix; components included, but were not limited to, brick, plastic, cable sheathing, molten and vitrified plastics, glass, polystyrene, paint, clay with tars, drums and pharmaceutical wastes. This was typically underlain by made ground comprising ash with glass, ceramic and some textiles, typical of 1950s / 1960s domestic wastes. Colliery / quarry spoil is also reported as present. In the absence of the AMEC logs the full soil profile across the Cable Tip site is unknown. The closest intrusive location to the site of interest is WYG HS01 which encountered a sandy gravelly clay with brick, coal, glass, ceramic, wood and plastic to at least 1m bgl.

4.2.8. Based on the information provided in the Cable Tip reports ground conditions at the site itself are expected to comprise made ground of 1950/60s type domestic wastes (typically ash with brick, ceramic, glass and textiles) and colliery spoils. It is indicated that the disposal of industrial wastes was not undertaken on the site itself. The expected ground conditions are summarised below:

Table 4.1: Summary of Expected Ground Conditions

strata	description	thickness	justification / source
made ground			
made ground	domestic wastes (ash with brick, ceramic, glass and some textiles); colliery / quarry spoils (typically clays with shales and some coal)	unknown; expected to be <10m; thin to west and deepening to east	BGS mapping; nearby intrusive site information
Bedrock			
Bettisfield Formation	productive Coal Measures; cyclic sequences of mudstones, sandstones and siltstones		BGS mapping; nearby intrusive site information

Ground Stability Data

4.2.9. Ground stability information provided by the BGS was obtained as part of a Coal Authority Ground Stability report which is provided in Appendix B R2122-R01 and is summarised below:

Table 4.2: Summary of Ground Stability

issue	summary
shrinkable clay	the site is in an area where the underlying clay deposits are considered to be mainly of 'low plasticity'. As such it is considered unlikely, they will cause ground movement
running sand	some sands, if voids are present, may flow if they come into contact with water; however, the sand deposits in this area are unlikely to cause ground movement
compressible deposits	the site is in an area underlain by natural compressible deposits; however, it is unlikely that compressible deposits in this area will cause ground movement
collapsible deposits	the site is not located in an area underlain by deposits which could collapse and cause ground movement
landslide activity	the site is in an area where the local geology and steepness of slope could combine to create the likelihood of landslide activities; however, landslide activity is unlikely to occur.
soluble rocks	the site is not located in an area underlain by soluble rocks

4.3. Mining

4.3.1. The Coal Measures have been extensively worked in the locality with former shafts mapped in the immediate and general area. No former shafts are shown on the historic OS mapping on the site itself, the nearest shaft being mapped as about 85m to the east-southeast (specific location unclear). In addition, the Premier Coal seam is shown as out-cropping across the southern section of the site; investigations to the west / southwest have shown the seam to have been worked at shallow depth in the locality and is therefore anticipated as having been worked under the site. The Premier Coal seam is further underlain by the Half Yard Coal seam which has also been worked locally. As such the site is potentially affected by both shallow and deeper mine workings; accordingly, a Coal Authority report has been obtained for the site.

4.3.2. The findings of the report are summarised below; for full details reference should be made to the report reproduced in Appendix B R2122-R01.

Table 4.3: Summary of Coal Authority report

issue	summary
Past underground mining	The site is within the likely zone of influence from workings in 1 seam of coal at shallow depth, and last worked in 1887.
Present / future mining	The site is not in the likely zone of influence of any present underground coal workings The site is not within an area for which the Coal Authority has / is determining to grant a licence for the removal of coal through underground workings or an area likely to be affected at the surface from any planned future workings. However, reserves of coal exist that could be worked at some time in the future.
Shafts / adits	There are 2 known mine entries within 20m of the site boundary
Coal mining geology	The Coal Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining

issue	summary
Opencast coal mining	The site is not within the boundary of an opencast site from which coal has been removed by opencast methods. The site does not lie within 200m of the boundary of an opencast site from which coal is being removed by opencast measures. The site does not lie within 800m of the boundary of a site for which the Coal Authority is determining whether to grant, or has granted, a licence to remove coal by opencast methods.
Subsidence	The Coal Authority has not received a damage notice or claim for the subject property or any property within 50m since October 1994
Mine Gas	There is no record of a mine gas emission requiring action by the Coal Authority within the property boundary

4.3.3. The Coal Authority reports indicates the presence of 2 former mine shafts within 20m of the site boundary; both of which are outside the site. These are located in the area of Bush House to the northeast (ref: 3283427-475) and the adjoining rough land to the southeast (ref: 328347-474). The locations of shafts are indicated on Ordnance Survey plans of the area (Drawing D01).

4.4. Hydrology and Drainage

4.4.1. Drainage across the site will currently be predominantly via infiltration, with potential surface water run-off to the northeast in times of heavy rainfall.

4.4.2. Surface water drainage in the general area is east / north-eastwards from the raised ground of Ruabon Mountain in the west towards Pentrebychan Brook, and subsequently the Afon Clywedog, in the east. Pentrebychan Brook flows south-eastwards within 800m of the site as it's closest point. An unnamed open watercourse flows 155m to the southeast of the site, and beyond the Cable Tip, towards Pentrebychan Brook.

4.4.3. Further drainage flows are directed eastwards alongside Llwyneinion Road; this is understood to take overflow from the Talwrn Borehole (former drinking water abstraction borehole; discussed below in Section 4.5). Redundant track drainage may exist in the railway cutting to the west of the site. The local surface water drainage network is indicated in Drawing D02.

4.4.4. No part of the site is indicated by NRW mapping as potentially being at risk from flooding from rivers or surface water.

4.4.5. Service plans have been provided for the site by Axis, however the local drainage network, which is assumed to exist to serve the mill building, is not included within information provided by Welsh Water. SGP is unaware of the presence of any interceptors or local private drainage systems on the site.

4.5. Hydrogeology and Groundwater

4.5.1. The made ground across the site is likely to be relatively free draining with groundwater flows expected to be either lateral at the interface of the made ground / glacial till (where present) / mudstones or via fractures and connected voids in the former mineworkings and weathered mudstones. Investigations of the adjoining Cable Tip did not encounter substantial perched groundwater within the made ground and AMEC concluded that groundwater flow was most likely to be preferentially vertically to the underlying Coal Measures via weathered mudstones and / or former mineworkings rather laterally at the interface of the made ground / glacial till / mudstones towards the nearby stream.

4.5.2. The underlying Coal Measures form a Secondary A aquifer; groundwater is typically present within the sandstone strata within the formation. Extensive investigations have been undertaken of the local groundwater regime within the wider natural deposits and the principal water bearing units have been identified as:

Table 4.4: Summary of Local Principal Water Bearing Units in the Coal Measures

unit	description	comments
Premier Coal	coal seam – extensively worked and believed to out-crop across southern part of site	typically, dry or partially saturated; groundwater flow expected to be southeast, down dip
No 2 Unit	interbedded sandstone, siltstone and mudstone	confined groundwater; low inflow rates reported
Half Yard Coal	extensively worked in area	limited groundwater encountered; low flows reported
No 3 Unit	interbedded sandstone, mudstone and siltstone	main water bearing unit of the Westphalian Coal Measures; sub-artesian conditions

4.5.3. The Cefn-y-Fedw Sandstone, which underlies the site at depth, supports a Principal Aquifer that was historically abstracted for drinking water supply from the Talwrn boreholes located 30m northwest of the site until the 1980s. There are 2 boreholes at the Talwrn abstraction point, both of which are reportedly 500ft (~150m deep). The aquifer is artesian, and the overflow now flows via the surface water drainage system.

4.5.4. Hydraulic continuity between the units is likely to be limited given the confined nature of the aquifers, however the extensive mineworkings, former shafts, faulting and fractures, may provide a degree of interconnectivity between the units.

4.6. Radon

4.6.1. The maps provided in the Indicative Atlas of Radon in England and Wales (ref HPA-RPD-033 Nov 2007) show the site to be within an area where 3-5% of homes lie above the radon Action Level as

defined by the Health Protection Agency (HPA). The BRE 211 report indicates that basic radon protective measures are therefore required in the construction of new dwellings or extensions.

4.7. Excavation and Landfilling

4.7.1. As noted in para 4.2.1 the site and surrounding area has been subject to extensive mineral extraction and subsequent infilling / waste disposal activities. Known historical extraction / landfill sites that have been identified in the area are detailed below and shown on Drawing D01 and D02:

Table 4.5: Nearby Former Landfill Sites

name	location and distance to site	Comments
Llwyneinion Old Refuse Tip 1, of which part is referred to as the Cable Tip	extends into southern section of site and adjoins to south / southeast; Cable Tip area adjoins to southeast but is not believed to extend onto the site.	former Local Authority waste disposal site later locally tipped with industrial wastes
Monsanto Chemical Waste Tip	60m W beyond railway cutting	chemical waste capped with ash
Cae Dwr Brickworks	30m SSW beyond railway cutting	former brickworks; ash
Llwyneinion Old Refuse Tip 2	18m N beyond Llwyneinion Road	unknown contents
Llwyneinion Acid Tar Lagoon	65m SW beyond railway cutting	site subject to coal mining and later iron working, clay extraction and brickworking; later topping with acid sludge and spent clay filter
Railway Cutting Fill	210 SSW	waste from Cae Dwr old tip – ash from burnt domestic waste
Llwyneinion Brick Works Small Quarry	270m SW beyond Llwyneinion Road	infilled reservoir; unknown contents
Cae Dwr Old Tip	450m S	part of site removed and deposited on Llwyneinion site in 1985; burnt domestic waste – ash, glass, ceramics and brick

Note: boundaries of former landfill sites taken from information provided by WCBC

4.7.2. A number of these sites, and in particular the Acid Tar Lagoon, Monsanto Chemical Waste Tip and Cable Tip, have been subject to extensive investigations on behalf of WCBC to assess the contamination status and potential risks posed to human health and the environment under Part 2A of the Environmental Protection Act. SGP understand that none of the sites has been determined as posing a significant risk of significant harm or significant pollution of controlled waters.

4.8. Industrial Land Uses

- 4.8.1. Adjacent to the east of the site is a depot utilised primarily for lorries occupied by Cecil Allen & Sons. A number of forklift trucks and a variety of vehicle maintenance areas were observed within the depot area.

4.9. Nature Conservation

- 4.9.1. No statutory nature conservation sites, such as SSSIs, SPAs etc have been identified within 1km of the site.
- 4.9.2. A detailed ecological assessment is outside the scope of this assessment however SGP staff did not note the presence of invasive plant species or protected species on the site during the inspection, however a vegetation strip had been undertaken which would have removed surface growth.

5. Preliminary Conceptual Site Model and Risk Assessment

5.1. Sources of Contamination

- 5.1.1. The site forms part of an area that has been historically subject to coal mining with numerous former mine shafts mapped in the locality, although not on the site itself. The Premier Coal seam, which is known to have been worked locally, is mapped as out-cropping beneath the site, and as such, colliery spoil is anticipated to be present on site, as encountered on land to the adjoining southeast. Colliery spoil may give rise to elevated pH, sulphates and PAHs.
- 5.1.2. The site itself is shown on historical mapping as open rough ground until sometime between 1938 and 1954 when a small building appears. The site is later, on 1963 mapping, shown as part of a refuse tip which extends to the south and southeast; it is understood this was associated with local authority waste disposal. Investigations of the adjoining site have identified made ground in the form of ash with brick, ceramic, glass and some textiles, consistent with 1950s / 60s type domestic waste. Typical soil contaminants that may be associated with such wastes, and have been identified on the adjoining site, are heavy metals / metalloids, sulphates and PAHs.
- 5.1.3. The site has subsequently been operated as a vehicle dismantlers and scrap yard. Such operations can result in ground contamination with asbestos, heavy metals / metals and hydrocarbons, , particularly from the result of spills / leaks of fuels and oils (with reference to DoE Industry Profile: Waste Recycling, Treatment & Disposal Sites: Metal Recycling Sites). At the time of the site visit much of the site had been cleared and prepared for redevelopment; there was no visual evidence of any significant contamination in the form of hydrocarbons (staining) noted on the site surface with the exception of locally in the vicinity of the mill building where oil containers appeared to have been stored, however the site surface appeared to have been recently scraped back, possibly during vegetation stripping. A large bonfire of cleared vegetation (trees) was present during the site visit in the south eastern corner of the scrap yard, however this was just outside the site boundary. No other visual evidence of possible contamination was noted during the site visit.
- 5.1.4. Fills across the site may give rise to ground gas, although extensive degradable materials are considered unlikely, reducing the potential for significant ground gas generation. Any worked coal seams that are close to the site surface may however provide a preferential pathway for mine gas. Elevated methane and carbon dioxide, with corresponding depleted oxygen, were detected on the adjoining site, albeit with low flow rates.
- 5.1.5. The surrounding area has also been subject to long industrial use, primarily mineral extraction (coal mining and clay extraction for brickworking) and subsequent waste disposal activities. Later waste disposal activities in the vicinity included the disposal of cable and other industrial wastes. It is believed this was concentrated on the area of land to the southeast, referred to as the Cable Tip. Contaminants identified on the adjoining land, and which may be anticipated associated with these

wastes, included heavy metals / metalloids, hydrocarbons, sulphates, PCBs, VOCs / SVOCs, asbestos and pesticides.

- 5.1.6. Much of this area has been subject to extensive investigation and assessment to determine potential risks to site users, and the wider environment. Such investigations have included shallow and deep soil sampling and analysis, surface water and groundwater analysis and ground gas monitoring.
- 5.1.7. Natural sources of contamination in the form of elevated radon is indicated as being present in the area, with 3-5% of homes lying above the radon action level.

5.2. Potential Targets and Exposure Pathways

- 5.2.1. Proposals for the site are for redevelopment to residential use with gardens and associated infrastructure. The principle receptors to any contamination are therefore: construction workers; future site occupiers; site maintenance workers; controlled waters (surface watercourse 190m to the west / southwest; Secondary A aquifer within underlying Coal Measures and Principal Aquifer within Cefn-y-Fedw Sandstone); and the built development on the site.

5.3. Preliminary Conceptual Site Model

- 5.3.1. A preliminary conceptual site model (CSM) was derived for the site describing the potential contamination sources, pathways and receptors. The CSM was used to provide rationale for the site investigation design and is summarised below in Table 5.1:

Table 5.1: Preliminary Conceptual Site Model

Receptor	Source / Contaminant	Pathway / Exposure	Pollutant Linkage (in absence of mitigation)	Further Investigation
1. humans – construction workers / future maintenance engineers	metals / metalloids / asbestos / organics may be present within made ground	dermal contact / ingestion / inhalation – short term exposure	Likely – extent, depth and nature of contamination unknown; any contamination present at shallow depths may pose a short-term risk if exposed during excavations	site investigation including shallow soil sampling to determine extent and nature of any contamination
2. humans – future site users	metals / metalloids / organics / asbestos may be present within made ground	dermal contact / ingestion / inhalation	Likely – extent, depth and nature of contamination unknown	site investigation including shallow soil sampling to determine extent and nature of any contamination
	ground gas (methane, carbon dioxide); mine gas; hydrocarbon vapours	accumulation within voids, confined spaces and service runs	Possible – extent, depth and nature of contamination or natural sources unknown	site investigation including gas monitoring to determine extent and nature of any contamination
3. property / services	ground gas (methane, carbon dioxide); mine gas; hydrocarbon vapours	accumulation within voids, confined spaces and service runs	Possible – extent, depth and nature of contamination or natural sources unknown	site investigation including gas monitoring to determine extent and nature of any contamination
	Natural radon gas	accumulation within voids, confined spaces and service runs	Possible – site lies in an area where between 3-5% of properties are above radon action limits	Site specific radon report should be acquired, or radon protection measure installed in future dwellings
	pH, sulphate and organic contaminants	chemical attack of buried concrete and plastic materials	Possible – extent, depth and nature of contamination or natural sources unknown	site investigation including shallow soil sampling to determine extent and nature of any contamination
4. vegetation / landscaping	leachable metals / metalloids may be present within soils	plant uptake	Possible – extent, depth and nature of contamination unknown	site investigation including shallow soil sampling to determine extent and nature of any contamination
5. ecosystems / protected species & habitats				
n/a – no ecosystems / protected habitats in immediate vicinity				

Receptor	Source / Contaminant	Pathway / Exposure	Pollutant Linkage (in absence of mitigation)	Further Investigation
6. surface waters	leachable metals / metalloids / organics may be present within made ground	migration via shallow groundwater into downgradient stream	Unlikely – extensive investigations in the locality have not identified any significant contamination of surface watercourses	site investigation including groundwater sampling
7i. groundwater – Secondary A Aquifer within superficial deposits	leachable metals / metalloids / organics may be present within made ground	migration via unsaturated zone / worked coal seams / mineworkings	Possible – vertical migration through made ground is possible, depending on the nature of the fill materials.	site investigation including groundwater analysis to determine extent and nature of any contamination
7ii. groundwater - Principle aquifer within bedrock	leachable metals / metalloids / organics may be present within made ground	migration via unsaturated zone / worked coal seams / mineworkings	Unlikely – the principal aquifer is artesian reducing the likelihood for vertical migration	investigation of the deeper aquifer not considered necessary

6. Investigation Methodology

6.1. Objectives and Rationale

6.1.1. The proposed use of the site is for residential purposes which is considered to be of high sensitivity. The indicative layout plan seen by SGP provides for several residential units with a shared access drive, garages and gardens.

6.1.2. The initial Intrusive investigations (2015) were undertaken to:

- confirm the ground conditions underlying the site;
- determine the presence, extent and nature of made ground and soil contamination across the site;
- obtain information on the presence, depth and quality of groundwater;
- determine the presence of ground gas;
- determine the suitability of the site for the proposed redevelopment and inform the remedial requirements necessary.

6.1.3. The supplementary site investigation (2018) has been undertaken to:

- to confirm and improve information on the ground conditions underlying the southernmost part of the site;
- to improve previous information on the extension and nature of made ground;
- to collect additional soil samples;
- to update information on the suitability of the site for the proposed redevelopment and inform the remedial requirements necessary.
- include additional samples, representative of the various fill/made ground materials from depths of between 0.5m and 1.5m for human health assessment purposes.

6.1.4. The current and previous investigations were undertaken in accordance with appropriate guidance (BS 10175 and CLR11).

6.2. Fieldwork (2015)

6.2.1. The site investigation utilised trial pits and cable percussion boreholes to permit visual inspection and logging of shallow and deeper strata, to obtain samples from the made ground and natural strata and to install ground gas and groundwater monitoring installations.

6.2.2. The investigation was undertaken between 28th April and 1st May 2015 under the supervision of SGP Geo-Environmental Consultant B Harvey (Senior Consultant). Subsequent monitoring was undertaken between 8th May and 12th June 2015.

6.2.3. Works involved:

- excavation of 11 trial pits (TP1–TP11) by tracked excavator to a maximum depth of 4.00m bgl;
- drilling of 3 boreholes (BH1-BH2) using cable percussion rig to a maximum depth of 7.45m bgl;
- screening of all soil arisings for visual or olfactory indicators of contamination and for volatiles with a photo-ionisation detector (PID); inspection and logging of ground conditions;
- SPT testing in all borehole entries at 1m intervals or change in strata;
- completion of 3 boreholes (BH1-BH3) as combined ground gas / groundwater monitoring wells;
- collection of 13 shallow and deeper soil samples during trial pitting and drilling and submission for a range of laboratory analyses as detailed below;
- collection of 1 groundwater sample and submission for laboratory analyses as detailed below;
- ground gas monitoring (6 rounds).

6.2.4. Investigation entries were set out on a systematic (non-targeted) grid in the open areas of the site to provide information on readily accessible areas of the site. Investigations were not undertaken within the existing building. Access to the northeast area of the site was restricted by the building and services. Overall a maximum spacing of 30m was achieved between entries. Trial pit and borehole locations are shown on Drawing D10.

6.2.5. Trial pits were backfilled immediately following excavation, following sampling and logging, with the infill compacted by the machine bucket.

6.2.6. All soil arisings were immediately screened in the open air for VOCs using a PID MiniRae 2000.

6.2.7. All the boreholes were installed with combined gas / groundwater monitoring wells. Installed response zones were from 1.0m depth to the base of the borehole. Full details are provided in Appendix D and are summarised below:

Table 6.1: Summary of Groundwater / Ground Gas Monitoring Well Installations

borehole ref	base of borehole	base of installation response zone	response zone	strata
	(m bgl)	(m bgl)		
BH1	6.45	6.00	1.0-base	made ground / clay (possibly made ground)

borehole ref	base of borehole	base of installation response zone	response zone	strata
	(m bgl)	(m bgl)		
BH2	4.50	3.12	1.0-base	made ground / weak mudstone
BH3	7.45	6.00	1.0-base	made ground / clay (possibly made ground)

6.3. Fieldwork (2018)

6.3.1. A total of 11 machine excavated trial pits (TP201-TP211) were formed at the site on 15 November 2018. B Thomas, SGP partner, and C Salwa, SGP consultant attended following excavation of the entries to inspect and log ground conditions and obtain samples for laboratory analysis.

6.3.2. The positions of the exploratory holes were selected by the client. The position of all exploratory holes undertaken at the site as part of complementary Site Investigation 2018 are indicated on SI Location Plan in Drawing D09 SI Location plan 2015-2018.

6.3.3. Works involved:

- excavation of 11 trial pits (TP201–TP211) by tracked excavator to a maximum depth of 5.00m bgl;
- screening of all soil arisings for visual or olfactory indicators of contamination and, inspection and logging of ground conditions;
- collection of 5 soil samples during trial pitting at depths of between 0.5m and 1.5m and submission for a range of laboratory analyses.

6.3.4. On completion, all trial pits were carefully backfilled with arisings in thin layers, ensuring that excavated material was replaced in the same order as it had been removed.

6.4. Chemical Analysis

6.4.1. Chemical analysis of soils and groundwater (2015) was carried out by Chemtest, Newmarket and Jones Environmental Laboratory, and by SOCOTEC UK Limited (soil samples 2018), respectively working where possible to MCERTS and / or ISO 17025 accreditation. Soil and water samples were stored in appropriate containers as advised by the laboratory, placed in a chilled cool box, and delivered to the laboratory within 48 hours. Chain of custody documentation was completed and is retained by SGP.

6.4.2. Soil samples were collected from the following horizons and were submitted for chemical analyses as detailed in Appendix D and summarised below.

Table 6.2: Summary of Soil Chemical Analysis (2015)

strata	description	depth (m bgl)	analytical suite (number of samples)
made ground	typically, black ashy sand and gravel frequently with clinker, glass and pottery; occasional rubber & plastic	0.1-2.5	pH (9), metals (9), SOM (9), PAHS speciated (9), asbestos screen (9), TPHCWG BTEX (9), VOCs (3), SVOCs (3), BRE 2:1 water soluble sulphate (2), PCBs (3), total phenols (3), calorific value (2), cyanides / thiocyanate (3)
	yellow brown sandy clay	0.6	pH (1), metals (1), SOM (1), PAHS speciated (1), asbestos screen (1), TPHCWG BTEX (1)
	band of grey shale within boulders of sandstone	0.6	pH (1), metals (1), SOM (1), PAHS speciated (1), asbestos screen (1), TPHCWG BTEX (1), BRE 2:1 sulphate (1)
	brown clay with gravel of shale	3.0	pH (1), BRE 2:1 water soluble sulphate (1)
natural	mottled orange grey sandy CLAY	3.2-3.4	pH (1), BRE 2:1 water soluble sulphate (1)

Table 6.2: Summary of Soil Chemical Analysis (2018)

strata	description	Sample	analytical suite (number of samples)
made ground	slightly clayey sandy gravel and cobbles of brick, mudstone, ceramic fragments, glass and occasional wires	TP201 at 0.5m	pH (1), metals (1), SOM (1), PAHS speciated (1), asbestos screen (1), TPHCWG BTEX (1), BRE 2:1 sulphate (1)
	very gravelly clay, gravel and cobbles of brick, ceramic fragments and rare rags	TP203 at 1.5m	pH (1), metals (1), SOM (1), PAHS speciated (1), asbestos screen (1), TPHCWG BTEX (1), BRE 2:1 sulphate (1)
	clayey gravel and cobbles of brick, slate, occasional concrete, ceramic fragments, glass, rare wood and rags	TP204 at 0.5m	pH (1), metals (1), SOM (1), PAHS speciated (1), asbestos screen (1), TPHCWG BTEX (1), BRE 2:1 sulphate (1)
	slightly clayey ashy gravel of brick, slate, clinker, glass and plastic	TP206 at 1.5m	pH (1), metals (1), SOM (1), PAHS speciated (1), asbestos screen (1), TPHCWG BTEX (1), BRE 2:1 sulphate (1)
	slightly clayey ashy gravel of brick, slate, clinker, glass, ceramic fragments, metal scrap and occasional wires	TP208 at 1m	pH (1), metals (1), SOM (1), PAHS speciated (1), asbestos screen (1), TPHCWG BTEX (1), BRE 2:1 sulphate (1)

- 6.4.3. A groundwater sample was collected from borehole BH1 on 22nd May 2015 and submitted for chemical analysis as detailed below. The sampling was carried out following purging the well to steady state as measured by in-situ parameters (dissolved oxygen and pH). Insufficient water was present in boreholes BH2 and BH3 to facilitate sampling.

Table 6.3: Summary of Groundwater Analysis

borehole ref.	analytical suite
BH1	pH, metals, PAHs (16 speciated), TPHCWG inc. BTEX, VOCs + TICs, SVOCs + TICs, PCBs (7 congeners), total phenols, sulphate

Metals = As, B, Cd, Cu, total Cr, Cr III, CrVI, Hg, Ni, Pb, Se, Zn

6.5. Ground Gas Monitoring 2015

- 6.5.1. Ground gas monitoring was undertaken of BH1-BH3 on 4 occasions following installation of the wells. Monitoring was undertaken for flammable gas (calibrated for methane), carbon dioxide, oxygen, carbon monoxide, hydrogen sulphide, relative borehole pressure, gas flow rate and volatiles (calibrated for isobutylene). The depth to groundwater was recorded in each well and atmospheric pressure recorded at the start and finish of each monitoring round. Two monitoring rounds coincided with low and falling atmospheric pressure (<1,000 mb). Results are attached in Appendix E R2122-R01.

7. Investigation Observations

7.1. Physical Observations

- 7.1.1. The intrusive holes logs and photographic record are presented in Appendix C. No significant obstructions were encountered during the excavation, a number of trial pit locations did not extend through the full depth of made ground into natural ground due to the capability of the available excavator limiting trial pits to 4.0m bgl in 2015 and tracked excavator limited to 5m during trial pitting in 2018.

Surface Covering

- 7.1.2. Topsoil and / or concrete hardstanding was not present across the site at the time of the investigations other in the location of the former mill. Ground conditions at the site surface across the majority of the site typically comprised a mixture of sands and colliery spoil - principally shale gravels.

Made Ground

- 7.1.3. Made ground was encountered within all the entries across the site to varying depths, and generally comprised interbedded ashy sands and coarse clayey gravels which are interpreted as mixed old (1950s/1960s) domestic waste and colliery wastes. A maximum proven depth of 4.9m bgl (TP210) was encountered, however several trial pit locations (2015) and TP202 (2018) did not fully penetrate the made ground due to the limitations of the machine excavators available.
- 7.1.4. The ashy sands contain clinker, glass (whole and broken bottles), brick and ceramic fragments while the colliery wastes are predominately shale gravels, broken glass bottles were mixed with the colliery waste in places. Made ground depths generally deepened to the east and south as tipping progressed as a plateau.
- 7.1.5. In TP4, TP8, TP9, TP10, TP11, TP12, TP202, TP206, TP209 and TP211 small pieces of plastic were encountered within the ashy made ground, comprising approximately 2% of the arisings, with rare rubber fragments present within TP4 and TP8. Within TP8 only, newspaper was also encountered associated with the ashy made ground throughout the trial pit, comprising approximately 5% of the spoil arisings, from ground level to an un-proven depth below 3.8m.
- 7.1.6. The ashy made ground was underlain in TP2 by a slightly sandy clayey made ground, this was the only location where this stratum was observed.
- 7.1.7. Within TP4 and TP10 the loose ashy shale gravel had a red to red/black colour and is interpreted as a burnt shale.

- 7.1.8. Boulders of dressed sandstone were encountered within TP1 between 0.15m and 1.3m bgl.
- 7.1.9. Generally, the made ground observed in additional trial pits (SI 2018) comprised similar materials as observed in previous site investigation; represented by variable mix of slightly clayey gravel, gravelly clay, where gravel and cobbles are brick, shale with ceramic fragments, glass, occasional wires, scrap metal, rags and rare wood.
- 7.1.10. Ash and clinker were observed additionally in TP206, TP207, TP208 and TP211.
- 7.1.11. Mix of clay and shale gravel fill was observed typically to the south-western portion of the site in proximity of dismantled railway.
- 7.1.12. Both BH1 and BH3 (2015), located towards the centre of the site, encountered a firm to still grey/brown clay between 3.5-6.0m (BH1) and 4.4-7.0m (BH3), underlain by mudstone. Interpretation of these observations is difficult due to the poor resolution from disturbed borehole samples, but the material could also be heavily weathered rock or disturbed material associated with old shallow mine workings or disturbed ground, such as bell pit or crop workings.

Natural Deposits

- 7.1.13. Natural sands were encountered within TP1 and TP2 at a depth of 1.3m bgl. This is interpreted as relating to the edge of the landfilling activities occurring on the site, with both locations being close to the mill which pre-dates the landfilling.
- 7.1.14. Natural sands were also encountered within TP10, present at a depth of 3.8m bgl, this may relate to variation in the depth of the tipped made ground, with the vicinity of TP10 comprising shallower made ground than the surroundings. Logs from offsite to the south, within the Cable Tip area, indicate the depth of made ground increases to the south.
- 7.1.15. In the north eastern corner of the site natural sandy clays were encountered within TP3, TP4 and TP12 all of which encountered natural material between 2.8-3.4m bgl, indicating the thickness of tipped material decreases to the north east. However, it appears that tipped material continues offsite to the north towards Bush House. It is assumed that tipped material does not extend far beyond the boundary to the north, as Bush House pre-dates landfilling on the site.
- 7.1.16. Possible bedrock in the form of weak grey mudstones was encountered in all three boreholes at depths of 2.0m bgl (BH2) on the eastern side of the site, to 7.0m bgl (BH3) in the centre of the site (2015).
- 7.1.17. During the supplementary site investigation bedrock was encountered in TP201, TP203,

TP204, TP205, TP206, TP207, TP208, TP209, TP210 and TP211 from depths of between 0.9m and 4.9m down to the base of trial holes at depths of between 2.6m and 5m. Typically represented grey to light grey, locally weathered reddish grey or brown, slightly clayey fine to coarse angular gravel and cobbles of laminated slate and occasional mudstone with rare boulders of mudstone. A veneer of completely weathered bedrock, observed as bluish grey slightly gravelly clay, was observed overlying the stratum of gravel and cobbles.

7.1.18. The reported ground conditions are generally consistent with expectations of made ground consistent with 1950s / 1960s domestic waste (ash with clinker, pottery, brick and glass and occasional metal) as well as a large quantity of colliery waste (clayey shale gravels) overlying mudstone (coal measures).

7.1.19. Natural strata, relating to superficial units has only been encountered in the north/northeast of the site. This has comprised a mixture of sands and sandy clays consistent with the mapped Glacial Till deposits in the vicinity.

7.1.20. A single natural sand deposit is present in TP10 in the south of the site, at a depth of 3.8m bgl, extending beyond the base of the trial pit.

7.1.21. Stratigraphy across the site indicates a generally increasing depth of tipped made ground (ashy sands and shale gravels) in the centre and south of the site underlain by sands/sandy clays in the north of the site and by made ground clays (possibly old mining disturbance) in the centre of the site underlain in turn by mudstone bedrock.

7.1.22. The above evidence of stratigraphy is taken from discrete locations. Given the broadly similar ground conditions between many of the entries, it appears reasonable to infer that similar conditions may extend between these locations across the majority of the site, although caution should always be exercised as the nature of the ground does vary between some entries. In particular, investigations have not been undertaken within the footprint of the existing mill building itself, and several trial pits did not penetrate the full depth of the fill.

7.2. Groundwater Conditions

7.2.1. Groundwater was not encountered during either the trial pit excavation and drilling of boreholes in 2015, and additional trial pits excavated in 2018, except slight seepage observed in TP201 at 1.2m (SI 2018).

7.2.2. The depths to groundwater encountered during groundwater monitoring rounds in 2015 are summarised below:

Table 7.2: Summary of Groundwater Depths (2015)

borehole ref	water depth (m bgl)	base of response zone
--------------	---------------------	-----------------------

	min	max	(m bgl)
BH1	3.40	3.43	6.00
BH2	3.12	3.12	3.12
BH3	none	none	6.00

Note: water encountered in BH2 at base of well

7.2.3. No sheen, free product or odour was observed during groundwater monitoring. The groundwater in BH1 is recorded as being brown due to suspended silts. Use of an interface dipmeter did not encounter the presence of any free product in groundwater during monitoring.

7.3. Contamination Indicators

7.3.1. Olfactory indicators of hydrocarbon contamination were noted in TP8 and TP9 during the investigations. In TP8 there was an increasing solvent odour within the ashy sand and gravel with depth from 2.5m onwards. In TP9 a TCP type odour was reported at 2.5m bgl. However, VOCs were not detected with the PID in any locations (all readings <0.1ppm).

7.3.2. No visual evidence of surface contamination (e.g. spills/staining) was encountered during either the site visit/investigation, or during subsequent monitoring visits.

7.3.3. No suspected asbestos containing materials (ACM), in the form of cement sheeting, friction products or lagging, were observed during the investigations.

8. Investigation Results

8.1. Results of Soil Chemical Analysis

- 8.1.1. The complete soil analytical data (2015 and 2018) are presented in Appendix D.
- 8.1.2. The results of the soil analyses are compared to human health critical values (CVs) for initial screening purposes. The CVs adopted are appropriate to the environmental setting and for the proposed residential use of the site and are taken primarily from the LQM / CIEH Suitable for Use Levels (S4ULs)¹. These are derived for a sandy loam soil; reference is initially made to the S4ULs derived for a soil with 1% soil organic matter as a conservative assessment for screening purposes.
- 8.1.3. The DEFRA published Category 4 Screening Level (C4SL) for lead in soils under residential land-use has been utilised to allow an initial screening for risk to human health. This is intended to demonstrate that land is definitely not Contaminated Land as defined under Part IIA of the Environmental Protection Act. The adoption of the C4SL in a planning scenario has not been universally accepted, however in the absence of other generic screening criteria for lead following the withdrawal of the SGV by the EA it is considered appropriate to utilise the screening criterion.
- 8.1.4. Where published human health critical values are unavailable or inappropriate (because the substance does not significantly affect human health but might have an effect on other receptors), then other commonly-used screening values are used, as noted below.
- 8.1.5. The results for both shallow (<0.6m bgl) and deeper soils have all initially been assessed against the screening criteria. However, the assessment criteria are intended for use for screening purposes only. Exceedances indicate that either more detailed site-specific risk assessment is required to better quantify risks to human health, or that remediation or mitigation is required to reduce risks by breaking the source-pathway-receptor relationship between solid phase contaminants and receptors.
- 8.1.6. The results for the made ground and natural soils are summarised below:

¹ Land Quality Management Ltd, The LQM / CIEH S4ULs for Human Health Risk Assessment, 2015

Table 8.1: Summary of Soils Analysis (2015)

Contaminant	Number of Samples		Range of Concentrations (mg/kg or indicated)		Soil Standard Adopted and Concentration (mg/kg or indicated)	Exceedances	
	Depth range (m)		Depth range (m)			Depth range (m)	
	0.0-0.6	0.6+	0.0-0.6	0.6+		0.0-0.6	0.6+
pH	8	5	7.2-8	7.0-7.5	none	n/a	n/a
calorific value (MJ/kg)	2	1	2.3-5.6	6.2	10 MJ/kg	none	none
arsenic	8	3	14-75	72-150	37 S4UL	2 (TP3.ES1, TP6.ES1,)	3 (TP8.ES1, TP8.ES2, TP9.ES2)
cadmium	8	3	0.31-7.1	1.1-3.0	11 S4UL	none	none
chromium (total)	8	3	16-42	50-110	910 S4UL	none	none
chromium (VI)	8	3	0.5	0.5	6 S4UL	none	none
copper	8	3	27-210	260-450	2,400 S4UL	none	none
					200 Defra Plant	1 (TP6.ES1)	none
lead	8	3	72-440	420-990	200 C4SL	5 (TP1.ES1, TP3.ES1, TP4.ES1, TP4.ES2, TP6.ES1,)	3 (TP8.ES1, TP8.ES2, TP9.ES2)
mercury (inorganic)	8	3	0.1-0.39	0.26-0.64	40 S4UL	none	none
nickel	8	3	21-120	120-140	180 S4UL	none	none
selenium	8	3	0.2-1.8	1.4-3.4	250 S4UL	none	none
zinc	8	3	95-1300	740-2000	3,700 S4UL	none	none
					300 Defra Plant	5 (TP1.ES1, TP3.ES1, TP4.ES1, TP4.ES2, TP6.ES1)	3 (TP8.ES1, TP8.ES2, TP9.ES2)
asbestos screen	8	3	nad	nad	nad	none	none
free cyanide	2	1	0.5	0.5	25 UKWIR 2010	none	none
complex cyanide	2	1	0.5	0.9	250 UKWIR	none	none
thiocyanate	2	1	5.0	7.3	50 UKWIR	none	none
total phenols	0	3	N/A	0.3	280 S4UL	N/A	none
PCBs (7 congeners)	0	3	N/A	0.1	0.1 LOD screening level	none	none

Contaminant	Number of Samples		Range of Concentrations (mg/kg or indicated)		Soil Standard Adopted and Concentration (mg/kg or indicated)	Exceedances	
	Depth range (m)		Depth range (m)			Depth range (m)	
	0.0-0.6	0.6+	0.0-0.6	0.6+		0.0-0.6	0.6+
naphthalene ³	8	3	0.1-2.1	0.1-1.5	2.4 S4UL	none	none
benzo(a)pyrene ³	8	3	0.1-2.6	0.1	2.2 S4UL	1 (TP3.ES1)	none
benzo(b)fluoranthene ³	8	3	0.1-3.8	0.1	2.6 S4UL	2 (TP1.ES1, TP3.ES1)	none
benzene	8	3	0.001	0.001-0.037	0.087 S4UL	none	none
toluene	8	3	0.001	0.001-0.035	130 S4UL	none	none
ethylbenzene	8	3	0.001	0.001-0.023	47 S4UL	none	none
m/p-Xylene	8	3	0.001	0.001-0.1	59 S4UL	none	none
o-xylene	8	3	0.001	0.12	56 S4UL	none	none
aliphatic >C5-C6	8	3	0.1	0.1	42 S4UL	none	none
aliphatic >C6-C8	8	3	0.1	0.1	100 S4UL	none	none
aliphatic >C8-C10	8	3	0.1	0.1-8.9	27 S4UL	none	none
aliphatic >C10-C12	8	3	1.0	1.0-76	130 S4UL (48) ¹	none	none
aliphatic >C12-C16	8	3	1.0	1.0-50	1,100 S4UL (24) ²	none	none
aliphatic >C16-C21	8	3	1.0	1.0-61	65,000 S4UL (8.48) ²	none	none
aliphatic >C21-C35	8	3	1.0	1.0-1800	65,000 S4UL (8.48) ²	none	none
aliphatic >C35-C44	8	3	1.0	1.0-93	65,000 S4UL (8.48) ²	none	none
aromatic >C5-C7	8	3	0.1	0.1	70 S4UL	none	none
aromatic >C7-C8	8	3	0.1	0.1	130 S4UL	none	none
aromatic >C8-C10	8	3	0.1	0.1-75	34 S4UL	none	1 (TP9.ES1)
aromatic >C10-C12	8	3	1.0	1.0-330	74 S4UL	none	1 (TP9.ES1)
aromatic >C12-C16	8	3	1.0	1.0-200	140 S4UL	none	1 (TP9.ES1)
aromatic >C16-C21	8	3	1.0-16	1.0-56	260 S4UL	none	none
aromatic >C21-C35	8	3	1.0-51	1.0-1900	1,100 S4UL	none	1 (TP9.ES1)
aromatic >C35-C44	8	3	1.0	1.0-98	1,100 S4UL	none	none
VOCs	1	2			See Table 8.1		
SVOCs	0	0			n/a	n/a	n/a

Notes to table:

nad: No asbestos detected
S4UL: LQM/CIEH Suitable for Use Levels (S4ULs), residential with plant uptake landuse, (at 1% SOM). Copyright Land Quality Management Ltd. Reproduced with permission publication number S4UL 3102. All rights reserved.
C4SL: Category 4 Screening Levels published by CL:AIRE (C4SLs); 'residential with plant uptake land use' (at 1% SOM)
DEFRA plant Threshold guideline for the protection of sensitive plant species used by MAFF
BRE SD1: Building Research Establishment Special Digest 1
1: CV exceeds vapour saturation limit provided in ()
2: CV exceeds solubility saturation limit provided in (), i.e. possibility of free product at this level
3: Only the PAH indicators naphthalene and benzo(a)pyrene and any for which exceedances are recorded are listed.

Table 8.2: Summary of Soils Analysis (complimentary assessment 2018)

Contaminant	Number of Samples	Range of Concentrations (mg/kg or indicated)	Soil Standard Adopted and Concentration (mg/kg or indicated)	Exceedances
pH	5	7.9-8.7	none	none
asbestos screen	5	No Asbestos Detected	Detectable	none
arsenic	5	9.8- 59.3	37 S4UL	TP206 1.5m. 59.3
cadmium	5	0.61-3.41	11 S4UL	none
chromium III	5	20.1-41.8	910 S4UL	none
chromium VI	5	<0.1	6 S4UL	none
copper	5	34.6- 245.7	2,400 S4UL	none
			200 Defra Plant	TP206 1.5m. 234.9 TP208 1m. 245.7
lead	5	123.4-557.7	200 C4SL	TP204 0.5m. 269.7 TP206 1.5m. 289 TP208 1m. 557.7
mercury	5	<0.6	40 S4UL	none
nickel	5	34.3-104.1	180 S4UL	none
selenium	5	0.6-2	250 S4UL	none
zinc	5	179.8- 2490	3,700 S4UL	none
			300 Defra Plant	TP201 0.5m. 1390 TP204 0.5m. 2490 TP206 1.5m. 833.9 TP208 1m. 1160
naphthalene	5	<0.09-0.25	2.3 S4UL	none
acenaphthylene	5	<0.12	170 S4UL	none
acenaphthene	5	<0.12	210 S4UL	none
fluorene	5	<0.12	170 S4UL	none
phenanthrene	5	<0.12-0.45	95 S4UL	none
anthracene	5	<0.09-0.11	2400 S4UL	none
fluoranthene	5	<0.12-0.53	280 S4UL	none
pyrene	5	<0.12-0.46	620 S4UL	none
benzo(a)anthracene	5	<0.12-0.4	7.2 S4UL	none
chrysene	5	<0.12-0.28	15 S4UL	none
benzo(a)pyrene	5	<0.12-0.42	2.2 S4UL	none
indeno(123cd)pyrene	5	<0.12-0.32	27 S4UL	none

Contaminant	Number of Samples	Range of Concentrations (mg/kg or indicated)	Soil Standard Adopted and Concentration (mg/kg or indicated)	Exceedances
dibenzo(ah)anthracene	5	<0.12	0.24 S4UL	none
benzo(ghi)perylene	5	<0.12-0.27	320 S4UL	none
benzo(b)fluoranthene	5	0.12-0.57	2.6 S4UL	none
aliphatic C8-C10	5	<6.10	27 S4UL	none
aliphatic C10-C12	5	<6.10	130 S4UL (48 vap)	none
aliphatic C12-C16	5	<6.10	1,100 S4UL (24 sol)	none
aliphatic C16-C21	5	<5.57-11.84	65,000 S4UL (8.48 sol)	none
aliphatic C21-C35	5	<12.2-107.1	65,000 S4UL	none
aromatic C8-C10	8	<5.93	34 S4UL	none
aromatic C10-C12	5	<5.93	74 S4UL	none
aromatic C12-C16	5	<5.93	140 S4UL	none
aromatic C16-C21	5	<4.6-12.44	260 S4UL	none
aromatic C21-C35	5	14.3-92.8	1,100 S4UL	none
benzene	5	<0.0148	0.087 S4UL	none
toluene	5	<0.0148	130 S4UL	none
ethyl benzene	5	<0.0148	47 S4UL	none
m/p-xylene	5	<0.0296	59 S4UL	none
o-xylene	5	<0.0148	56 S4UL	none
Total Organic Carbon	5	0.85->31.7	NA	
SOM %	5	1.47->54.6		

Notes to table:

S4UL: LQM/CIEH Suitable for Use Levels (S4ULs), residential with homegrown produce landuse, (at 1% SOM, 6% SOM for metals). Copyright Land Quality Management Ltd. Reproduced with permission publication number S4UL 3102. All rights reserved.

C4SL: Category 4 Screening Levels published by CL:AIRE (C4SLs); 'residential with homegrown produce land use' (at 1% SOM)

DEFRA plant Threshold guideline for the protection of sensitive plant species used by MAFF

vap: CV exceeds vapour saturation limit provided in ()

sol: CV exceeds solubility saturation limit provided in (); i.e. probability of free product at this level

8.1.7. Asbestos fibres were not detected within any samples submitted for an asbestos screen.

8.1.8. The soil organic matter (SOM) concentrations ranged from 2% to 48%. Given the widespread presence of ash and clinker with partial combustion residues, and colliery spoil, as well as inclusions of more degradable organic materials within made ground strata this range is as expected.

8.1.9. Concentrations of metals / metalloids in the form of arsenic and lead were present in both shallow and deeper ashy made ground above the CVs referred to for the protection of human health for residential use.

8.1.10. Concentrations of zinc in both the shallow and deeper the made ground are below the CVs referred to for the protection of human health but are above those for the protection of plants. Copper was present above the CVs for the protection of plants in one sample of shallow made ground.

8.1.11. The sample of odorous material collected from TP8 (TP8.ES2, 2.5m bgl) contained total petroleum hydrocarbons (TPH) at 4,800 mg/kg with concentrations of the aromatic hydrocarbon bands >C8-C10, >C10-12, >C12- BTEX compounds were present but at concentrations below the relevant CVs. A number of additional VOCs were also present as summarised in Table 8.2 below.

8.1.12. The sample of material from TP8 at shallower depth (TP8.ES1; 0.8m) did not contain any detectable concentrations of TPH; BTEX compounds were present although again were below the relevant CVs.

8.1.13. The sample collected from TP9 where a TCP type odour was noted (TP9.ES2, 2.5m) did not contain detectable banded petroleum hydrocarbons, BTEX compounds, other VOCs or SVOCs.

Table 8.2: Summary of VOC Analysis (other than BTEX)

Sample ref	Detected VOCs ¹	Concentration (mg/kg)	Assessment Criteria (mg/kg) ²
TP8.ES1	1,2,4-trimethylbenzene	0.017	0.35
TP8.ES2	n-propylbenzene	0.022	34
	1,3,5-trimethylbenzene	0.620	none (<i>insufficient data to derive GAC</i>)
	1,2,4-trimethylbenzene	0.300	0.35
TP9.ES2	none	n/a	n/a

1: Only those VOCs present above the limit of detection are detailed

2: Based on CL:AIRE Soil Generic Assessment Criteria for Human Health Risk Assessment, January 2010; 1% SOM residential with consumption of homegrown produce

8.1.14. The concentration of 1,2,4-trimethylbenzene in TP8.ES2 is marginally below the CV of 0.35 mg/kg; this was however present at a depth of 2.5m bgl with substantially lower concentrations being detected at shallow depth (TP8.ES1, 0.8m). 1,3,5-trimethylbenzene does not have a published CV, although if it is assumed to be of similar toxicity and have the same physiochemical properties as its isomer, and exceedance does exist.

8.1.15. The other detected VOCs are substantially below the CVs where established. Additional VOC / SVOC TICs (tentatively identified compounds) were not detected in the 3 samples tested.

8.1.16. Concentrations of PAHs in the made ground were typically below the CVs other than marginal exceedances of benzo(a)pyrene in 1 sample (TP3.ES1) and benzo(b)fluoranthene in 2 samples (TP1.ES1 and TP3.ES1). The PAH indicator compound of naphthalene was below the CVs in all samples.

8.1.17. Total phenols and PCBs (7 congeners) were undetected in the 3 samples submitted for analysis.

8.1.18. Three samples of the made ground were submitted for calorific value testing to assess the potential for combustion. A value of 10 MJ/kg is typically referred to as indicating the material may be combustible and a value of 2 MJ/kg as indicating those that are unlikely to burn². None of the results exceeded the upper level, being in the range 2.3-6.2 MJ/kg. However, given the levels above 2 MJ/kg there may be some combustible material present, most likely due to the presence of unburnt to partially combusted coal and coke in the ash fills or coal fragments in the colliery spoil.

8.2. Results of Groundwater Analysis

8.2.1. There are no existing water quality standards for groundwater. Therefore, groundwater results are compared against Environmental Quality Standards (EQSs) provided for surface waters³. Where an EQS has not been published under the WFD, reference has been made to the EQSs referred to under the EC Dangerous Substances Directive 76/464/EEC. For a number of determinants, the EQS is hardness related. No hardness data is available on the EA website for surface watercourses in the locality, and hence the lowest hardness band of <50 mg/l has been referred to for an initial screening assessment.

8.2.2. In the absence of an EQS reference has been made to the standards provide for groundwater drinking water protected areas or in the Water Supply (Water Quality) Regulations 2000, (typically referred to as the UK Drinking Water Standards or UK DWS). It should be noted that these are particularly stringent as they are used to protect drinking water consumers and hence, although they provide an indication of the presence of any contamination, they are not necessarily directly applicable to the site itself.

8.2.3. Results are summarised below and provided in detail in Appendix D.

Table 8.3: Summary of Groundwater Results

Determinant	Number of samples	Range of Concentrations (µg/l or indicated)	Quality standard adopted and concentration (µg/l or indicated)	Exceedances
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² ICRCL Guidance Note 61/84, Notes on Fire Hazards of Contaminated Land, July 1986, 2nd Edition

³ River Basin Districts Surface Water and Groundwater Classification (Water Framework Directive)(England & Wales) Direction 2009, Part 5

Determinant	Number of samples	Range of Concentrations (µg/l or indicated)	Quality standard adopted and concentration (µg/l or indicated)	Exceedances
pH (units)	1	7.00	6-9 (pH units) EQS	none
arsenic	1	<0.9	50 EQS WFD	none
boron	1	384	1,000 DWS	none
cadmium	1	0.34	0.08 EQS WFD¹	1
chromium total	1	0.3	none	none
chromium III	1	<2	4.7 EQS WFD	none
chromium VI	1	<2	3.5 EQS WFD	none
<i>copper</i>	1	<3	1 EQS WFD ¹	-
lead	1	6.2	7.2 EQS WFD	none
mercury	1	<0.01	0.05 EQS WFD	none
nickel	1	2.0	20 EQS WFD	none
selenium	1	<1.2	10 DWS	none
zinc	1	2.6	8 EQS WFD ¹	none
TPH (C5-35)	1	<10	10 DWS	none
benzene	1	<0.5	10 EQS WFD	none
ethylbenzene	1	<0.5	none	-
toluene	1	<0.5	50 EQS WFD	none
p/m-xylene	1	<1	30 EQS WFD	none
o-xylene	1	<0.5	30 EQS WFD	none
VOC TICs	1	nd	n/a	-
SVOC TICs	1	nd	n/a	-
PCBs	1	nd	n/a	-
<i>total phenols (mg/l)</i>	1	<0.1	0.007 EQS WFD*	-
naphthalene	1	<0.014	2.4 EQS WFD	none
anthracene	1	<0.013	0.1 EQS WFD	none
fluoranthene	1	<0.012	0.1 EQS WFD	none
benzo(bk)fluoranthene	1	<0.02	0.03 EQS WFD	none
benzo(a)pyrene	1	<0.016	0.05 EQS WFD	none
<i>benzo(g,h,i)perylene + indeno(1,2,3-cd)-pyrene</i>	1	<0.022	0.002 EQS WFD*	-
sulphate (mg/l)	1	136.41	400 BRE SD1	none

Notes:

All metals are dissolved unless stated otherwise; all other determinants are total concentrations

EQS: National Environmental Quality Standard for inland surface waters, annual average

UK DWS: Water Supply (Water Quality) Regulations 2000

* Environmental Quality Standard below analytical limit of detection

1. Hardness related; reference made to hardness band <50 mg/l for screening assessment

8.2.4. The concentration of cadmium is, at 0.34 µg/l, above the EQS of 0.08 µg/l established for water bodies where the hardness is <50 mg/l. It is likely the hardness of the receiving watercourse is higher than this, reports on the Cable Tip having referred to hardness bands of 100-150 mg/l. However, the concentration remains above the least conservative EQS value of 0.25 µg/l for hardness band >250 mg/l.

8.2.5. The analytical limit for copper is above the EQS established for the lowest hardness band at 3 µg/l compared to EQS of 1 µg/l, although below that for the least conservative band of 28 µg/l.

8.2.6. The analytical limit of detection for total phenols and the PAHs benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene for which EQSs are established are higher than the EQSs. Phenols were however undetected within the soil samples and potential significant impacts on the underlying groundwater are not therefore considered likely.

8.2.7. Concentrations of all other determinants were below environmental quality standards.

8.3. Results of Soluble Sulphate Analysis

8.3.1. 2 samples of the shallow ashy made ground natural, 1 sample of shale and 3 samples of the underlying clay (possible natural or reworked clays) were subject to BRE 2:1 soluble sulphate analysis.

8.3.2. 2 samples (TP8.ES2: ash made ground and TP11.ES2: shale made ground) contained water soluble sulphate in exceedance of the BRE Special Digest SD1 (2009) threshold of 0.5 g/l that would indicate the requirement of the use of sulphate resistant concrete within the development. The single sample of groundwater collected from BH1 contained soluble sulphate below the 0.4 g/l groundwater threshold concentration.

8.3.3. The groundwater is classified as mobile, and based on the groundwater pH, the overall results and ACEC classification is as follows:

Table 8.4: Summary of Concrete in Aggressive Ground Assessment

Determinant Soils	Number of Samples	Range Results	BRE SD1 sulphate assessment	
			Characteristic value	Table 5.2 classification
soluble sulphate mg/l (2:1 extract – made ground / possible natural	5	<63-1,300	1,300 ¹	DS-2
sulphate mg/l – groundwater	1	136.41	136 ¹	DS-1
pH (soils) – all soils	13	7.0-8.0	7.1 ²	AC-1
pH (groundwater)	1	7.00	7.0	AC-2

1: highest result of data set; 2: characteristic value is the mean of the lowest 20% of the results

8.3.4. Concrete classification risk assessment based on concentrations of soluble sulphate within the made ground indicate a worst-case design sulphate class (DC) of DS-2. Based on the pH result obtained for the soils, and assuming mobile groundwater within the made ground, an

Aggressive Chemical Environment for Concrete (ACEC) classification of AC-2 is indicated. It should however be noted that the highest two 2:1 soluble sulphate results were obtained for the deeper made ground and it may be necessary to alter the classification further with additional testing, once foundation and infrastructure design proposals are available.

8.3.5. In addition, the underlying colliery spoil may contain sulphides in the form of pyrite and if concrete is to be constructed within the colliery spoil further consideration of the potential for sulphides to be present should be considered, with further testing conducted as necessary. Similar considerations apply to the Coal Measures bedrock.

8.4. Results of Ground Gas Monitoring

8.4.1. Guidance published by CIRIA ("Assessing risk posed by hazardous ground gases to buildings", CIRIA C665, 2007), CIEH ("The Local Authority Guide to Ground Gas", CIEH, 2008) and BS8485:2007 ("Code of Practice for the Characterisation and Remediation of Ground Gas in Affected Developments") has been referred to in determining potential risks posed by ground gases. Screening assessment criteria of 1% methane, 5% carbon dioxide and 0.07 l/hr gas screening value have been referred to initially. The gas screening value (GSV) is the product of gas concentration and flow.

8.4.2. The results of the ground gas monitoring are summarised below and presented in detail in Appendix F.

Table 8.5: Summary of Ground Gas Results

Well	No. visits	max CH ₄ (%)	max CO ₂ (%)	max Flow (l/hr)	CH ₄ GSV (l/hr)	CO ₂ GSV (l/hr)	min O ₂ (%)	max VOC (ppm)
BH1	6	<0.1	4.7	<0.1	<0.07	<0.07	14.2	0
BH2	6	<0.1	3.6	<0.1	<0.07	<0.07	14.3	0
BH3	6	<0.1	11.8	<0.1	<0.07	<0.07	6.6	0.8
Site ¹	6	<0.1	11.8	<0.1	<0.07	<0.07	6.6	0.8

1: Site classification is based on highest recorded flows and highest recorded concentration from the full dataset

GSV – Gas Screening Value (=maximum gas concentration x maximum gas flow over monitoring period)

Atmospheric pressure ranged from 985mb to 1009mb.

8.4.3. The atmospheric pressure was below 1,000mb on three monitoring occasions. On two of these the general trend over the preceding days had been falling.

8.4.4. Methane was undetected in any location on any monitoring round.

8.4.5. Carbon dioxide has been detected in all locations on the majority of monitoring rounds. The highest concentrations were consistently detected in BH3 at levels above the assessment criteria and to a maximum of 11.8%, with corresponding depleted oxygen. Gas flows were

negligible with the resulting GSV for this borehole being below 0.07 l/hr. Concentrations of carbon dioxide were lower in BH1 and BH2 with no exceedances of the screening criteria.

8.4.6. Gas flow rates were negligible on all occasions.

9. Revised Conceptual Site Model and Risk Assessment

9.1. Methodology

- 9.1.1. Information from the site investigation has been used to refine the likely source-pathway-receptor relationships identified in the preliminary Conceptual Site Model (CSM). A Tier 1 risk assessment has been undertaken by comparison of contaminant concentrations in various media (soil, groundwater and ground gas) to generic screening criteria. These are values appropriate to the intended residential end-use of the site and indicate whether potentially unacceptable risks to receptors are likely to exist, requiring either more detailed site-specific risk assessment or remediation to break the potential contaminant linkage.

9.2. Source Risk Assessment

- 9.2.1. The historical mapping indicates the site to have comprised rough open land associated with a nearby Tile and Pipe Works in the late 1800s. A number of mine shafts are mapped in the area and potentially worked coal seams exist below the site at shallow depth and as such the desk study indicated the potential presence of colliery spoil on the site arising from former mine workings. Historical mapping indicates little change on the site between the late 1800s and mid-1900s other than the appearance of a single building between 1938 and 1953/54, and which is now referred to as Esclusham Mill.
- 9.2.2. By the early 1960s the site is mapped as part of a larger 'refuse tip' which extended to the south / southeast and is reported to have formed a Local Authority landfill. Part of the former refuse tip to the south and east (external to the site) is referred to as the Cable Tip and is understood to have been tipped with industrial wastes including cables, paint & tins, insecticide, food waste paper and sawdust, capacitors and soap. The site itself, and adjoining land to the south, is mapped as forming part of a scrap yard by 1993.
- 9.2.3. The intrusive investigations encountered two principal types of made ground, a typically ashy sand and a coarse clayey shale gravel (colliery waste) both of which were interbedded and are therefore assumed have been tipped concurrently across the site. The made ground was generally thin in the north and west and deepening to the south and west. The ashy sand made ground contained frequent clinker and brick with occasional metal, glass, plastic and occasionally rubber and newspapers. The clayey shale gravel contained occasional glass. Industrial wastes in the form of cables, drums and tins were not encountered in any location and the 'Cable Tip' identified to the south of the site is not considered to have extended onto the site. Wastes encountered on the site are consistent with old (1950s) domestic waste and colliery spoil.
- 9.2.4. The intrusive investigations, soil and water analysis and ground monitoring have identified the following sources of contamination:

- concentrations of the metals / metalloids arsenic and lead and the PAHs benzo(a)pyrene and benzo(b)fluoranthene in the near-surface ashy made ground above the human health screening criteria;
- concentrations of zinc, and in one location copper, in the near-surface ashy made ground above the screening criteria referred to for protection of plants;
- odorous material in TP8 (at 2.5m bgl) with concentrations of the aromatic hydrocarbons >C8-C10, >C10-12, >C12-16 and >C21-35 above the human health screening criteria; the VOC isomers of trimethylbenzene was present at or above the human health screening criteria;
- a TCP type odour was noted in the made ground in TP9 at 2.5m bgl; although common VOC contaminants were below the relevant limit of detection in the soil sample from this area;
- consistently elevated carbon dioxide has been detected in one location (BH3) with corresponding oxygen, albeit with low gas flow rates;
- site is located within an area of reported elevated natural radon levels;
- the groundwater in BH1 contained elevated concentration of cadmium;
- potentially elevated soluble sulphate within the made ground / colliery spoil and potential for sulphides in the form of pyrite within the colliery spoil.

9.2.5. A review of investigation reports for adjoining sites has not identified any significant off-site sources of contamination that may affect the site that have not been considered as part of the intrusive investigation.

9.3. Potential Receptors

9.3.1. The principal vulnerable receptors, assuming residential development of the site, will be:

- construction workforce;
- future site users;
- on-site building structures and infrastructure (properties; roadways; services);
- gardens and soft landscaping areas;
- groundwater within the Coal Measures; and,
- nearby surface watercourses to the southeast of the site.

9.4. Human Health Risk Assessment

9.4.1. No soil contaminants identified were recorded at concentrations that would be expected to pose an acute risk to human health; risks to construction and maintenance workers, and surrounding residents, are considered therefore to be minimal provided normal occupational hygiene measures are adhered to.

- 9.4.2. The ashy made ground present across the site contains arsenic and lead, and to a lesser extent, benzo(a)pyrene and benzo(b)fluoranthene at concentrations above the assessment criteria established for the protection of human health for the proposed landuse. These contaminants principally pose a potential risk to human health via ingestion / inhalation / dermal contact when present in near-surface / exposed soils. Asbestos has not been detected.
- 9.4.3. The principal potential risk posed by the hydrocarbon contamination identified in TP8 with respect to human health is the generation of volatile gases and inhalation (for aromatic bands >C5-C16) and ingestion (>C21-35). The impacted material was present at a depth of 2.5m bgl and as such is unlikely to give rise to a significant risk in the context of built development containing gas protection measures.
- 9.4.4. The sample of odorous material in TP9, at 2.5m bgl, did not contain any elevated levels of hydrocarbon or other organic VOC contamination and risks to human health are not indicated. However, it is advised further inspections are carried out in this area to determine whether any contamination not encountered to date is present.
- 9.4.5. It is of note that the additional investigations completed in 2018, local to TP8 & TP9 (TP211 & TP210) did not encounter any. However, it is advised further inspections are carried out in this area during the remediation / preparatory earthworks to confirm the absence of significant contamination and confirm whether any additional specific remedial measures are necessary.

9.5. Ground Gas / Vapour Risk Assessment

- 9.5.1. Carbon dioxide is present within BH3 at concentrations above the gas screening level, albeit at low gas flows. The presence at a maximum of 11.8% places the site as CIRIA Characterisation Situation 2 (CS2) indicating the requirement to install gas protection measures within newly constructed buildings. For low rise housing with a clear ventilated void that meets the model NHBC definition, the concentration of carbon dioxide would place the site as Amber 1.
- 9.5.2. Further consideration of ground gas risks was made in the SGP letter report: “*Legacy Scrap Yard/Esclusham Mill, Llwyneinion, Rhosllanerhugog: Ground Gas Risks*” (Ref: R2499-L20180215 Ground Gas RA (Final), Dated 15th February 2018). The report concluded that:
- risks from gas sources within and immediately adjacent to the Development Area are accurately represented by the existing site characterisation and can readily be managed by standard gas protection measures. Further confirmation of this will be obtained during preparatory and remediation earthworks.

- There is less certainty regarding potential off-site sources, assessment of whose potential to impact the site is more difficult using a limited monitoring dataset. The distances of the sources to the Development, the intervening geology, and the assumed lack of impacts in other nearby high-sensitivity receptors implies these risks are not substantial but even in a worst-case scenario, well developed and effective mitigation technologies exist which could be applied in a small to medium sized development scenario.
- The use of the site as a scrap yard may have resulted in spills or leaks of fuels and some odours, elevated photo-ionisation detector readings and confirmed incidence of volatile hydrocarbons indicate that risks from Volatile Organic Compounds (VOCs) will also have to be considered. Some of the other, external sources of ground gas may also be co-contaminated by VOCs. In general, the remediation methods of source removal/reduction and barriers required to mitigate risks from bulk ground gases considered in this report will remain effective for such contaminants and their presence is similarly unlikely to absolutely preclude the safe development of the site.
- Substantial further investigation is required to allow detailed design of an appropriate Remediation Strategy: a coal mining risk assessment, further gas monitoring and possibly targeted delineation exercises will be required as a minimum.

9.6. Property Risk Assessment

- 9.6.1. The proposed redevelopment of the site will include residential buildings, an access road, car parking, drainage infrastructure, utility services, gardens and areas of soft landscaping. The concentrations of zinc present within the made ground are such that may pose a risk to sensitive plant species if present within near-surface soils in gardens and areas of soft landscaping.
- 9.6.2. Given the nature of the made ground on site a water supply pipeline risk assessment should be completed once final pipe lay runs are known, to ensure the correct materials for water pipelines are used.
- 9.6.3. Levels of soluble sulphate within the made ground (BRE 2:1 sulphate) are low to moderate and moderate risks of aggressive conditions to concrete are indicated. The deeper colliery spoil or Coal Measures rocks may also pose a risk due to the potential presence of sulphides. Depending on the preferred foundation solution and depth to drains some further assessment of the appropriate concrete design class may be required.

9.7. Controlled Waters Risk Assessment

- 9.7.1. Shallow groundwater has not been recorded within the made ground across the site, with groundwater being encountered at depths of >3m bgl. Investigations of the adjoining site have concluded that groundwater movement is most likely vertically via the underlying weathered

mudstones and / or mine workings, and not via lateral movement towards the stream to the southeast.

9.7.2. An elevated concentration of cadmium has been detected in the groundwater from BH1. Previous investigations undertaken on behalf of WCBC of adjoining land did not identify any contamination of the downgradient watercourse with regard to cadmium; although it should be noted that the current EQS is now substantially lower than previously, and typically lower than historic limits of detection.

9.7.3. The proposed development will result in the covering of a greater proportion of the site with hardstanding than previously, reducing the degree of infiltration and, hence leaching. The underlying groundwater is not abstracted locally, and if not in direct continuity with the watercourse, the potential impact from the site is not considered significant in the context of the wider area and sensitivity of local controlled waters receptors.

9.8. Revised Conceptual Site Model

9.8.1. The revised CSM is summarised overleaf.

Table 9.1: Revised Conceptual Site Model

Receptor	Source / Contaminant	Pathway / Exposure	Pollutant Linkage (in absence of mitigation)	Further Investigation / Remediation
1. humans – construction workers / future maintenance engineers	metals / metalloids / organics within made ground deposits	dust inhalation, dermal contact and accidental ingestion – short term exposure	Unlikely – concentrations of metals and organic compounds (PAHs and hydrocarbons) unlikely to pose an acute health risk provided normal occupation hygiene and environmental controls are in place. No asbestos fibres were identified.	No specific requirements other than normal occupation hygiene. However, vigilance should be maintained, and suitable precautions taken in event unexpected / unknown materials encountered.
2. humans – future occupiers	metals / metalloids / organics within made ground deposits	dermal contact / ingestion / dust/vapour inhalation	Possible - concentrations of arsenic and lead above assessment criteria and may pose a long-term risk if present in shallow soils	Mitigated through provision of clean cover system in garden / soft landscaping areas; additional inspections in areas of hydrocarbon contamination to determine whether additional mitigation measures required
	ground gas (methane / carbon dioxide) from made ground / mine gas	accumulation within voids, confined spaces and service runs	Possible – Significant organic deposits with the potential to generate ground gas were not identified. Carbon dioxide recorded above screening criteria although with negligible gas flow rates; methane gas not detected at elevated concentrations	Site characterised as CIRIA CS2 / Amber 1 conditions; mitigated through provision of gas protection measures within buildings and possibly in-ground barriers -further monitoring to inform detailed design required
	radon gas from natural ground	accumulation within voids, confined spaces and service runs	Possible – site is identified as being in area where 3-5% properties contain radon above the action level	Mitigated through use of radon protection measures in building construction
3. property / services	ground gas from made ground / mine gas	accumulation within voids, confined spaces and service run	Possible – Significant organic deposits with the potential to generate ground gas were not identified. Carbon dioxide recorded above screening criteria although with negligible gas flow rates; methane gas not detected at elevated concentrations.	Site characterised as CIRIA CS2 / Amber 1 conditions; mitigated through provision of gas protection measures within buildings and possibly in-ground barriers -further monitoring to inform detailed design required

Receptor	Source / Contaminant	Pathway / Exposure	Pollutant Linkage (in absence of mitigation)	Further Investigation / Remediation
	pH, sulphate and organic contaminants	chemical attack of buried concrete and plastic materials	Possible – elevated concentrations of soluble sulphate present which could attack concrete; pyrite may be present within colliery spoil, hydrocarbons present	Mitigated through use of appropriate concrete; a water supply pipeline risk assessment should be completed;
4. vegetation / landscaping	leachable metals / metalloids may be present within made ground	plant uptake	Possible – elevated concentrations of phytotoxic metals were reported above DEFRA plant values for crops and sensitive species	Mitigated through provision of clean cover system to gardens / soft landscaping
5. ecosystems / protected species & habitats	n/a – no ecosystems / protected habitats in immediate vicinity			
6. surface waters – unnamed downgradient watercourse	leachable metals / metalloids / organics present within made ground	leaching from soils and migration via groundwater in made ground, drains, surface runoff	Unlikely – previous investigation of wider area concluded preferential pathway was via mineworking's / weathered Coal Measures and not laterally towards the watercourse	no action required; provision of areas of hardstanding and drainage system will reduce current infiltration
7. groundwater – Secondary Aquifer within Coal Measures; Principle aquifer within bedrock	leachable metals / metalloids / organics may be present within made ground	migration via unsaturated zone	Unlikely – vertical migration towards Coal Measures is likely, however significant impact is unlikely; Principle Aquifer is artesian reducing likelihood for vertical migration towards this aquifer	no action required

10. Outline Remedial Strategy

- 10.1. Redevelopment of the site is to residential use proposed. A number of remedial measures will be necessary to ensure the site is suitable for the development and to protect the surrounding environment. However, contamination has not been identified on the site to an extent that would preclude redevelopment of the site for this end-use. The fundamental requirements will be to break existing and future potential linkages via containment, treatment and / or disposal. The conceptual model of the site was developed to provide a systematic risk assessment for the development of an appropriate outline remedial strategy. This considers the likely requirements of the site development, including technical, commercial, practical and sustainability issues. The following outlines the likely remedial options that will be necessary, although a full options appraisal has not been undertaken at this stage.
- 10.2. Site preparation works will involve the clearance of residual surface materials, demolition of the residual site building and breaking out of any remaining structures including drainage networks. Given the potential presence of asbestos containing materials within the building, a Type 3 pre-demolition asbestos survey will be necessary prior to any demolition works. All asbestos stripping of existing structures and removal should be undertaken in accordance with current legislation, HSE codes of practice and waste disposal legislation. All potentially usable brick and concrete should be stockpiled and retained on site for use within the development.
- 10.3. It is recommended additional inspections are carried out in the area of TP8 and TP9 to confirm the absence of significant hydrocarbon/organic contamination, and to ascertain any specific required remedial measures, such as excavation and off-site removal or treatment of impacted materials. These may be most practically carried out during preparatory earthworks.
- 10.4. Any relict structures and foundations are likely to require breaking out and any significant volumes of deleterious waste materials that are present removed. To date only small quantities of deleterious materials have been encountered on site and extensive deposits are not indicated as being present. Any unexpected or not previously identified materials encountered during the development should be investigated and assessed as necessary by a suitably qualified Environmental Consultant to determine any additional remedial requirements to those set out below.
- 10.5. The ground gas monitoring data indicates the requirement for the installation of gas protection measures in accordance with CS2 conditions (Amber 1 if development meets the NHBC model), however due to changes in best practice and the results of supplementary risk assessment completed since the initial site investigation, some further monitoring is deemed appropriate to inform the detailed design of gas mitigation measures, including both the

specification for in-building protection, and external ground barrier / venting to manage risks from external sources, if required.

- 10.6. The current available information indicates that sulphate resistant concrete should be used in the development; the specific requirements may be re-assessed following obtaining further data.
- 10.7. The provision of a clean soil cover (600mm) through the importation of suitable sub-soil / topsoil will be required in all gardens and areas of soft landscaping. Soil quality criteria will require agreement with WCBC; all placed material will require appropriate quality and depth validation by a suitably qualified environmental consultant.
- 10.8. The requirement for provision of clean cover may necessitate the regrading of the site and off-site disposal of surplus material, or design levels could be amended to accommodate the required thickness.
- 10.9. A water supply pipeline risk assessment will be necessary following completion of the earthworks in accordance with the UKWIR guidance (UKWIR: Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, report ref: 10/WM/03/21, 2010).
- 10.10. A detailed Remedial Strategy, based on the findings of this report and any further investigations, and produced in accordance with EA / Defra CLR11 guidelines will be required by WCBC prior to the commencement of works to prepare the site for development.
- 10.11. The overall Remedial Strategy will require approval by WCBC but is likely to comprise:
- asbestos survey all existing structures prior to demolition;
 - asbestos stripping of existing structures and removal in accordance with legislation, HSE codes of practice and waste disposal legislation, if necessary;
 - breaking out of any residual concrete slabs, foundations, brick structures, voids and drains with inspection of materials and excavations, and testing as necessary; off-site removal of deleterious materials as necessary;
 - retention and stockpiling for crushing of all suitable engineering materials (concrete, brick etc);
 - additional inspections in the area of TP8 and TP9 to confirm absence of significant hydrocarbon contamination;
 - watching brief by site operatives and supervisors during all other excavations to check for uncharacterised contamination sources, supplemented by regular visits by an independent specialist to observe exposed ground and arisings;
 - derivation of appropriate remedial target criteria;

- placement of 600mm clean cover soil layer in gardens / areas of soft landscaping;
- provision of sulphate resistant concrete within the development;
- provision of suitable gas protection measures into built development and, if required, in-ground barriers / venting;
- placement of all services in trenches excavated and backfilled with clean materials; utilisation of appropriate water pipe materials (as advised the utility provider); and,
- contingency for assessment of, and appropriate response to, any unexpected contamination encountered during preparatory and construction excavations.

10.12. Remedial targets and validation testing will be necessary to demonstrate that the site has been remediated successfully, is suitable for the proposed end-use and does not pose an unacceptable risk to human health or the wider environment.

10.13. The following testing and assessment is likely to be required:

- validation and testing of any excavated hydrocarbon hotspots;
- validation of replacement fills used to fill voids, service corridors etc;
- validation testing of cover materials and recording of cover depths;
- inspection and validation of any installed gas protection measures;
- provision of a Completion Report detailing all on-site inspections; in-situ monitoring, soil and groundwater analysis, cover validation, gas protection measure validation etc to all relevant parties.

10.14. The investigations and assessment have not considered geotechnical issues and hence recommendations with regards to piling and ground improvement, foundations, floor slabs, construction, highways and mining are not provided within this report.

10.15. However, it should be noted that the potential exists shallow mineworkings and as such a Coal Mining Risk Assessment should be undertaken. This may require additional investigations to determine the presence of any such shallow mineworkings/disturbed ground which could be combined with a geotechnical appraisal and further gas monitoring.

11. Conclusions

- 11.1. The site investigation confirms that the site appears generally suitable with respect to contamination, for future redevelopment for residential use, without major environmental liabilities, although certain additional investigation and remedial works are necessary to inform detailed design.
- 11.2. These could be incorporated with a geotechnical appraisal to inform foundation and infrastructure/pavement design and investigation of shallow coal mining hazards, if indicated by a Coal Mining Risk Assessment.
- 11.3. Ground conditions typically comprised made ground of interbedded ashy sands and coarse clayey gravels; interpreted as mixed old (1950s) domestic waste and colliery wastes, which thin to the northeast of the site; overlying natural sands and clays in the north/ north east of the site and reworked clays in the centre/south of the site. Below approximately 3.5m bgl weak mudstone bedrock was present.
- 11.4. Extensive deleterious deposits or areas of significant contamination have not been encountered, although the potential does exist for such materials to be present between the investigation entries. It is recommended additional inspections are carried out in the area of TP8 and TP9 to confirm the absence of significant hydrocarbon contamination noted in these areas and to determine whether additional remedial actions are required to those necessary for the wider site.
- 11.5. A more general watching brief for any other contamination indicators (not described during the various phases of site investigation) should be implemented during site preparation and construction works. Full time independent attendance is not deemed necessary, but a watching brief by all groundworkers, supplemented by regular attendance by an independent specialist in land companion for the inspection of exposed materials and implementation of the required verification programme is considered a proportionate response to the moderate levels of risk posed by the site.
- 11.6. A services search on the site undertaken by AAS in 2015 included a No plans of the drainage network, or any associated interceptors have been seen by SGP.
- 11.7. Other general remedial measures likely to be required include the provision of clean cover to gardens and areas of soft landscaping, provision of gas protection measures, provision of sulphate resistant concrete (subject to further testing) and protection of water mains as detailed in Section 10. The details should be provided in a Remedial Strategy to be agreed with WCBC in advance of the commencement of site development works. Subsequent validation of the implemented remedial works will be necessary.

11.8. Limitations

Stratigraphy

11.8.1. The evidence of stratigraphy is taken from discrete borehole and trial pit locations, and from factual information provided by other parties. Whilst it is usually reasonable to infer that similar conditions may extend between these locations, caution should be exercised.

Contamination

11.8.2. The site investigation involved sampling at discrete locations, and it should be recognised that further areas or types of contamination may exist between investigation positions. The analyses performed are drawn from a typical suite of tests used to screen potentially contaminated land and specified to fall within the available budget. It is always possible that other substances may be present that have not been included within the standard range of tests.

Soil gas and groundwater

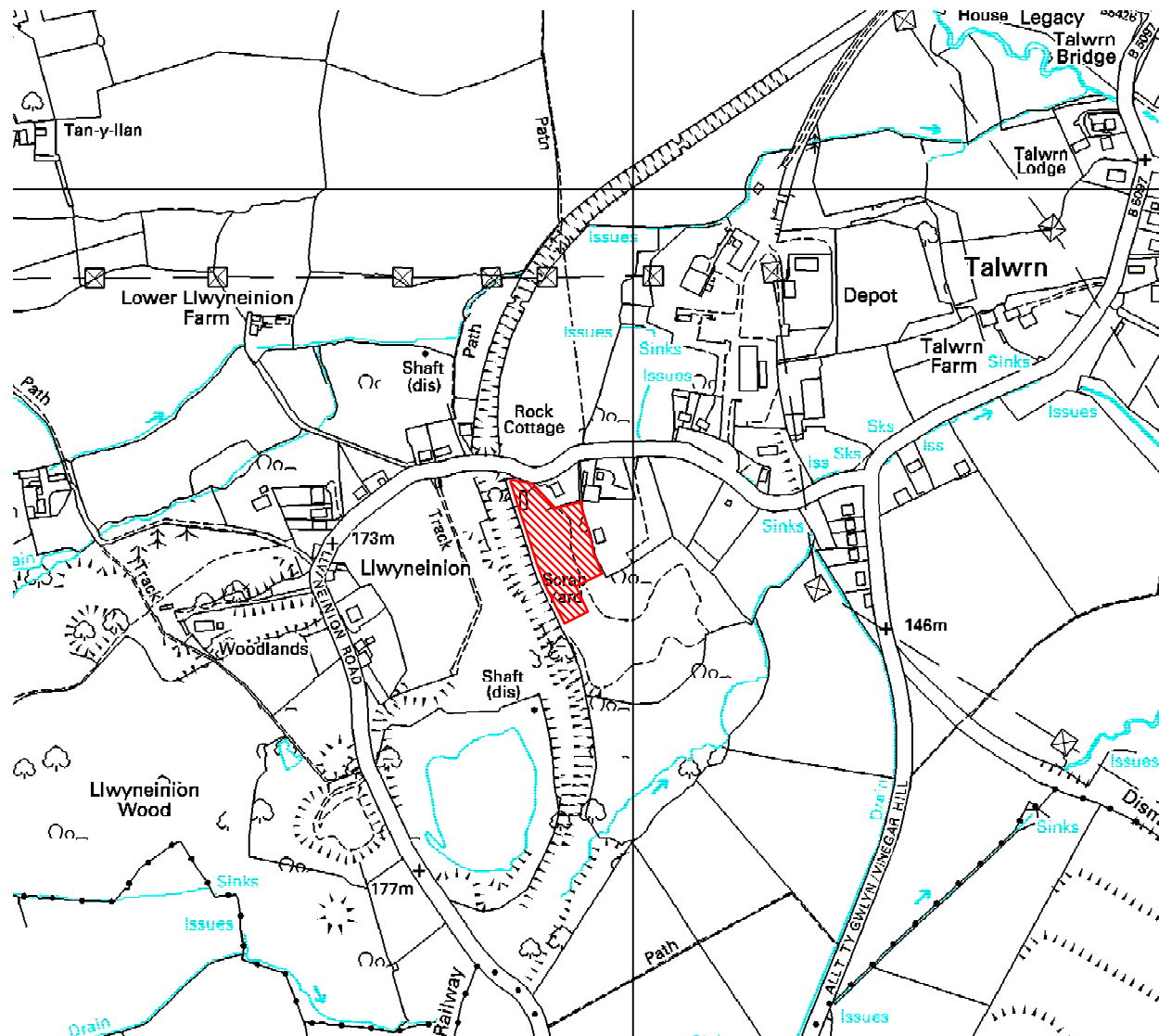
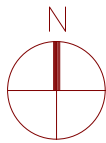
11.8.3. Any comments made on gas and/or groundwater conditions are based on observations or tests made at the time that the work was carried out. It should be noted that gas concentrations and pressures and groundwater levels and concentrations of substances may vary according to seasonal or weather-related effects, sometimes in an unpredictable fashion.

General

11.8.4. This report has been prepared by SGP for the sole and exclusive use of Wrexham County Borough Council. All reasonable skill, care and diligence has been exercised within the budget available, and in accordance with the technical requirements of the brief. Notwithstanding the efforts made by the professional team in undertaking the assessment and preparing this report, it is possible that other ground conditions and contamination as yet undetected may exist. Reliance on the findings of this report must therefore be limited accordingly. Such reliance must be based on the whole report and not on extracts which may lead to incomplete or incorrect conclusions when taken out of context.

11.8.5. SGP reserves the right to alter any of the foregoing information in the event of new information being disclosed or provided and in the light of changes to legislation, guidelines and responses by the statutory and regulatory authorities.

DRAWINGS



 Site Location

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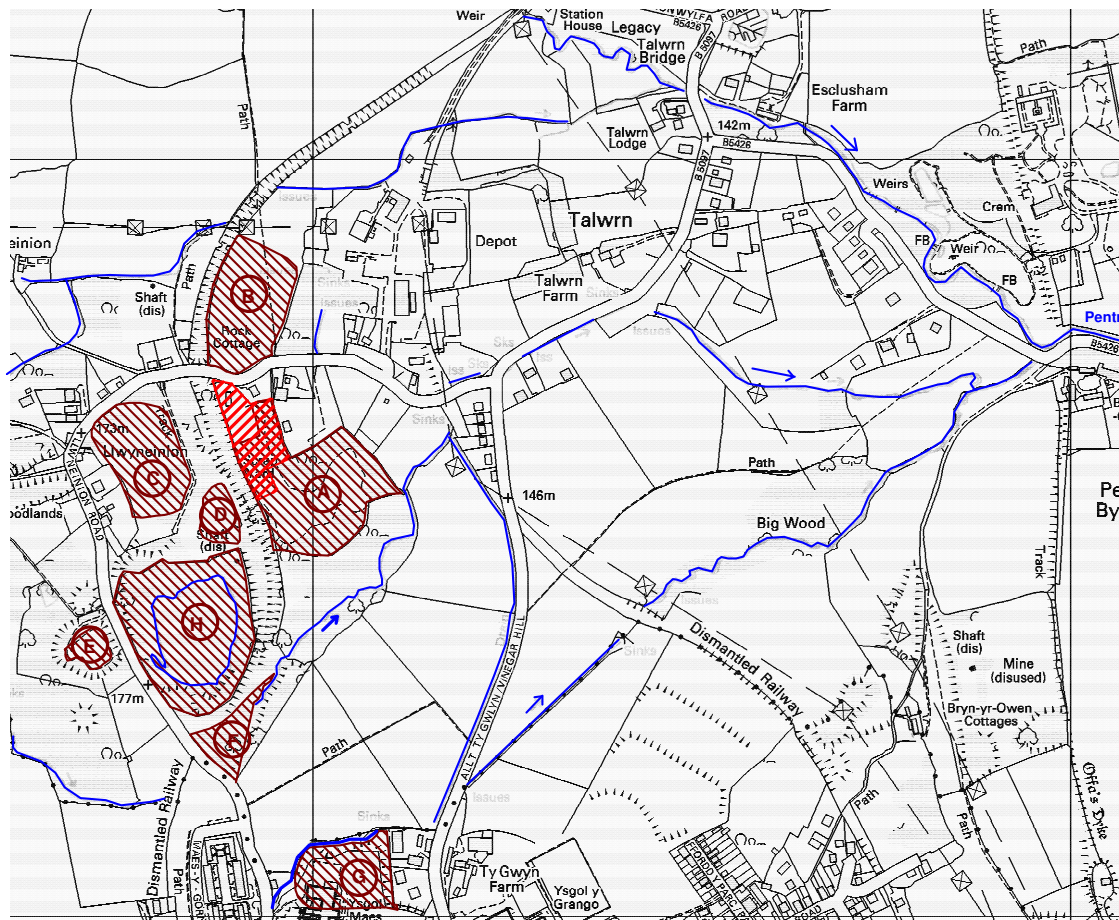
Project: Former Scrap Yard,
Esclusham Mill
Llwyneinion

Drawing:
Site Location

Drawn: SM	Checked: KEH
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Date: 30.06.15	Scale: nts
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Job No: R2122	Drg No: D01
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Site Location



Nearby Former Landfill /
Tip Sites
(based on WCBC data)

- A - Llywneinion Old Refuse Tip No 1
- B - Llywneinion Old Refuse Tip No 2
- C - Monsanto Chemical Tip
- D - Old Dwr Brickworks
- E - Llywneinion Brick Works Small Quarry
- F - Railway Cutting Fill
- G - Cae Dwr Old Tip
- H - Llywneinion Acid Tar Lagoon

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Project: Former Scrap Yard,
Esclusham Mill,
Llywneinion

Drawing: Site Setting

Drawn: SM

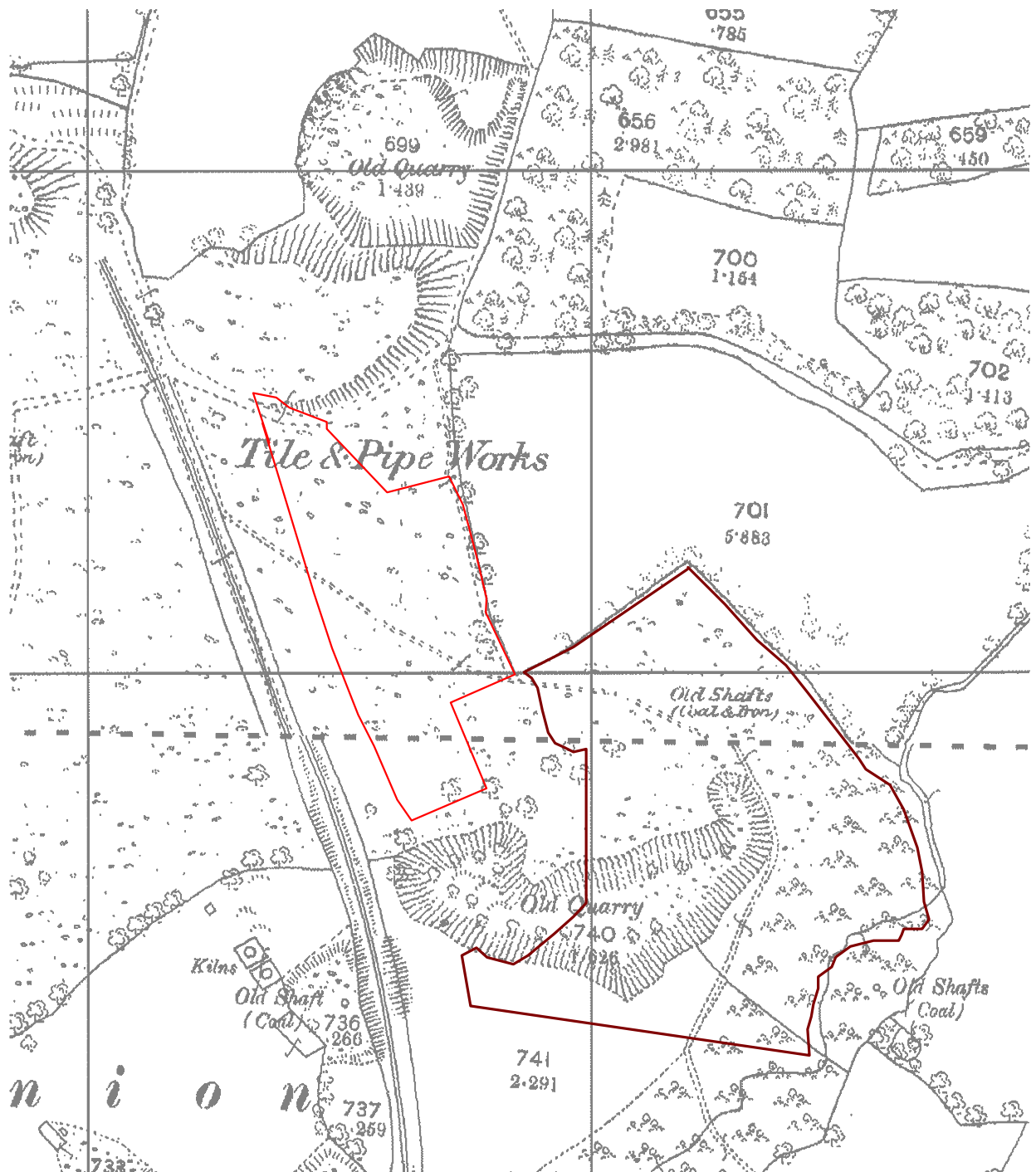
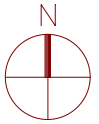
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Job No:
R2122

Drg No:
D02



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Site Boundary



'Cable Tip' Boundary
(as detailed in WCBC reports)



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Project: Former David Kelly Legacy Car
Dismantlers / Scrap Yard,
Llwyneinion

Drawing: Historical Map - 1873-1874

Drawn: SM

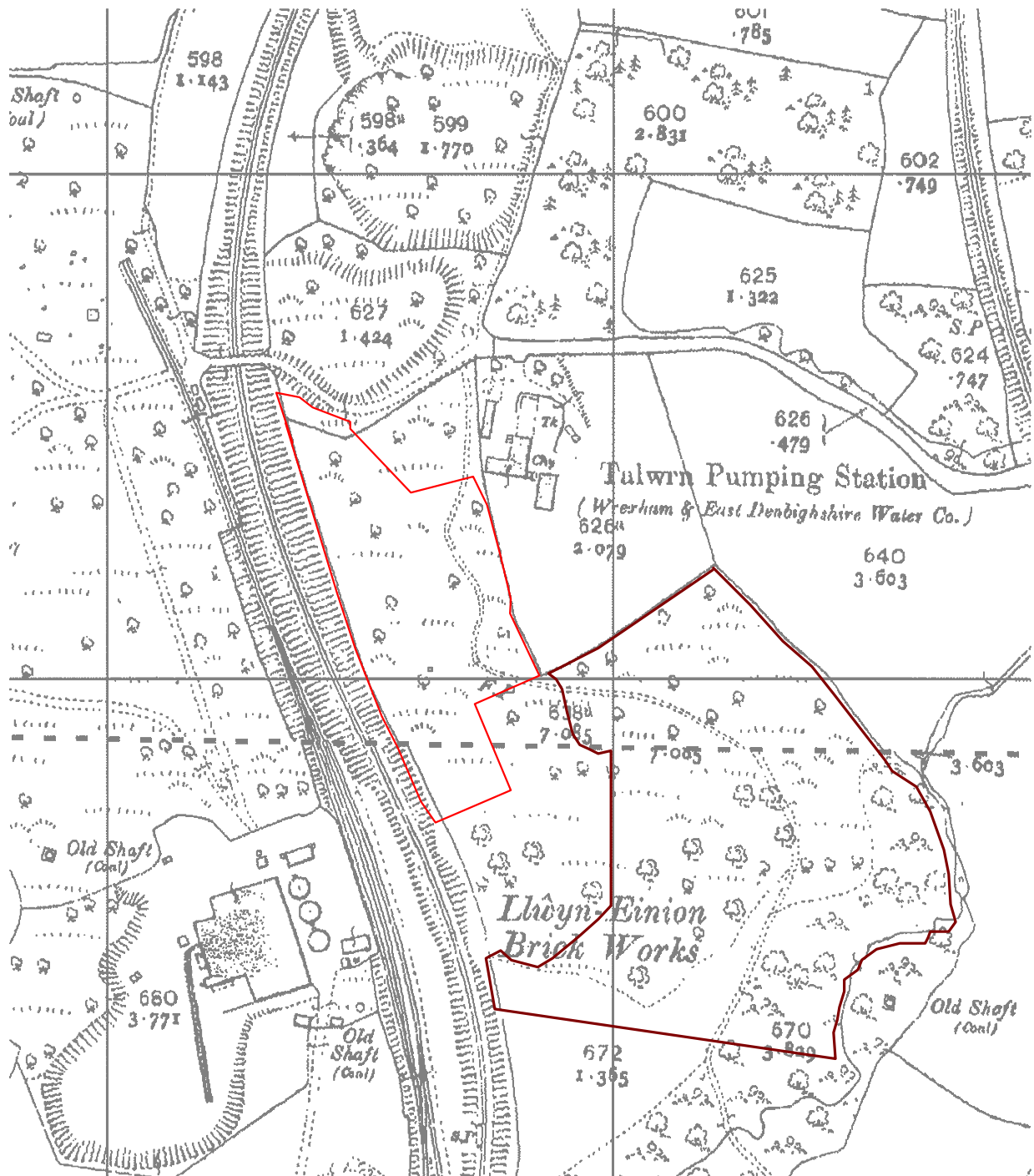
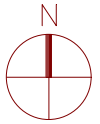
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Drg No: D03



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Project: Former David Kelly Legacy Car
Dismantlers / Scrap Yard,
Llwyneinion

Drawing:

Historical Map - 1912

Drawn: SM

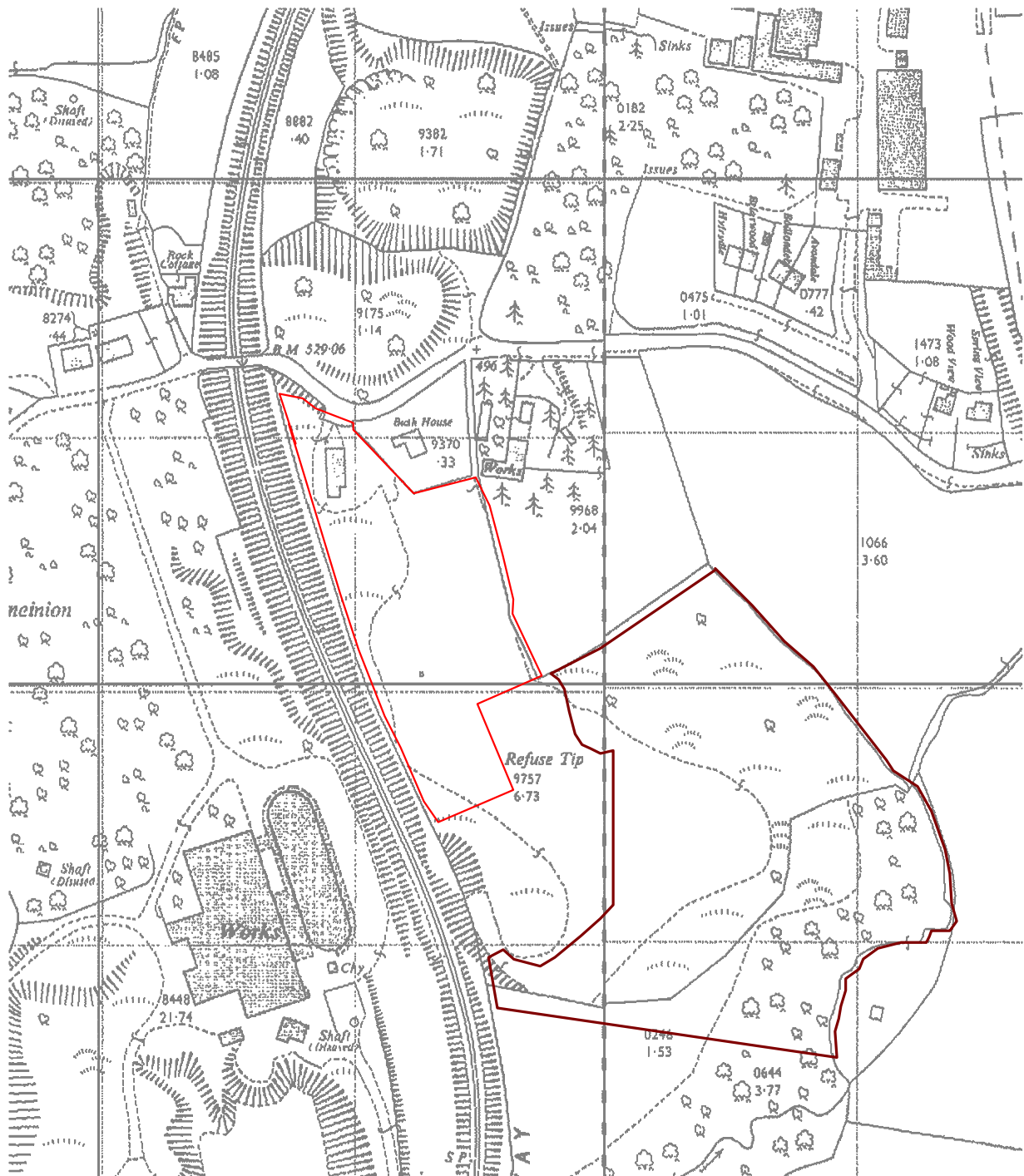
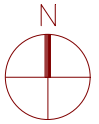
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Job No: R2112

Drg No: D05



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Project: Former David Kelly Legacy Car
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Llwyneinion

Drawing: Historical Map - 1963

Drawn: SM

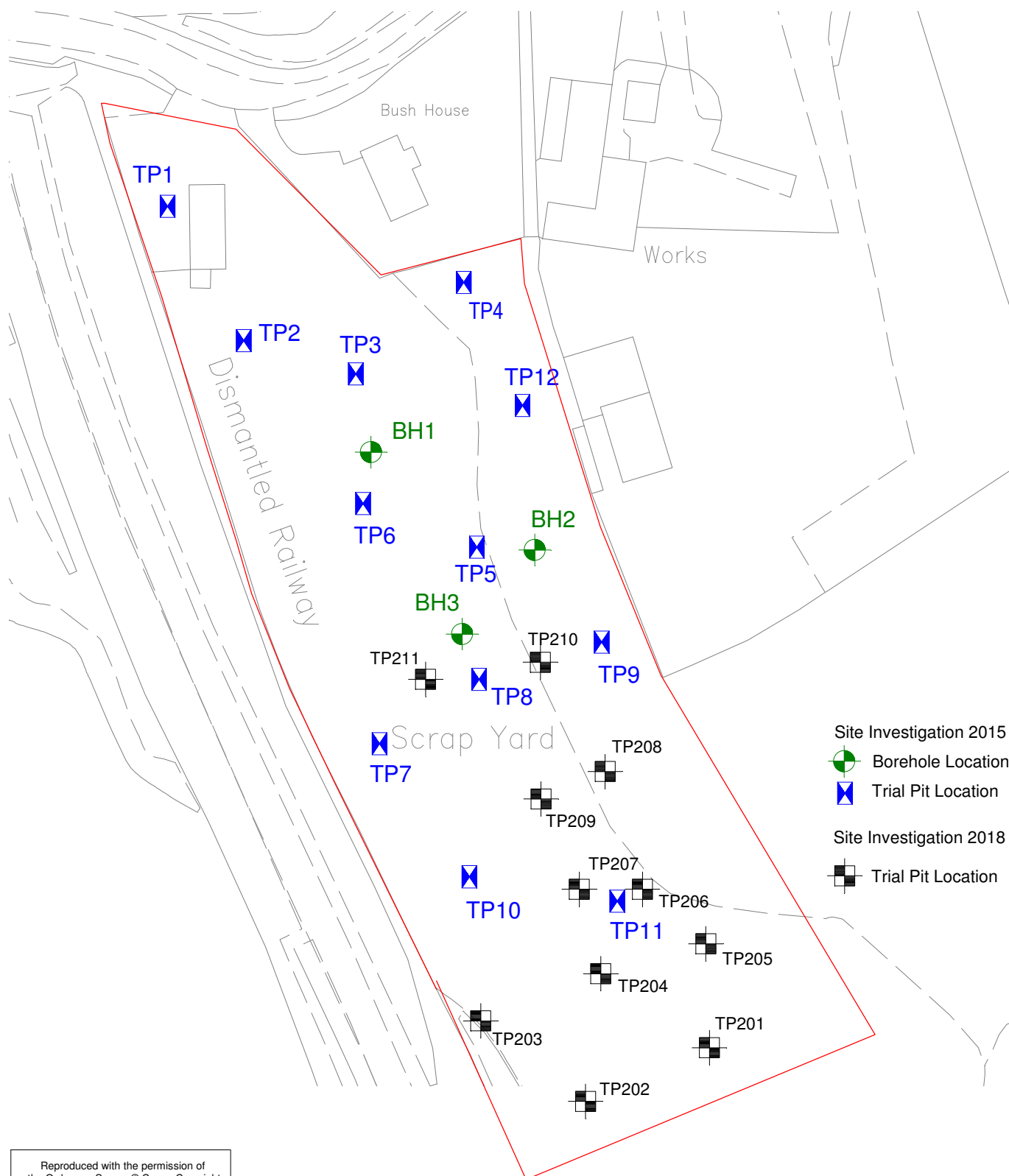
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Job No: R2112

Checked: KEH

Scale: 1:2,500
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Drg No: D06



Site Investigation 2015

Borehole Location

Trial Pit Location

Site Investigation 2018

Trial Pit Location

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Project: Former Scrap Yard,
Esclusham Mill,
Llwyneinion

Drawing: Site Investigation
Locations

Drawn: CS

Date: 19.11.18

Job No: R2499

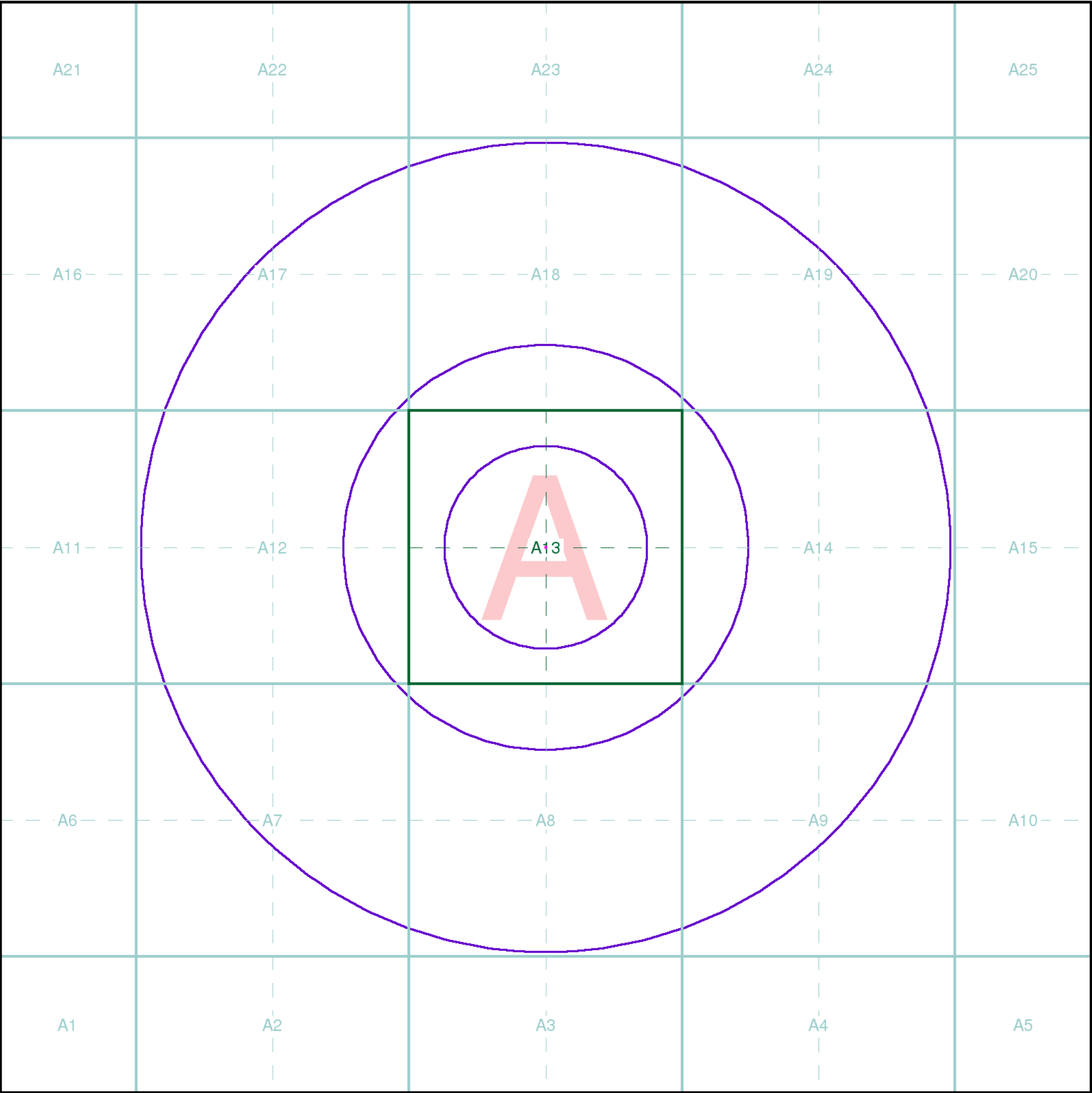
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Drg No: D09

APPENDIX A

R2122_R01-Envirocheck Historical Maps



Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice
Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment
A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant
A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:



Envirocheck reports are compiled from 136 different sources of data.

Client Details
Mr S Miller, Smith Grant Partnership, Station House,
Station Road, Ruabon, Wrexham, LL14 6DL

Order Details
Order Number: 67639020_1_1
Customer Ref: R2122
National Grid Reference: 328930, 347600
Site Area (Ha): 0.01
Search Buffer (m): 1000

Site Details
David Kelly Car Dismantlers, Esclusham Mill, Llwyneinion Roa,
Legacy, Rhostyllen, WREXHAM, Clwyd, LL14 4ET

Full Terms and Conditions can be found on the following link:
<http://www.landmarkinfo.co.uk/Terms/Show/515>



Historical Mapping Legends

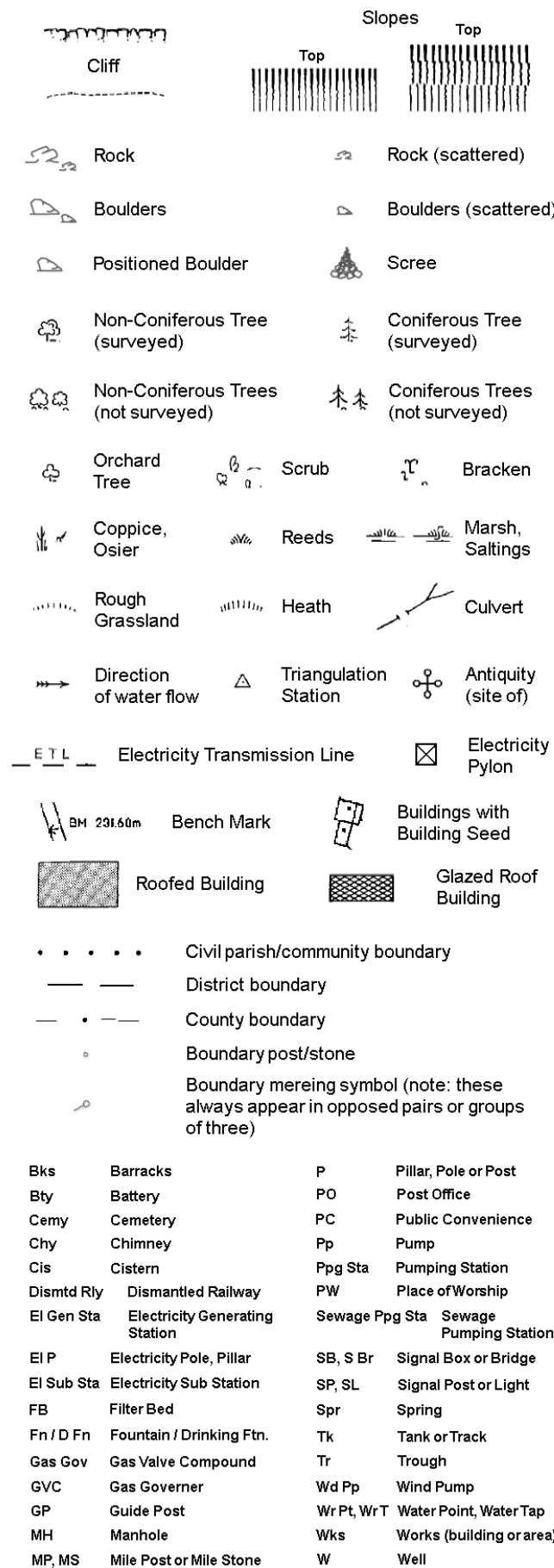
Ordnance Survey County Series and Ordnance Survey Plan 1:2,500



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



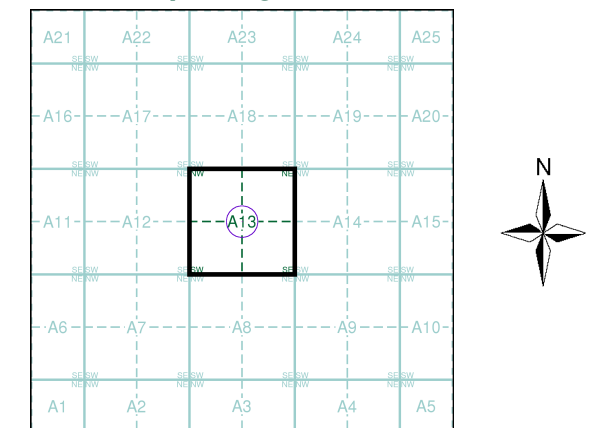
Large-Scale National Grid Data 1:2,500 and 1:1,250



Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Denbighshire	1:2,500	1873 - 1874	2
Denbighshire	1:2,500	1899 - 1900	3
Denbighshire	1:2,500	1912	4
Ordnance Survey Plan	1:2,500	1963	5
Additional SIMs	1:2,500	1963	6
Supply of Unpublished Survey Information	1:2,500	1974	7
Additional SIMs	1:2,500	1988	8
Large-Scale National Grid Data	1:2,500	1993	9

Historical Map - Segment A13



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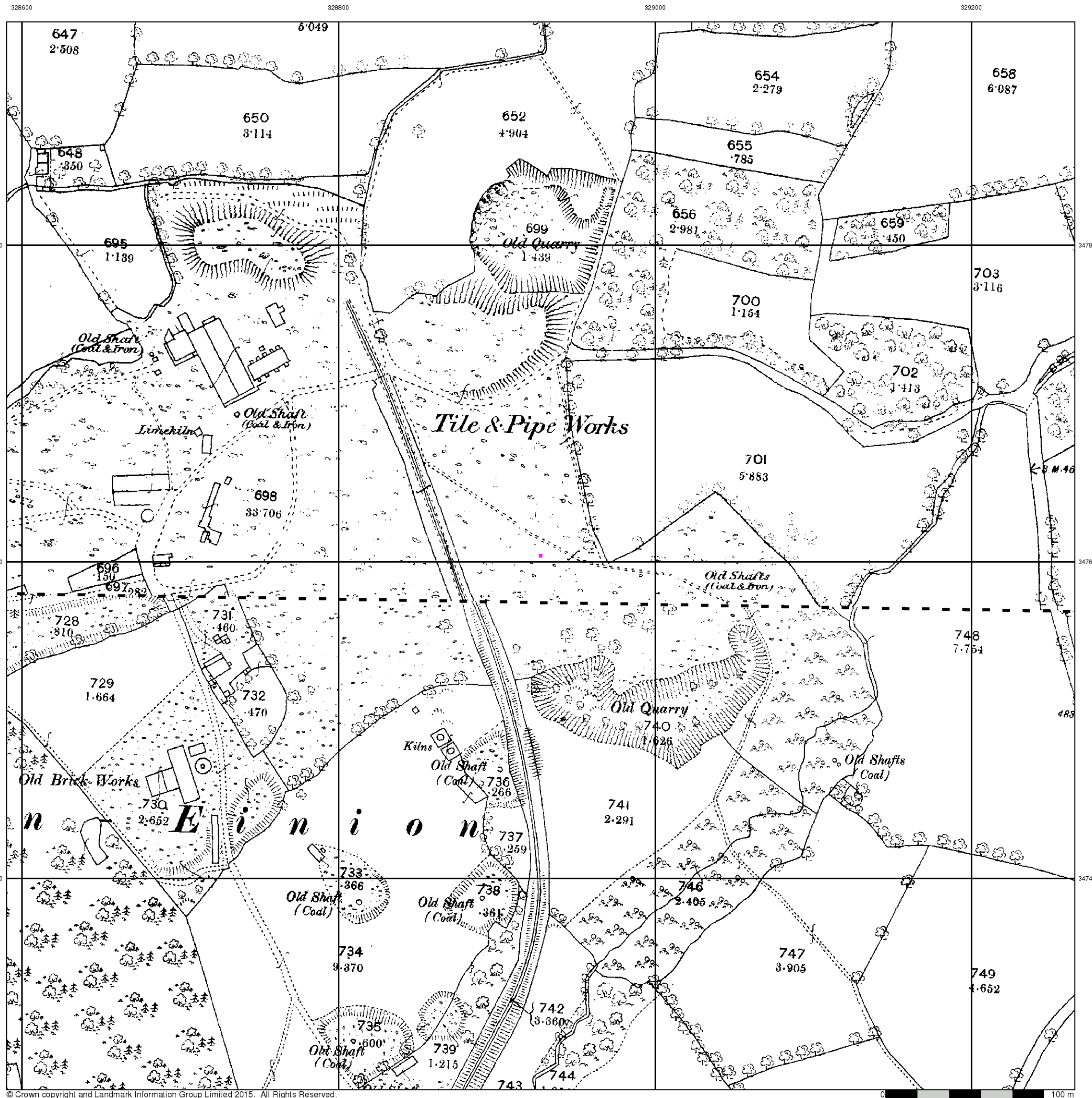
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Search Buffer (m): 100

Site Details

David Kelly Car Dismantlers, Esclusham Mill, Llwyneinion Roa, Legacy, Rhosyllen, WREXHAM, Clwyd, LL14 4ET



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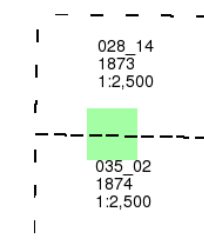
Denbighshire

Published 1873 - 1874

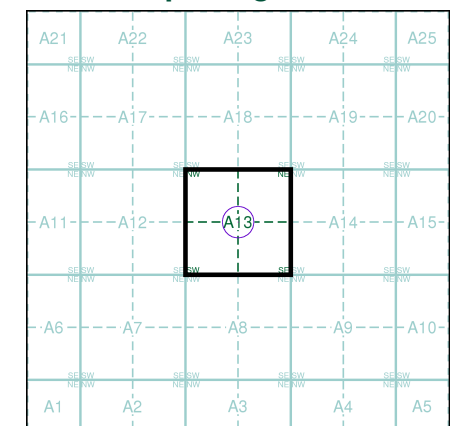
Source map scale - 1:2,500

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

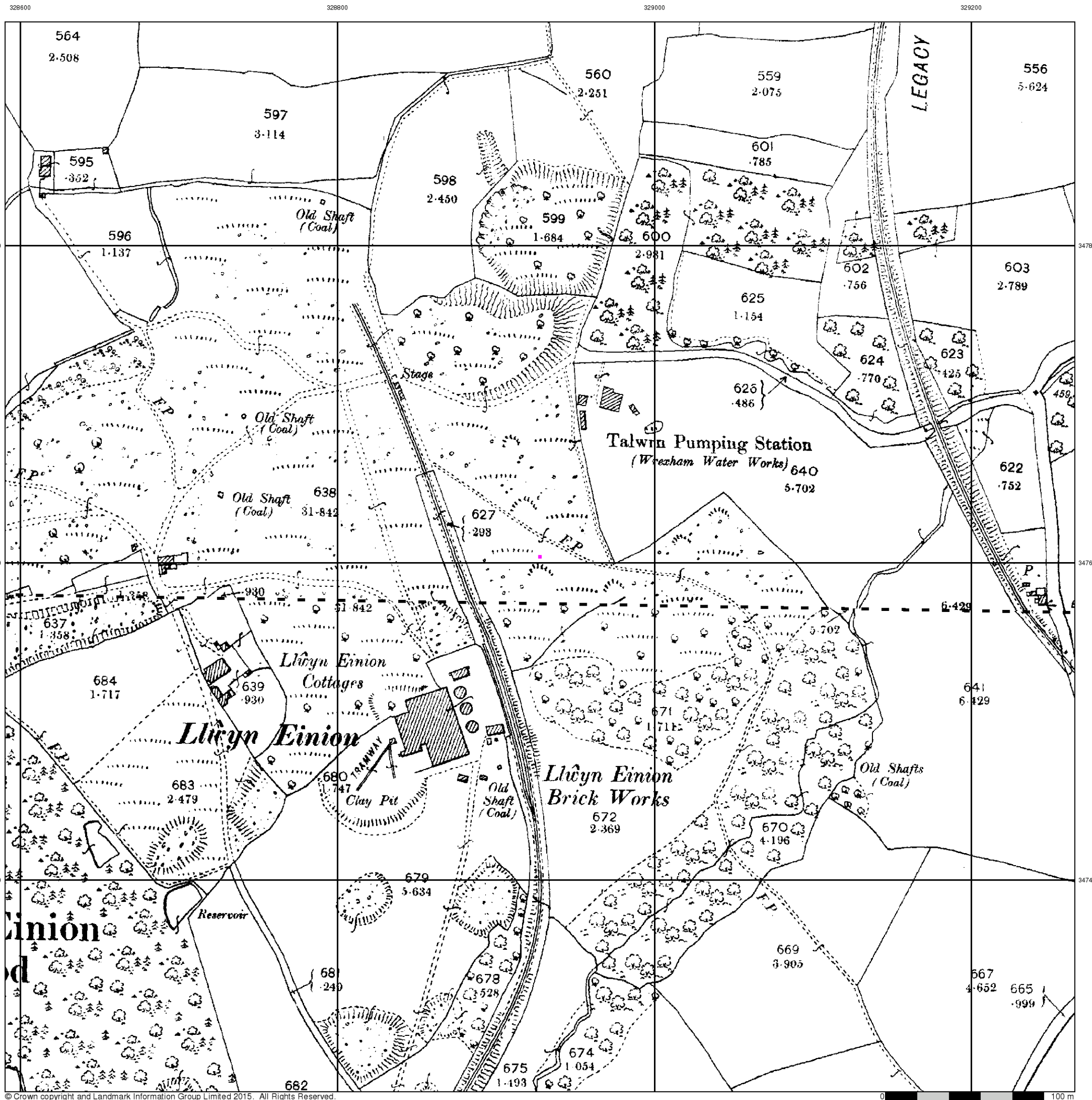
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Search Buffer (m): 100

Site Details

David Kelly Car Dismantlers, Esclusham Mill, Llwyneinion Roa, Legacy, Rhostyllen, WREXHAM, Clwyd, LL14 4ET



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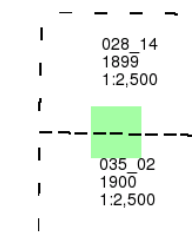
Denbighshire

Published 1899 - 1900

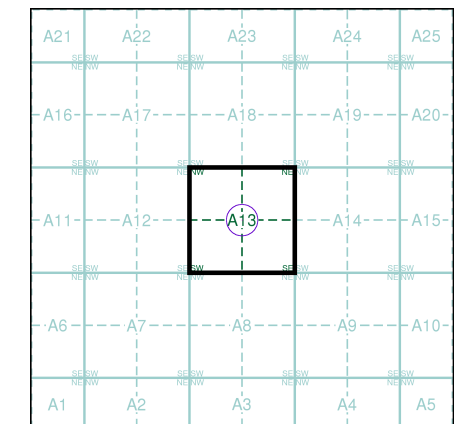
Source map scale - 1:2,500

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

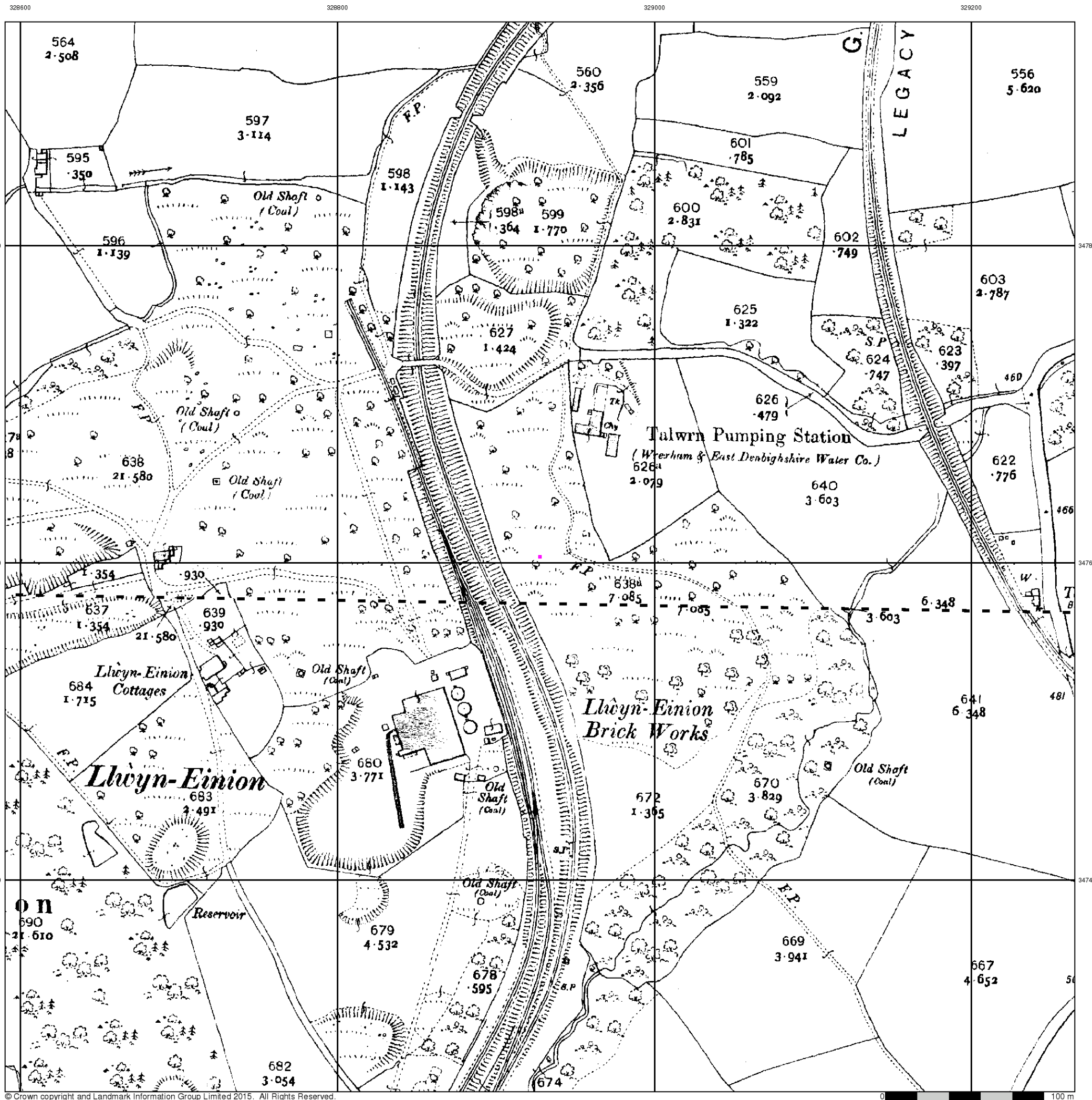
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Customer Ref: R2122
National Grid Reference: 328930, 347600
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 100

Site Details

David Kelly Car Dismantlers, Esclusham Mill, Llwyneinion Roa, Legacy, Rhostyllen, WREXHAM, Clwyd, LL14 4ET



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



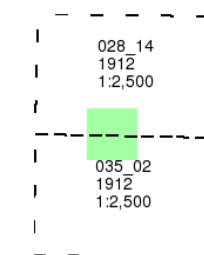
Denbighshire

Published 1912

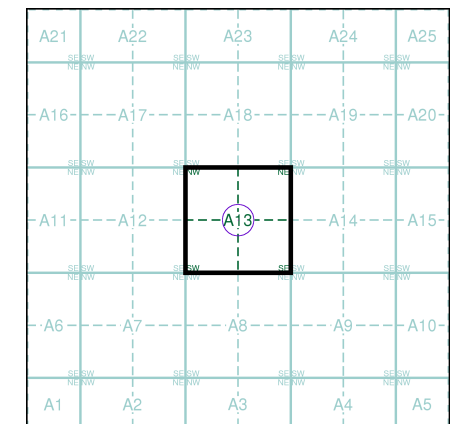
Source map scale - 1:2,500

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

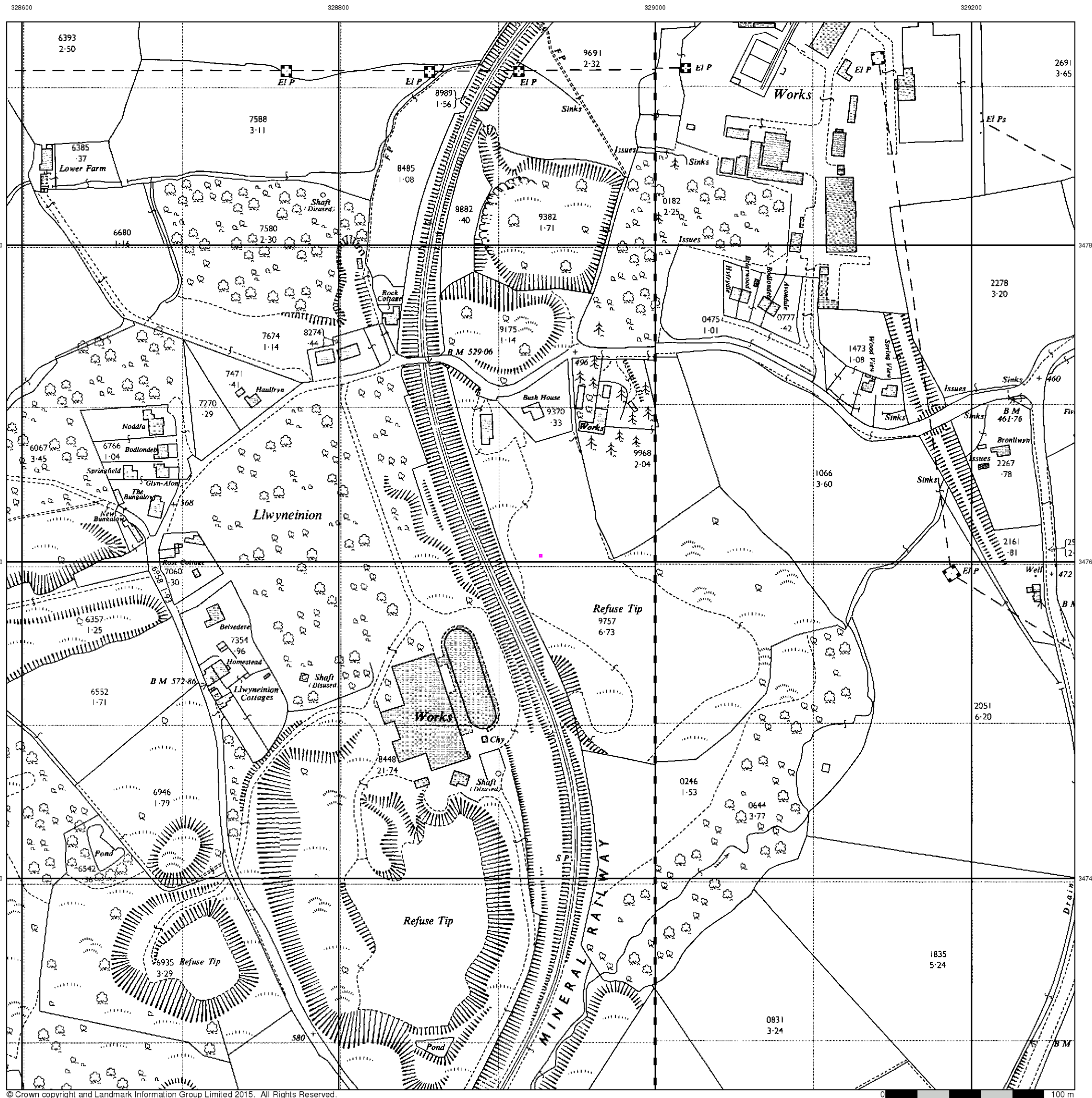
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Slice: A
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Search Buffer (m): 100

Site Details

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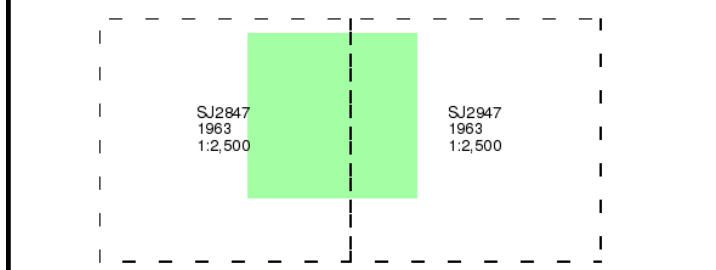
Tel: 0844 844 9952
Fax: 0844 844 9951
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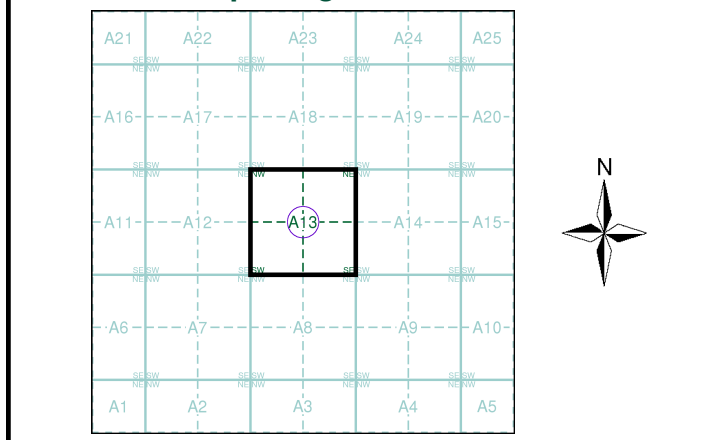
Ordnance Survey Plan
Published 1963
Source map scale - 1:2,500

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: 67639020_1_1
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National Grid Reference: 328930, 347600
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 100

Site Details
David Kelly Car Dismantlers, Esclusham Mill, Llwyneinion Roa, Legacy, Rhosyllen, WREXHAM, Clwyd, LL14 4ET





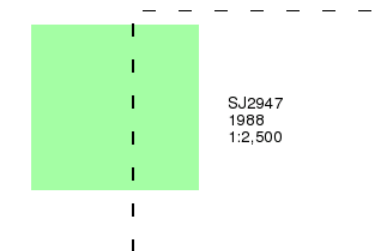
Additional SIMs

Published 1988

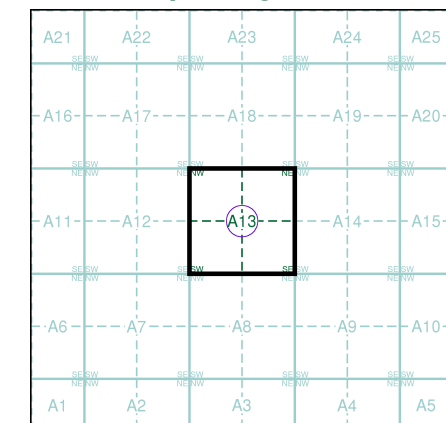
Source map scale - 1:2,500

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

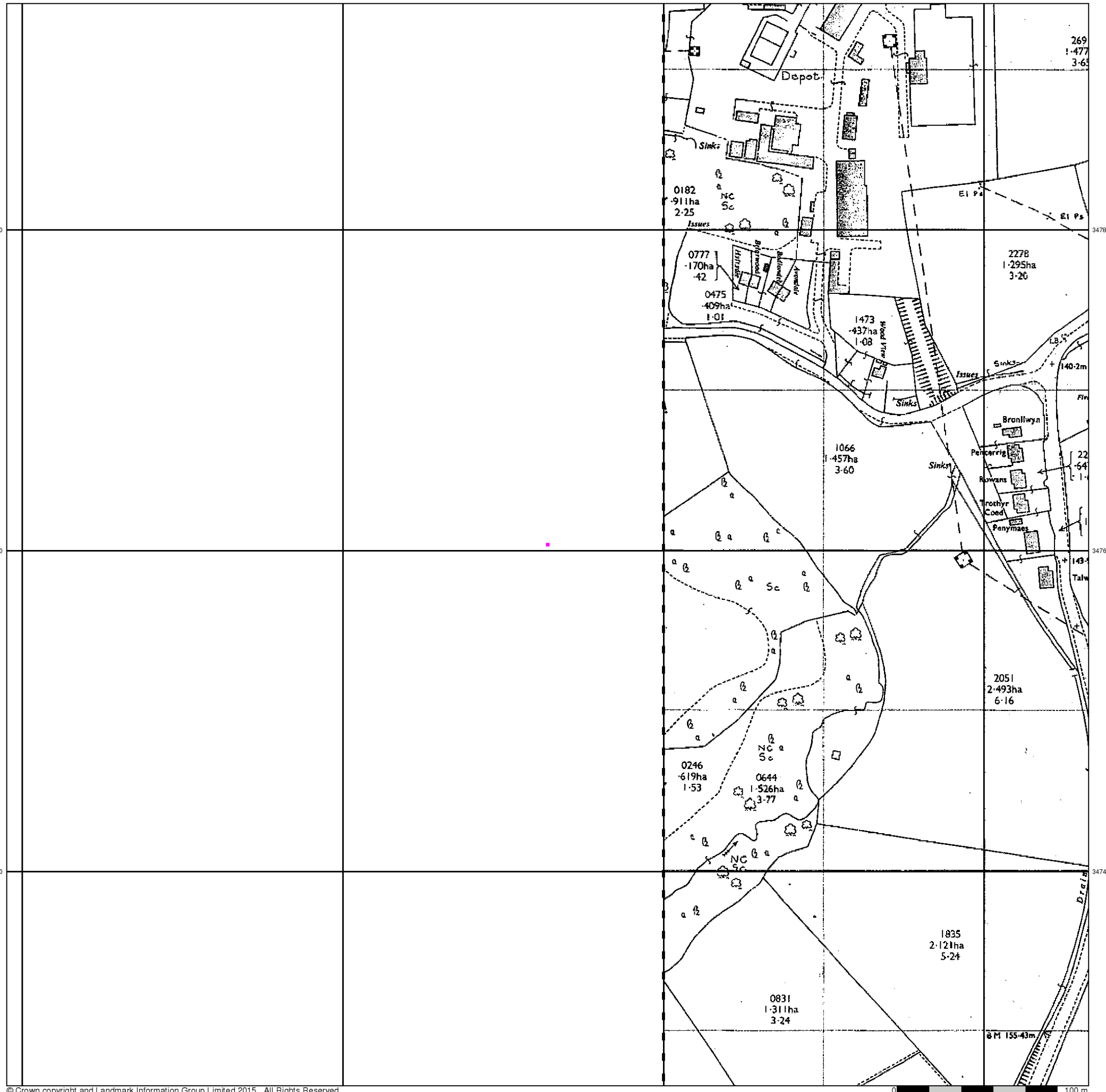
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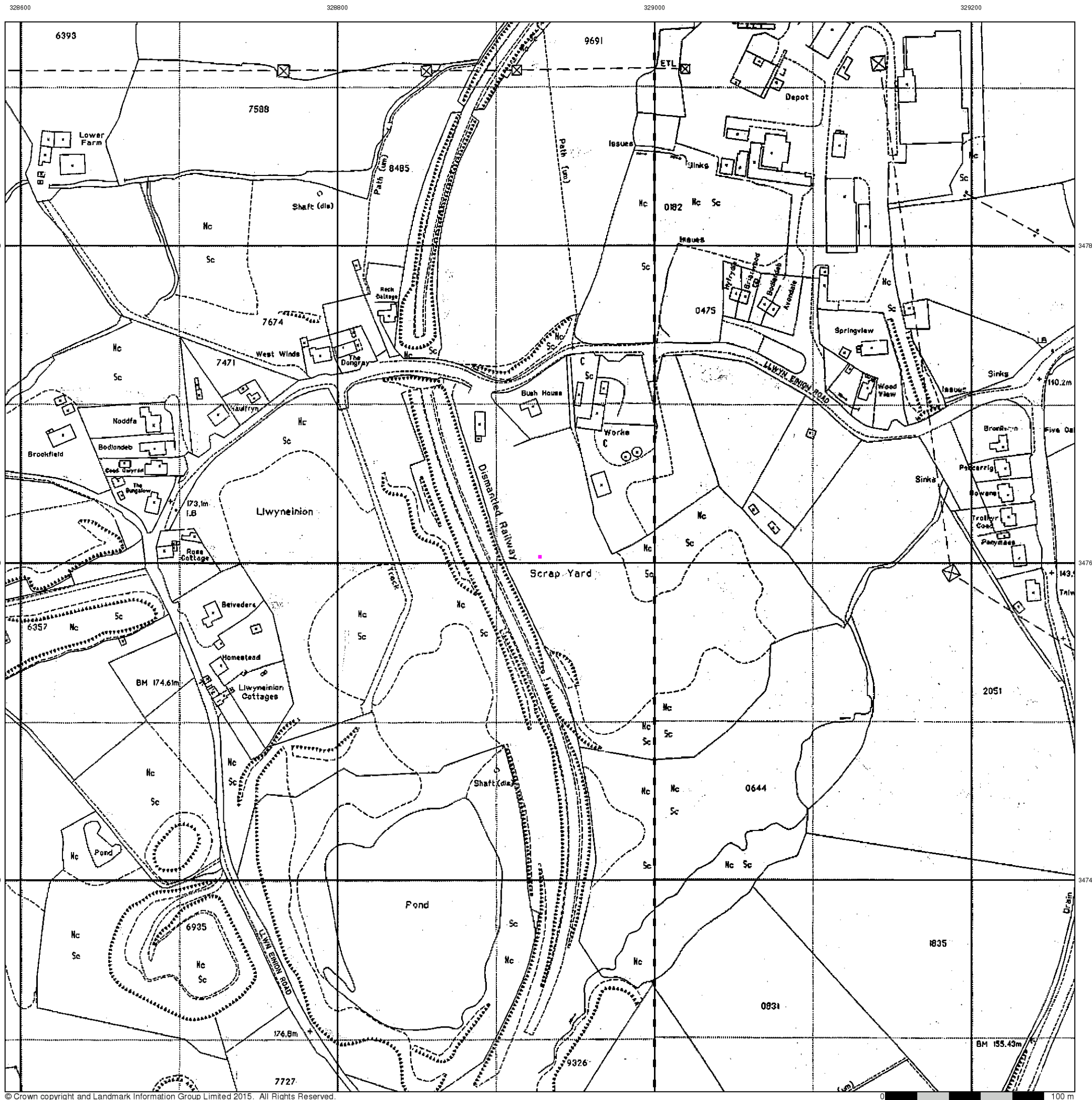
Site Details

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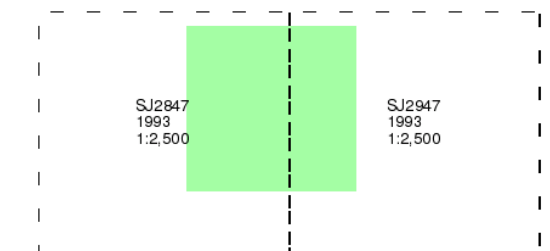
Large-Scale National Grid Data

Published 1993

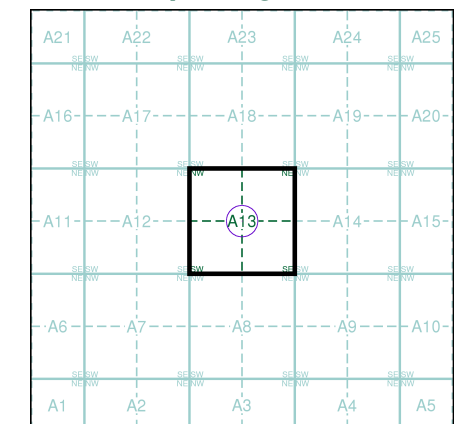
Source map scale - 1:2,500

'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

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Customer Ref: R2122
National Grid Reference: 328930, 347600
Slice: A
Site Area (Ha): 0.01
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Site Details

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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		Minor Roads		
	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				
	County Borough Boundary (England)				
	County Burgh Boundary (Scotland)				
	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
	Bracken		Heath
	Marsh		Reeds
	Building		Glasshouse
	Sloping Masonry		Pylon
	Cutting		Embankment
	Road Under		Road Over
	Level Crossing		Foot Bridge
	Standard Gauge Multiple Track		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
	Civil Parish		
	BP, BS Boundary Post or Stone		Police Station
	Church		Post Office
	Club House		Public Convenience
	Fire Engine Station		Public House
	Foot Bridge		Signal Box
	Fountain		Spring
	Guide Post		Telephone Call Box
	Mile Post		Telephone Call Post
	Mile Stone		Well

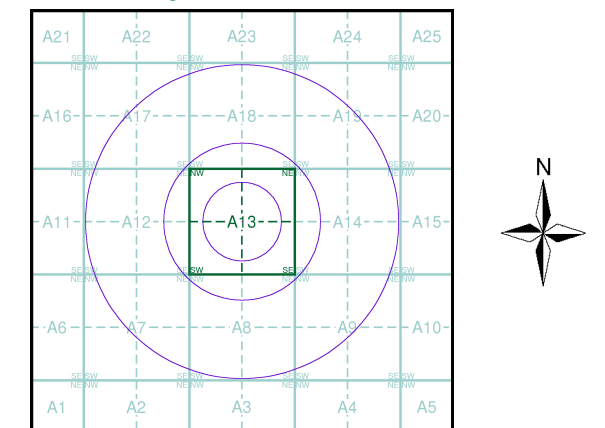
1:10,000 Raster Mapping

	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
	Mean high water (springs)		Mean low water (springs)
	Telephone line (where shown)		Electricity transmission line (with poles)
	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

Historical Mapping & Photography included:

Mapping Type	Scale	Date	Pg
Denbighshire	1:10,560	1879	2
Denbighshire	1:10,560	1900	3
Denbighshire	1:10,560	1914	4
Denbighshire	1:10,560	1938	5
Denbighshire	1:10,560	1953 - 1954	6
Ordnance Survey Plan	1:10,000	1963 - 1964	7
Ordnance Survey Plan	1:10,000	1976 - 1979	8
Ordnance Survey Plan	1:10,000	1993	9
10K Raster Mapping	1:10,000	2006	10
VectorMap Local	1:10,000	2015	11

Historical Map - Slice A



Order Details

Order Number: 67639020_1_1
Customer Ref: R2122
National Grid Reference: 328930, 347600
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 1000

Site Details

David Kelly Car Dismantlers, Esclusham Mill, Llwyneinion Roa, Legacy, Rhosyllen, WREXHAM, Clwyd, LL14 4ET



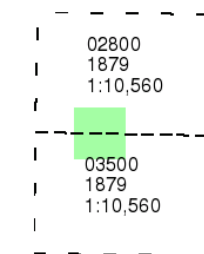
Denbighshire

Published 1879

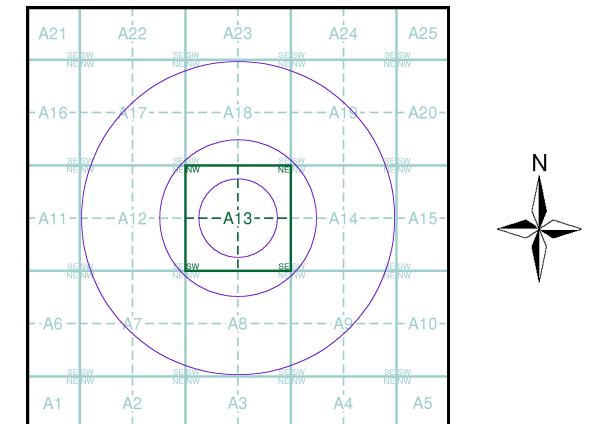
Source map scale - 1:10,560

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

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

Order Number: 67639020_1_1
Customer Ref: R2122
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Slice: A
Site Area (Ha): 0.01
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Denbighshire

Published 1900

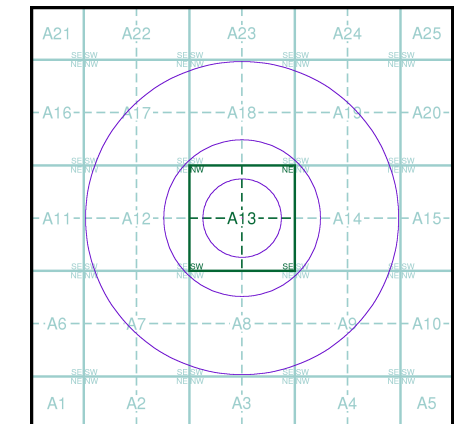
Source map scale - 1:10,560

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

Map Name(s) and Date(s)

028SW	1900	1:10,560
035NW	1900	1:10,560

Historical Map - Slice A

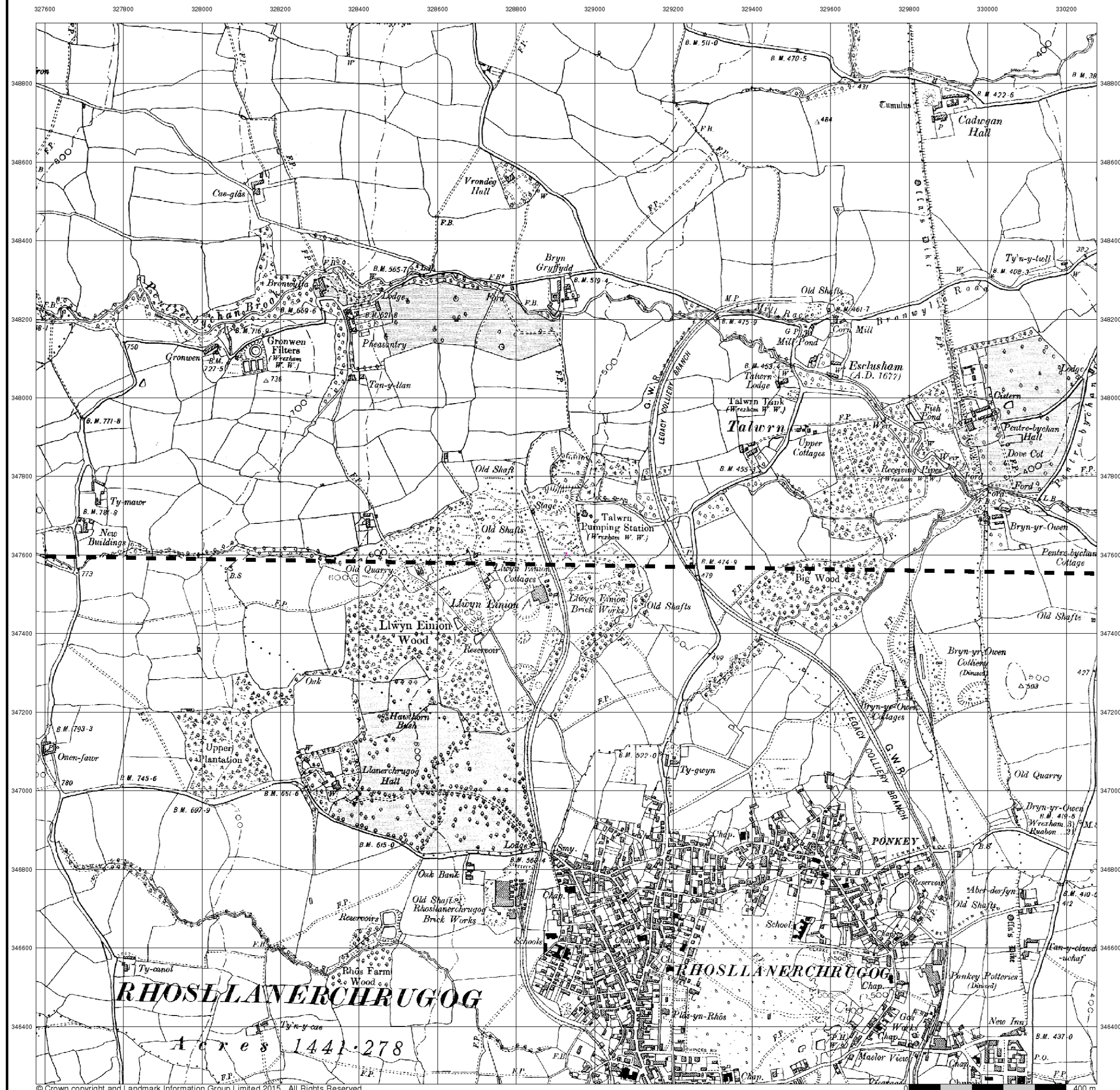


Order Details

Order Number: 67639020_1_1
 Customer Ref: R2122
 National Grid Reference: 328930, 347600
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 Site Area (Ha): 0.01
 Search Buffer (m): 1000

Site Details

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Denbighshire

Published 1914

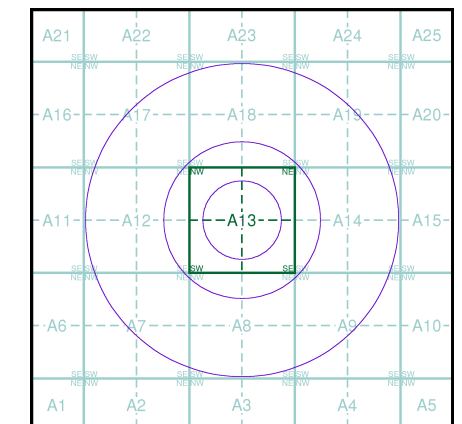
Source map scale - 1:10,560

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

Map Name(s) and Date(s)

028SW	1914	1:10,560
035NW	1914	1:10,560

Historical Map - Slice A

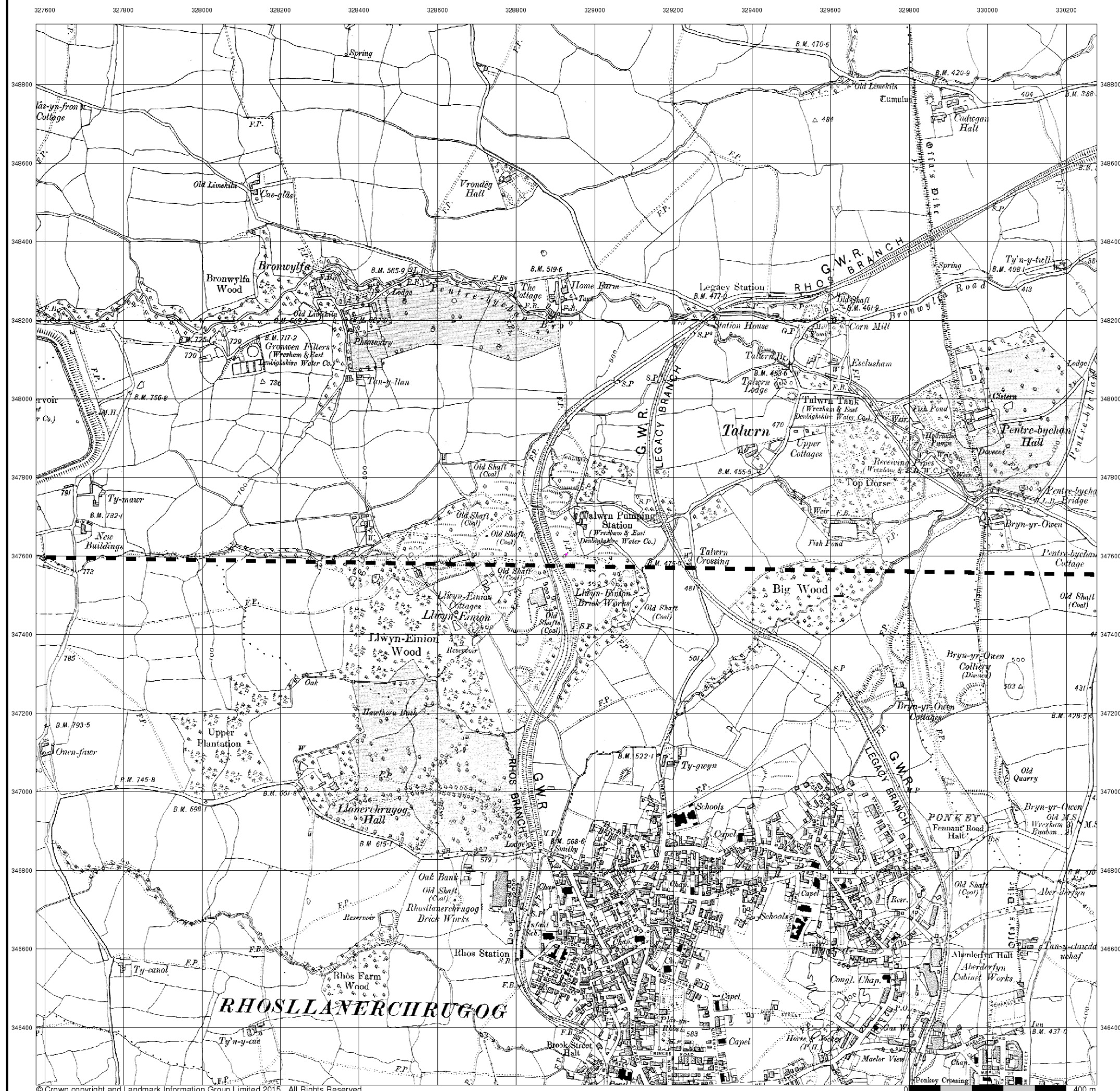


Order Details

Order Number: 67639020_1_1
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Site Details

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Denbighshire

Published 1938

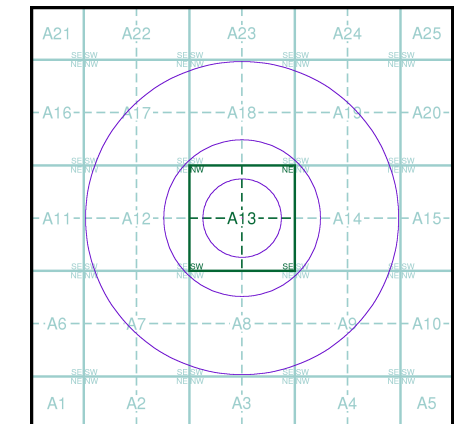
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Map Name(s) and Date(s)

028SW	1938	1:10,560
035NW	1938	1:10,560

Historical Map - Slice A

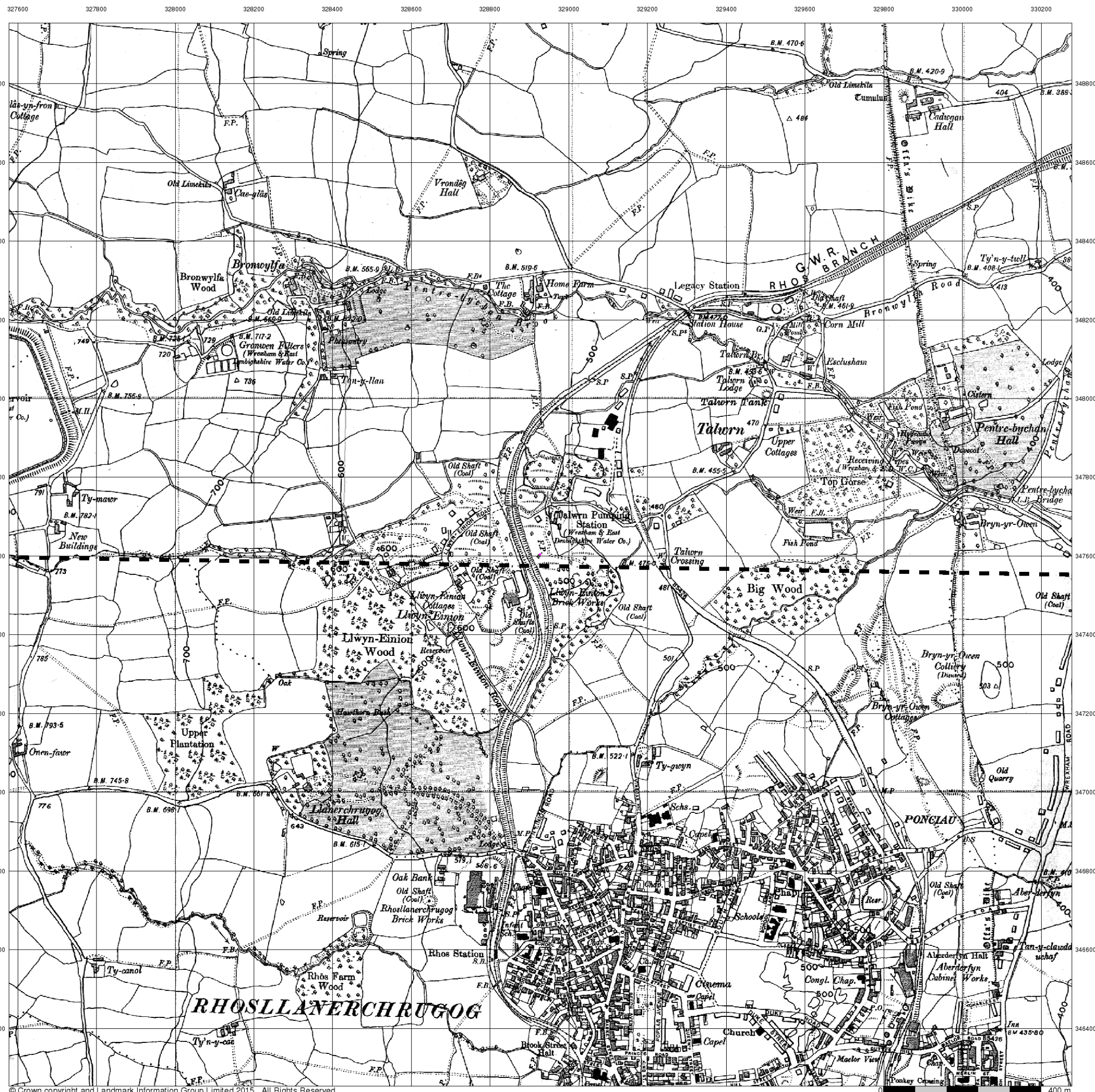


Order Details

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 Site Area (Ha): 0.01
 Search Buffer (m): 1000

Site Details

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Denbighshire

Published 1953 - 1954

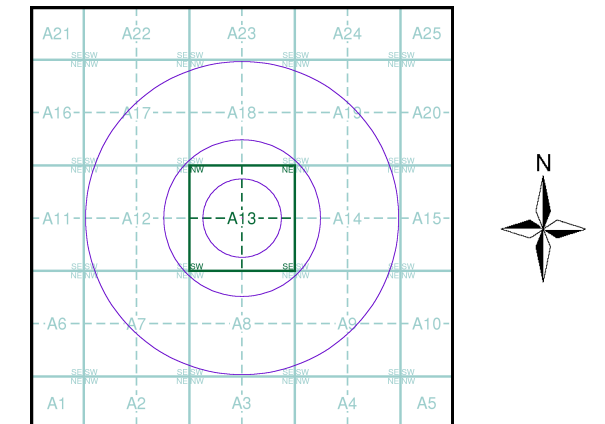
Source map scale - 1:10,560

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

Map Name(s) and Date(s)

028SW	1954	1:10,560
035NW	1953	1:10,560

Historical Map - Slice A

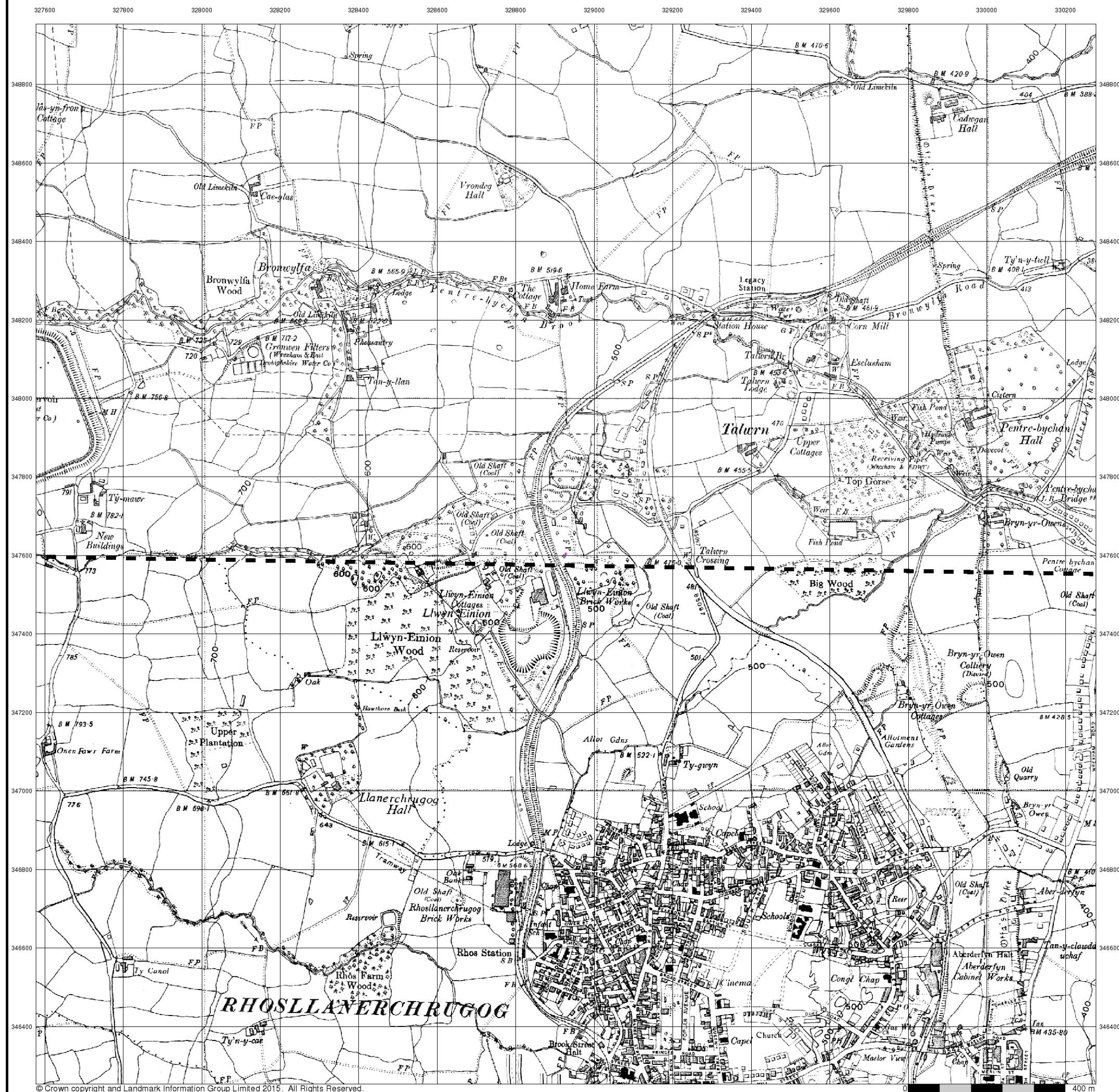


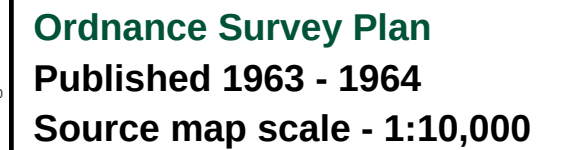
Order Details

Order Number: 67639020_1_1
 Customer Ref: R2122
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 Slice: A
 Site Area (Ha): 0.01
 Search Buffer (m): 1000

Site Details

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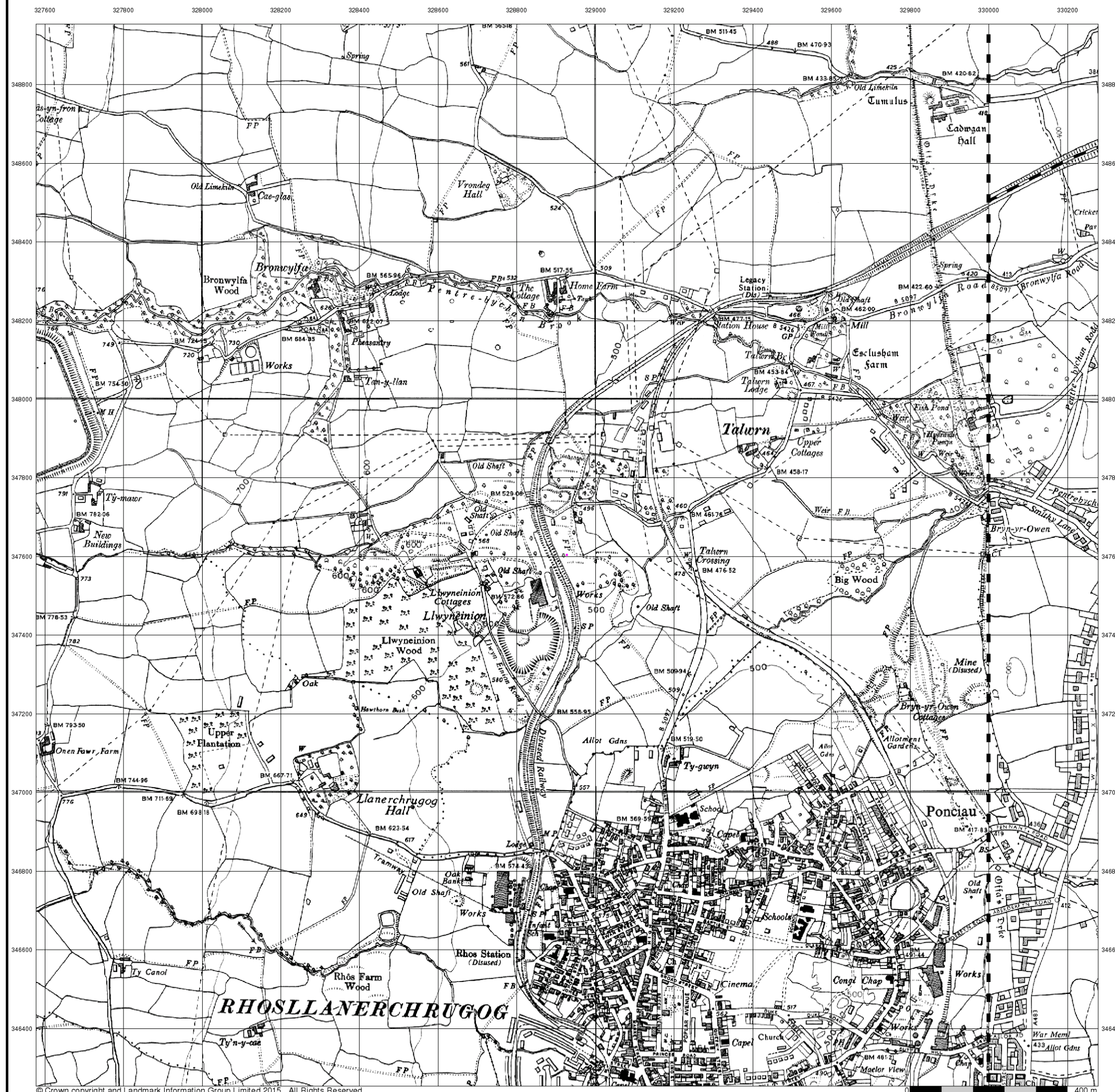
SJ24NE
1963
1:10,560

SJ34NW
1964
1:10,560

The diagram shows a 10x10 grid with columns labeled A1 to A5 and rows labeled A1 to A10. Concentric circles are centered at A13. A green square is centered at A13, with its corners labeled SW, SE, NW, and NE. A compass rose is on the right.

Order Number: 67639020_1_1
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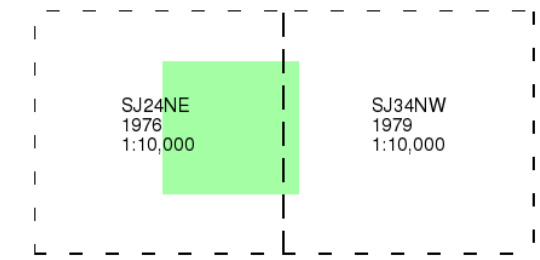
Ordnance Survey Plan

Published 1976 - 1979

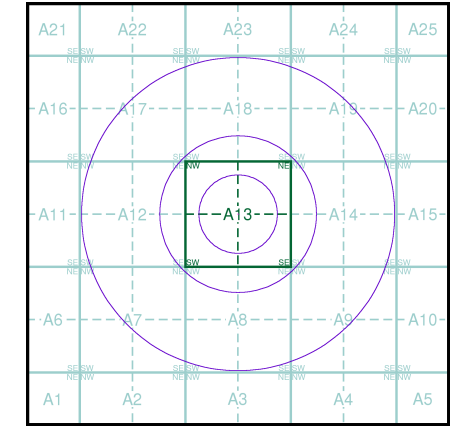
Source map scale - 1:10,000

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

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

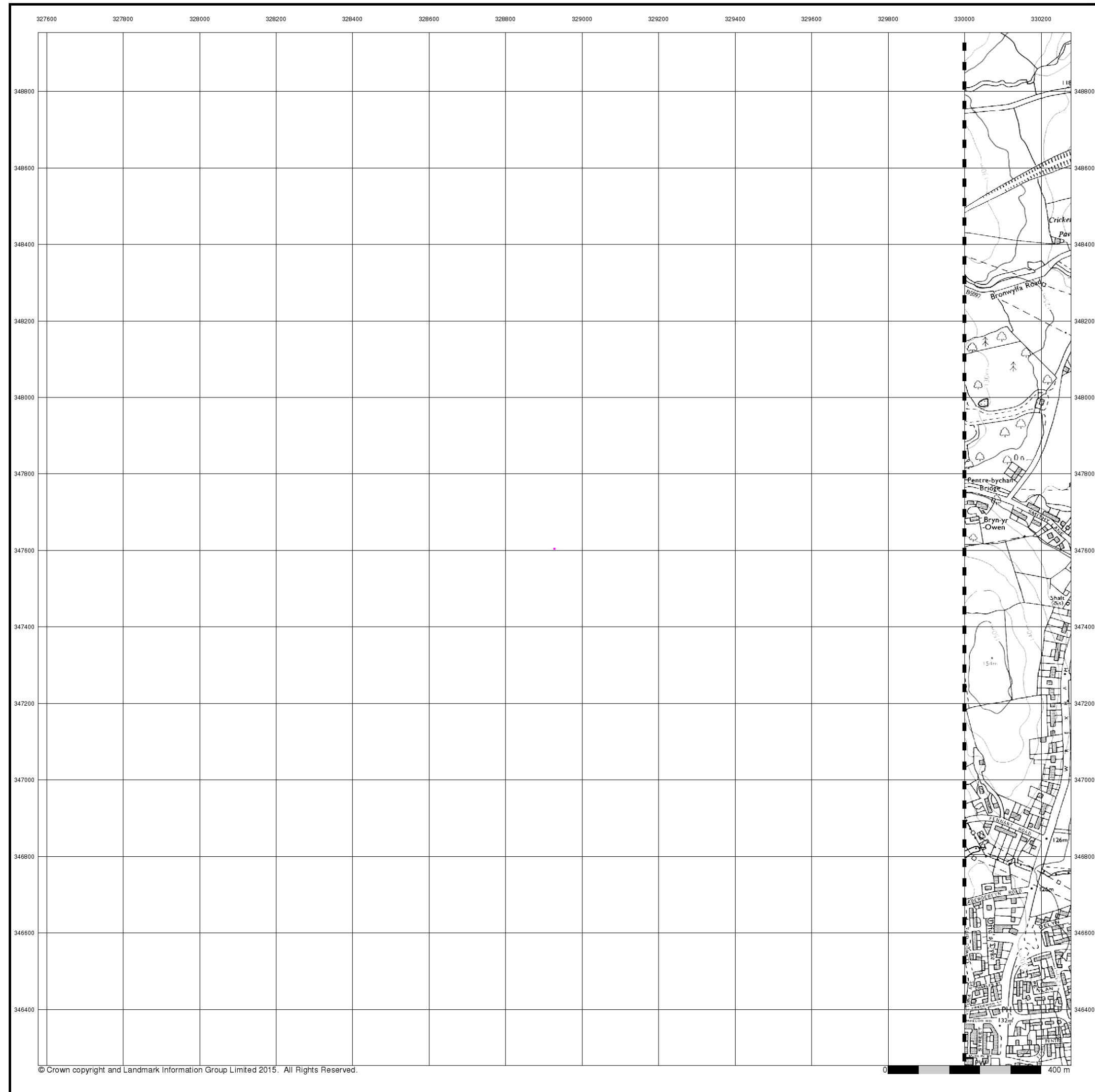
Order Number: 67639020_1_1
Customer Ref: R2122
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Slice: A
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Fax: 0844 844 9951
Web: www.envirocheck.co.uk





Ordnance Survey Plan

Published 1993

Source map scale - 1:10,000

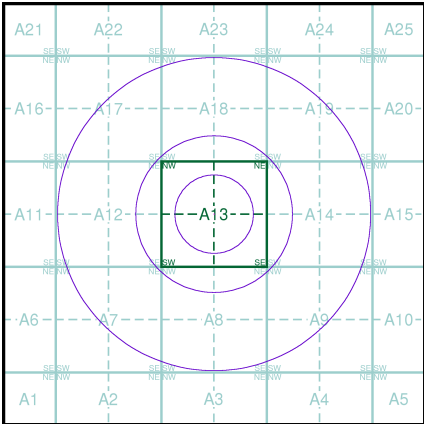
The historical maps shown were reproduced from maps predominantly held at the scale adopted for England, Wales and Scotland in the 1840's. In 1854 the 1:2,500 scale was adopted for mapping urban areas; these maps were used to update the 1:10,560 maps. The published date given therefore is often some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



SJ34NW
1993
1:10,000

Historical Map - Slice A



Order Details

Order Number:	67639020_1_1
Customer Ref:	R2122
National Grid Reference:	328930, 347600
Slice:	A
Site Area (Ha):	0.01
Search Buffer (m):	1000

Site Details

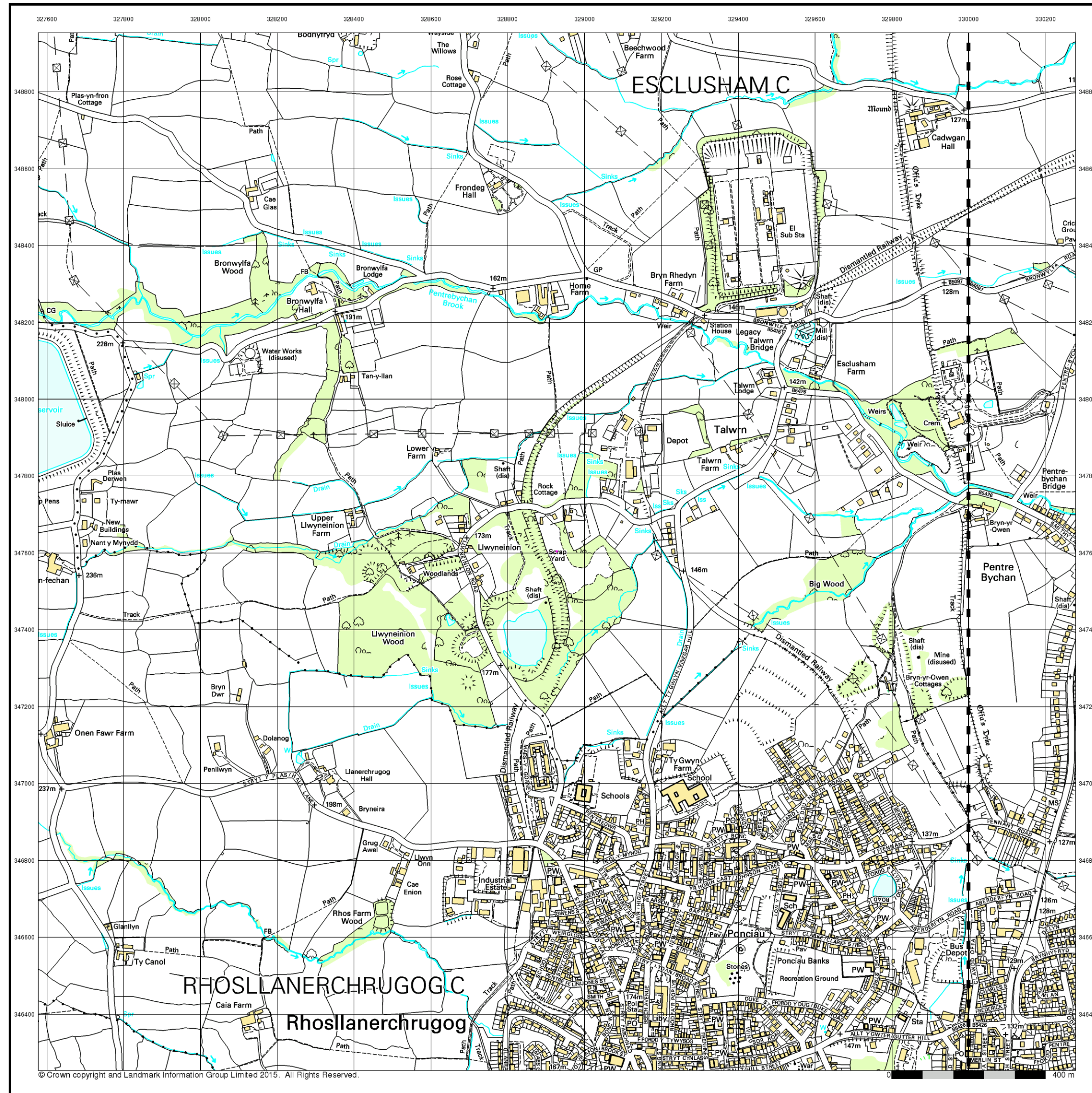
David Kelly Car Dismantlers, Esclusham Mill, Llwyneinion Roa, Legacy, Rhostyllen, WREXHAM, Clwyd, LL14 4ET



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

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A Landmark Information Group Service v47.0 18-May-2015 Page 9 of 11



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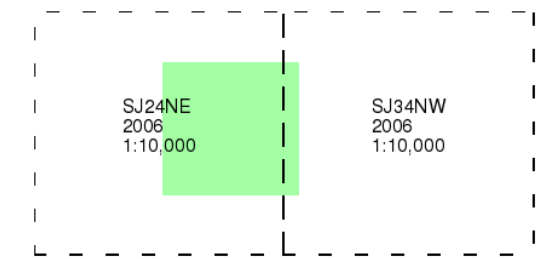
10k Raster Mapping

Published 2006

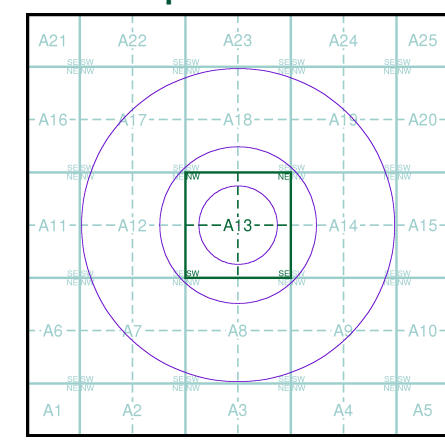
Source map scale - 1:10,000

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

Map Name(s) and Date(s)



Historical Map - Slice A



Order Details

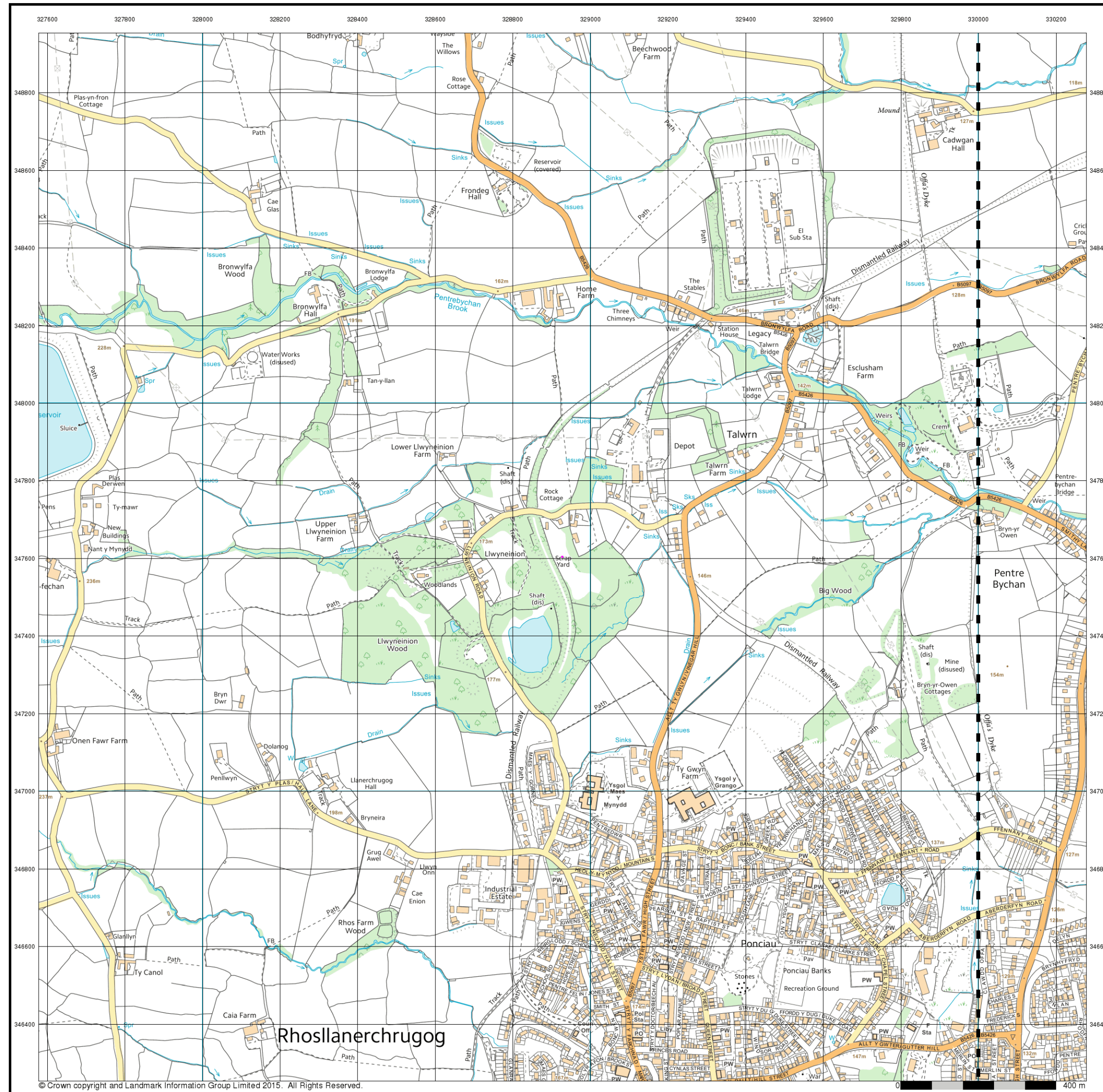
Order Number: 67639020_1_1
Customer Ref: R2122
National Grid Reference: 328930, 347600
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 1000

Site Details

David Kelly Car Dismantlers, Esclusham Mill, Llwyneinion Roa, Legacy, Rhostyllen, WREXHAM, Clwyd, LL14 4ET



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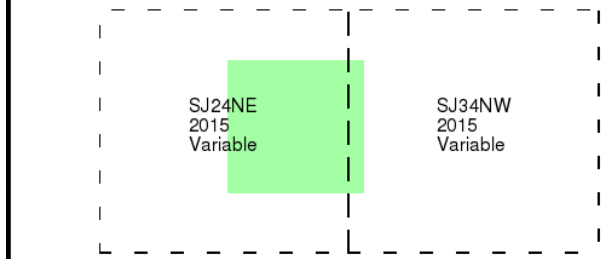
VectorMap Local

Published 2015

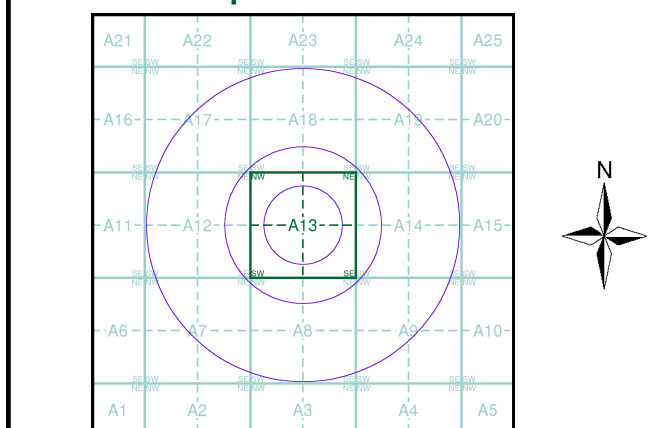
Source map scale - 1:10,000

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)



Historical Map - Slice A



Order Details

Order Number: 67639020_1_1
Customer Ref: R2122
National Grid Reference: 328930, 347600
Slice: A
Site Area (Ha): 0.01
Search Buffer (m): 1000

Site Details

David Kelly Car Dismantlers, Esclusham Mill, Llwyneinion Roa, Legacy, Rhostyllen, WREXHAM, Clwyd, LL14 4ET



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

APPENDIX B

R2122-R01-Coal Authority Report

Issued by:

The Coal Authority, Property Search Services, 200 Lichfield Lane, Berry Hill, Mansfield, Nottinghamshire, NG18 4RG
Website: www.groundstability.com Phone: 0345 762 6848 DX 716176 MANSFIELD 5

**SMITH GRANT LLP
STATION HOUSE
STATION ROAD
RUABON
WREXHAM
CLWYD
LL14 6DL**

Our reference: **51000908546001**
Your reference: **R2122**
Date of your enquiry: **23 June 2015**
Date we received your enquiry: **23 June 2015**
Date of issue: **23 June 2015**

This report is for the property described in the address below and the attached plan. The report is issued subject to the terms and conditions attached, which you are strongly advised to read.

Non-Residential Ground Stability Report - On Coalfield

**LAND AT ESCLUSHAM MILL, LLWYNEINION ROAD, LLWYNEINION,
RHOSLLANERCHRUGOG, WREXHAM,**

This report is based on and limited to the records in the possession of the Coal Authority; the records and geological interpretation of The British Geological Survey (BGS) and the records of the Cheshire Brine Subsidence Compensation Board, at the time the search is answered.

Coal mining	See comments below
Shrinkable clay	See comments below
Running sand	See comments below
Compressible deposits	See comments below
Collapsible deposits	No
Landslide potential	See comments below
Soluble rocks	No
Brine Compensation District	No

Information from the Coal Authority

Underground coal mining

Past

The property is in the likely zone of influence from workings in 1 seam of coal at shallow depth, and last worked in 1887.

Present

The property is not in the likely zone of influence of any present underground coal workings.

Future

The property is not in an area for which the Coal Authority is determining whether to grant a licence to remove coal using underground methods.

The property is not in an area for which a licence has been granted to remove or otherwise work coal using underground methods.

The property is not in an area that is likely to be affected at the surface from any planned future workings.

However, reserves of coal exist in the local area which could be worked at some time in the future.

No notice of the risk of the land being affected by subsidence has been given under section 46 of the Coal Mining Subsidence Act 1991.

Mine entries

Within, or within 20 metres of, the boundary of the property there are 2 mine entries, the approximate positions of which are shown on the attached plan.

There is no record of what steps, if any, have been taken to treat the mine entries.

Records may be incomplete. Consequently, there may exist in the local area mine entries of which the Coal Authority has no knowledge.

For an additional fee, the Coal Authority will provide a supplementary Mine Entry Interpretive Report. The report will provide a separate assessment for the mine entry (entries) referred to in this report. It will give details based on information in the Coal Authority's possession, together with an opinion on the likelihood of mining subsidence damage arising from ground movement as a consequence of the existence of the mine entry/entries. It will also give details of the remedies available for subsidence damage where the mine entry was sunk in connection with coal mining.

Please note that it may not be possible to produce a report if the main building to the property cannot be identified from Coal Authority plans (ie. for development sites and new build).

For further advice on how to order this additional information visit www.groundstability.com or telephone 0345 7626 848.

Coal mining geology

The Authority is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.

Opencast coal mining

Past

The property is not within the boundary of an opencast site from which coal has been removed by opencast methods.

Present

The property does not lie within 200 metres of the boundary of an opencast site from which coal is being removed by opencast methods.

Future

The property is not within 800 metres of the boundary of an opencast site for which the Coal Authority is determining whether to grant a licence to remove coal by opencast methods.

The property is not within 800 metres of the boundary of an opencast site for which a licence to remove coal by opencast methods has been granted.

Coal mining subsidence

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

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

The 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

There is no record of a mine gas emission requiring action by the Coal Authority within the boundary of the property.

Hazards related to coal mining

The property has not been subject to remedial works, by or on behalf of the Authority, under its Emergency Surface Hazard Call Out procedures.

Withdrawal of support

The property is not in an area for which a notice of entitlement to withdraw support has been published.

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

Working facilities orders

The property is not in an area for which an Order has been made under the provisions of the Mines (Working Facilities and Support) Acts 1923 and 1966 or any statutory modification or amendment thereof.

Payments to owners of former copyhold land

The property is not in an area for which a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Comments on Coal Authority information

The attached plan shows the approximate location of the disused mine entry/entries referred to in this report. For reasons of clarity, mine entry symbols may not be drawn to the same scale as the plan.

Property owners have the benefit of statutory protection (under the Coal Mining Subsidence act 1991*). This contains provision for the making good, to the reasonable satisfaction of the owner, of physical damage from disused coal mine workings including disused coal mine entries. A leaflet setting out the rights and the obligations of either the Coal Authority or other responsible persons under the 1991 Act can be obtained by telephoning 0345 762 6848 or online at www.coal.decc.gov.uk/en/coal/cms/services/claims.

If you wish to discuss the relevance of any of the information contained in this report you should seek the advice of a qualified mining engineer or surveyor. If you or your adviser wish to examine the source plans from which the information has been taken these are normally available at our Mansfield office, free of charge, by prior appointment, telephone 01623 637235. Should you or your adviser wish to carry out any physical investigations that may enter, disturb or interfere with any disused mine entry the prior permission of the owner must be sought. For coal mine entries the owner will normally be the Coal Authority.

The Coal Authority, regardless of responsibility and in conjunction with other public bodies, provide an emergency call out facility in coalfield areas to assess the public safety implications of mining features (including disused mine entries). Our emergency telephone number at all times is 01623 646333.

*Note, this Act does not apply where coal was worked or gotten by virtue of the grant of a gale in the Forest of Dean, or any other part of the Hundred of St. Briavels in the county of Gloucester.

In view of the mining circumstances a prudent developer would seek appropriate technical advice before any works are undertaken.

Therefore 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 good engineering practice developed for mining areas. No development should be undertaken that intersects, disturbs or interferes with any coal or mines of coal without the permission of the Coal Authority. Developers should be aware that the investigation of coal seams/former mines of coal may have the potential to generate and/or displace underground gases and these risks both under and adjacent to the development should be fully considered in developing any proposals. The need for effective measures to prevent gases entering into public properties either during investigation or after development also needs to be assessed and properly addressed. This is necessary due to the public safety implications of any development in these circumstances.

Information from the British Geological Survey on potential for natural ground movement

Shrinkable clay

The property is in an area underlain by clay. Clay can swell or shrink if the moisture content changes.

However, the clay deposits in this area are considered to be mainly of "low plasticity". This means it is unlikely that they will cause ground movement.

Running sand

The property is in an area underlain by sand. Some sands, if voids are present, may flow if they come into contact with water.

However, the sand deposits in this area are unlikely to cause ground movement.

Deposits which could compress

The property is in an area underlain by natural compressible deposits. When this material is overloaded, or dries out, it can become unstable causing ground movement.

However, it is unlikely that the compressible deposits in this area will cause ground movement.

Deposits which could collapse

The property is not in an area underlain by deposits which could collapse and cause ground movement.

Natural landslide activity

The property is in an area where the local geology and steepness of slope could combine to create the likelihood of landslide activity.

However, landslide activity is unlikely to occur.

Soluble rocks

The property is not in an area underlain by soluble rocks.

Comments on the British Geological Survey information

These features should not necessarily give cause for concern.

Whether or not a property is affected by ground movement can depend on a number of factors such as its age, type of construction, and on its surroundings and such matters as drainage and nearby trees.

Since 1992 buildings should have been designed and constructed according to buildings regulations to ensure natural ground movement will not cause damage to a building.

However, you should consider the possible consequences before you:

- carry out any building or excavation work;
- alter the ground surface or drainage of surface or ground water; or
- plant or remove large shrubs or trees

Ground movement can cause uneven damage or subsidence to a property.

Developers should always carry out an appropriate risk assessment before starting any work on, or around, a property.

If you own the property and it is damaged by ground movement: You should contact your insurance company and anyone else who has an interest in the property, for example, the mortgage lender.

If you are considering buying the property and BGS has identified that ground movement could occur you should tell your professional advisers.

Information from the Cheshire Brine Subsidence Compensation Board

The property lies outside the Cheshire Brine Compensation District.

Additional Remarks

Information provided by the Coal Authority in this report is compiled in response to the Law Society's Con29M Coal Mining and Brine Subsidence Claim enquiries. The said enquiries are protected by copyright owned by the Law Society of 113 Chancery Lane, London WC2A 1PL. Please note that Brine Subsidence Claim enquiries are only relevant for England and Wales. This report is prepared in accordance with the Law Society's Guidance Notes 2006, the User Guide 2006 and the Coal Authority, British Geological Survey and Cheshire Brine Subsidence Compensation Board's Terms and Conditions applicable at the time the report was produced. The Coal Authority and British Geological Survey owns the copyright in this report. The information we have used to write this report is protected by our database rights. All rights are reserved and unauthorised use is prohibited. If we provide a report for you, this does not mean that copyright and any other rights will pass to you. However, you can use the report for your own purposes.

Issued by:	The Coal Authority, 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG
Tax Point Date:	23 June 2015
Issued to:	SMITH GRANT LLP STATION HOUSE STATION ROAD RUABON WREXHAM CLWYD LL14 6DL
Property Search for:	LAND AT ESCLUSHAM MILL, LLWYNEINION ROAD, LLWYNEINION, RHOSLLANERCHRUGOG, WREXHAM,
Reference Number:	51000908546001
Date of Issue:	23 June 2015
Cost:	£88.00
VAT @ 20%:	£17.60
Total Received:	£105.60
VAT Registration	598 5850 68

Location map



Approximate position of property



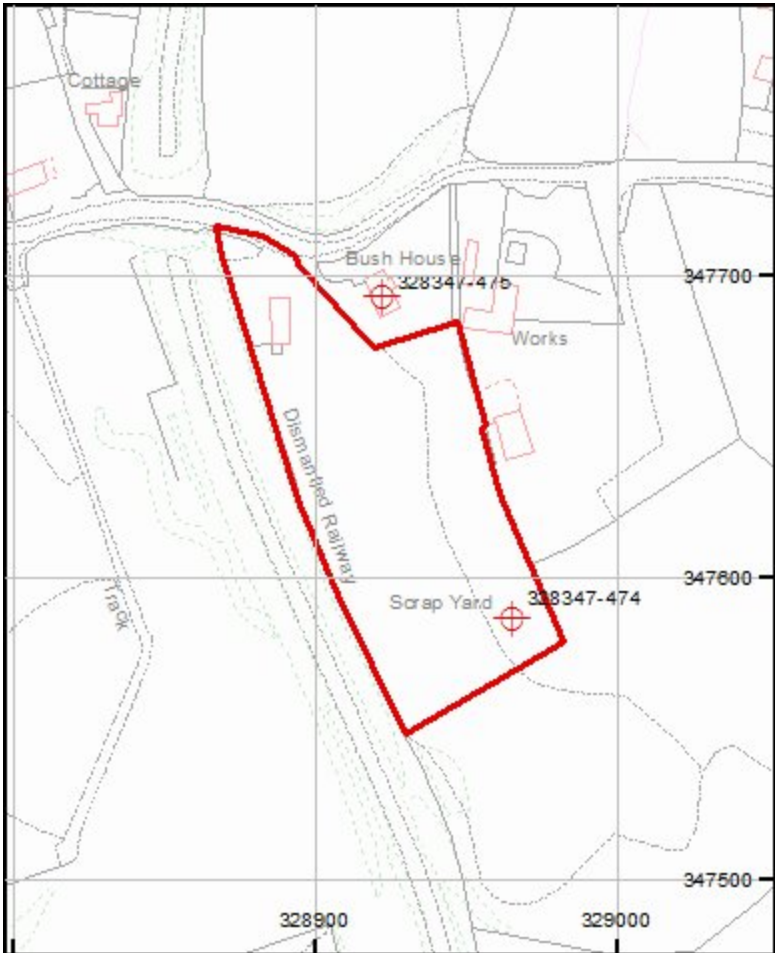
Enquiry boundary

Reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown copyright and database right 2015. All rights reserved. Ordnance Survey Licence number: 100020315

Key

Approximate position of enquiry boundary shown

Disused Adit or Mineshaft



TERMS

DEFINITIONS

In these Terms the following words have the following meanings:

"BGS" means the British Geological Survey of Kingsley Dunham Centre, Keyworth, Nottingham, NG12 5GG, a component organisation of the Natural Environment Research Council;

"CA" means the Coal Authority of 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG;

"Cheshire Brine" means the Cheshire Brine Subsidence Compensation Board of Sir Henry Doulton House, Forge Lane, Etruria, Stoke on Trent, ST1 5BD;

"Customer" means the person, firm or company placing the Order, either on its own behalf as User or as agent for a User;

"Guidance" means the relevant current version of the Guidance Notes and User Guide for the Report, available on request and displayed on the Website;

"Order" means any request for a Report made by the Customer;

"Property" means the address or location specified by the Customer in the Order;

"Report" means a ground stability report (in printed, electronic or any other form) which combines information on coal mining, brine subsidence claims and natural ground movement which has been prepared by CA in respect of the Property using data from, amongst others, the Suppliers and to which these Terms apply;

"Supplier(s)" means all or any of CA, BGS and/or Cheshire Brine;

"these Terms" means these terms and conditions, incorporating the Guidance (if and to the extent of any conflict between these Terms and the Guidance, the provisions of these Terms will prevail);

"User(s)" means the person or persons so described in Clause 15; and

"Website" means CA's website for the provision of the Reports service (currently www.groundstability.com).

TERMS

1. These Terms apply to the provision of Reports by CA to the Customer and/or the User.
2. The Customer and the User agree that the placing of an Order indicates their acceptance of these Terms.
3. These Terms shall apply to the exclusion of all other terms and conditions.
4. CA reserves the right to change these Terms from time to time with immediate effect and without prior notice. Any changes to these Terms will be displayed on the Website. Placement of Orders after any such variation will be deemed to be an acceptance of these Terms as amended in respect of Reports which are provided in response to Orders placed after the variation is made.
5. Where the Customer is acting as an agent for a User, the Customer will provide a copy of the Report and these Terms to the User.

LIMITATIONS OF THE REPORT

General

6. The Report is prepared with due skill and care, but has a number of limitations which are set out in these Terms which the Customer and the User acknowledge and accept when relying on it.

Sources of information

7. The Report has been prepared by CA using information held by CA, together with information supplied to it by BGS and Cheshire Brine. The Report is based on, and is limited to:

- a) the specific features identified in the Report, as more particularly described in the Guidance; and
- b) each Supplier's interpretation of the records it holds relating to the particular features for which the Report states that the Supplier is responsible (and, in the case of information from BGS and Cheshire Brine, as provided to CA) at the time the Report is prepared.

The Customer and the User therefore acknowledge and agree that the records used to prepare the Report do not represent an exhaustive or comprehensive list of all records that may exist or may be available for the Property (see further Clause 8). The Customer and the User also acknowledge that no physical inspection of the Property has or will be carried out in the preparation of the Report.

8. Without prejudice to the generality of Clause 7:

- a) information from CA is based on records in its possession relating to coal mining activity. There may be information held by others on historical coal mining, and information on other types of mining, which is not searched as part of the Report;

- b) information from BGS relates solely to the following six natural ground stability hazards: shrinkable clay; running sand; compressible deposits; collapsible deposits; landslide activity; and soluble rocks. It does not cover any other geological hazards, or man-made hazards (such as contaminated land). BGS may hold data on other geological hazards and features that may affect the Property which are not searched as part of the Report and consequently the Report should not be taken as a guarantee that there are no other geological hazards or other issues affecting the Property; and

- c) information from BGS is prepared using the BGS GeoSure database which is based on 1:10,000 scale geological mapping reduced to 1:50,000 scale. The Customer and the User therefore acknowledge that BGS may be able to provide a more specific and detailed interpretation relating to the geological conditions and ground stability at the Property than that which is included in the Report. A more detailed interpretation is available via the BGS GeoReports service on BGS's website www.bgs.ac.uk.

9. The information from the Suppliers may be derived from records from a number of disparate sources which vary in age, quantity and quality. Such records may include material donated to the Suppliers by third parties, which may not have been subject to any verification or other quality control process.

10. Raw data used to prepare the Reports may have been transcribed from analogue to digital format, or may have been acquired by means of automated measuring techniques. Although such processes are subjected, where possible, to quality control to ensure reliability, some raw data may have been processed without human intervention and may in consequence contain undetected errors.

11. The records available to the Suppliers are constantly being updated. The Suppliers cannot be responsible to the Customer or Users for any changes in the information on which the Report is based which occur after the date on which the Report is prepared. Where this Report is for a residential property, insurance is included to cover loss in property value caused and arising from these circumstances. The Report includes a policy and key facts summary which outlines the significant features, benefits and limitations of the cover provided. The full terms, conditions and exclusions are shown in the policy document.

Maps

12. The Customer and the User must take all reasonable steps to check that the details in the Order are correct and that the Report provided by CA has been prepared for the correct location and property type, and that the boundaries of the Property as shown in the Report's plan correspond with those of the Property. Any discrepancies between the Order and the Report must be notified to the CA within 28 days after the issue date of the Report and CA will, in the case of error by CA, issue a revised Report free of charge; otherwise a new Report should be ordered with payment of the appropriate fee.

13. The Property has been located using Ordnance Survey ("OS") mapping. The Suppliers do not warrant that the OS information is complete or accurate and accept no liability for the plotted position of the Property as shown on OS maps. Further, the relative position between surface features and coal mining and other geological features may differ between OS maps and the Suppliers' maps used to prepare the Report, depending upon when the Suppliers' maps were prepared.

14. The plan or plans accompanying the Report must not be enlarged otherwise the accuracy will be affected.

RELIANCE ON THE REPORT

Who may rely on the Report

15. Only the following persons ("Users") may rely on the Report:

- a) the owner of the Property at the time the Report is prepared;
- b) any purchaser of the whole of the Property from the owner described in a above; and
- c) any person who provides funding to the persons in a or b above which is secured on the whole of the Property.

Such reliance will be subject to the provisions of Clauses 17 and 24 to 28 (inclusive).

Extent of Reliance

16. The Report has been prepared for use by the Users only and the Report should not be relied upon by any other third party.

17. Customers or Users may not act in reliance upon the Report (either by purchasing the Property, providing funding secured on the Property or carrying out any works on or affecting the Property) more than ninety (90) days after its date of issue.

18. The Report gives an indication of whether ground movement could occur at the Property. This does not necessarily mean that the Property is or will be affected by ground instability. Such an assessment can only be made by inspection of the Property by a qualified professional, such as a surveyor or engineer. The Report DOES NOT therefore:

- a) include any information or warranty relating to the actual state, or the structural or other condition, of the Property;
- b) determine the saleability or value, or the safety, of the Property;
- c) indicate the suitability of the Property for any particular purpose (including, without limitation, its suitability for development (within the meaning of section 55 of the Town and Country Planning Act 1990 as amended) or any building, excavation or landscaping work); or
- d) act as a substitute for any physical inspection, specialist interpretations and/or professional advice.

19. No representations, warranties or terms (whether express or implied by statute, common law, custom, trade usage, course of dealing or otherwise) are given in relation to the Report unless they are expressly set out in these Terms, save to the extent that such terms cannot be excluded by law.

USE OF THE REPORT

20. The Customer and the User acknowledge that the Report is confidential and that it is intended for the purposes of the User only. Accordingly the Customer and the User agree that they are permitted to use and copy the Report for these purposes only.

21. The Customer and the User (or any person who is provided with a copy of the Report) will not:

- a) remove, obliterate or alter any trade mark or any copyright or other proprietary notice which is contained in the Report;
- b) reformat or otherwise change, add to or enhance the Report, or combine it with or incorporate it into any other information, data or materials; or
- c) create any product which is derived directly or indirectly from the data contained in the Report; or
- d) resell the Report (other than in the case of a bona fide legal adviser recharging the cost of the Report as a disbursement) unless this has been specifically authorised in writing by CA.

22. The copyright and all other intellectual property rights in the Report will remain the property of the Suppliers or other third parties (as appropriate). Neither the Customer nor the User will acquire any rights in respect of the Report other than as expressly provided in these Terms.

EVENTS BEYOND THE SUPPLIERS' CONTROL

23. A Supplier will not be liable to the Customer or the User for any delay or failure in performance of its obligations which result from circumstances beyond its reasonable control (including, without limitation, fire, explosion, flood, tempest, unusually adverse weather conditions, war, hostilities, riot, acts of terrorism, failure or shortage of power supplies, telecommunications or processing failure or computer malfunction) or the acts or omissions of any person for which a Supplier is not legally responsible.

LIABILITY

24. The Report has been prepared for the Property on the basis of information on the Property's location and type provided by the Customer and/or the User, and consequently the Suppliers exclude all liability which may arise from any errors or omissions in the information so provided or from any failure to check for discrepancies pursuant to Clause 12.

25. The Report has been prepared specifically for the Property, and on the basis of the property type specified in the Order. Under no circumstances will the Suppliers be liable if a Report is relied on for any other property, or if a Report on a residential property is used for a non-residential or commercial property or for the development of the Property, and vice versa.

26. Except in the circumstances described in Clause 28 the total liability of the Suppliers to the Customer and the User arising from an error in the Report caused by negligence, breach of contract or in any other way will be limited to:

- a) the reasonable costs of carrying out necessary remedial work on the Property reasonably promptly; or
- b) the difference between the true market value of the Property and the market value of the Property on the basis of the Report at the time of reliance on the Report in accordance with these Terms.

27. Except in the circumstances described in Clause 28 or to the extent that a Supplier is found to be liable for the losses described in Clause 26 (a) or (b) arising from an error in the Report, the Supplier will not be liable to the Customer or the User for: loss of business, goodwill, profits or savings, loss of use or opportunity, lost or wasted staff time or for any indirect or consequential loss (whether arising from negligence, breach of contract or in any other way) even if the Customer or User was advised of or knew of the likelihood of that loss or type of loss arising.

28. Nothing in these Terms excludes or limits the liability of the Suppliers for death or personal injury caused by their negligence, or for fraud.

GENERAL

29. The headings in these Terms are for ease of reference only and do not affect their interpretation or construction.

30. Use of the singular includes the plural and vice versa, and use of any gender includes the other genders.

31. The benefit of these Terms cannot be assigned or transferred by the Customer or the User without the Suppliers' prior written consent. The Suppliers may assign any or all of their rights and obligations under these Terms without prior notice.

32. These Terms (together with the Order and the Guidance) represent the entire agreement relating to the supply of the Report and the relationship which that supply creates between the Suppliers and Customers and Users. No prior statement, representation or arrangement of any nature (whether written or oral) will add to, vary or waive terms of this agreement and the Customer and the User acknowledge that they have not relied on any statement or representation made by or on behalf of CA or any other Supplier in agreeing to enter into this agreement. Nothing in this Clause 32 will operate to limit or exclude liability for fraud.

33. The illegality or invalidity of any part of these Terms will not affect the legality or validity of the remainder of these Terms.

34. Except to the extent that these Terms confer benefits on the Suppliers and the Users, no third party is entitled to the benefit of these Terms under the Contracts (Rights of Third Parties) Act 1999.

35. These Terms are governed by English law. The English courts (where the Property is situated in England or Wales) and the Scottish courts (where the Property is situated in Scotland) have exclusive jurisdiction to deal with any dispute which may arise out of or in connection with them.

**THESE TERMS ARE AVAILABLE IN LARGER PRINT FOR THOSE WITH IMPAIRED VISION OR AT
WWW.COAL.GOV.UK**

APPENDIX C

Site Investigation logs 2015 and 2018

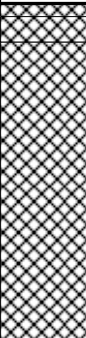
Trial Pit Photographs SI 2015

	
TP1	TP1
	
TP1	TP2
	
TP2	TP2
	
TP3	TP3

	
TP3	TP4
	
TP4	TP4
	
TP5	TP5
	
TP5	TP6
	
TP6	TP6

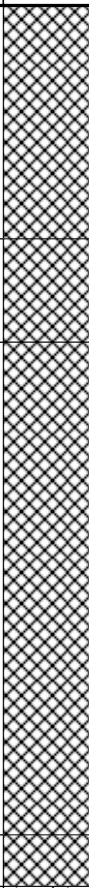
	
TP7	TP7
	
TP7	TP8
	
TP8	TP8
	
TP9	TP9
	
TP9	TP10

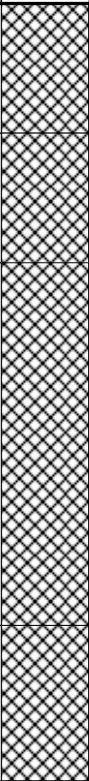
	
TP10	TP10
	
TP11	TP11
	
TP11	TP12
	
TP12	TP12

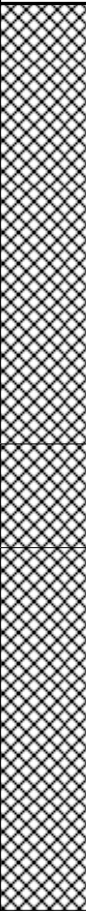
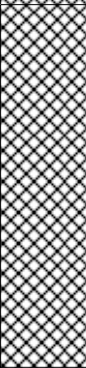
SHEET: 1 of 1	LOCATION: Rhos	PROJECT: Esclusham Mill	ENGINEER: BH	JOB NO. R2122	TRIAL PIT NO. TP1
		EXCAVATED BY: 360 Excavator	CLIENT: Axis Architectural Services Ltd	DATE: 4/28/2015	
DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
0.1	TP1-ES1	Band of pale grey shale gravel at 0.6m	0.00 0.05 0.15	MADE GROUND: Coarse GRAVEL of limestone MADE GROUND: Coarse, loose, black GRAVEL of clinker MADE GROUND: BOULDERS of dressed sandstone with sand matrix	
0.6	TP1-ES2		1.00 1.3	Orange brown, slightly clayey, medium dense SAND	
			1.9 2.00	Trial pit terminated at 1.9m	
			3.00 4.00 5.00		
 SMITH GRANT Environmental Consultancy LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Groundwater not encountered			
		REMARKS: PID 0.0 throughout			
SCALE: 1:250		LOGGED BY: BH		FIGURE NO. 1	

SHEET: 1 of 1	LOCATION: Rhos	PROJECT: Esclusham Mill	ENGINEER: BH	JOB NO. R2122	TRIAL PIT NO. TP2
		EXCAVATED BY: 360 Excavator	CLIENT: Axis Architectural Services Ltd	DATE: 4/28/2015	
DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
0.6	TP2-ES2		0.00	MADE GROUND: grey brown ashy loose SAND AND GRAVEL with frequent fine rootlets	
			0.4	MADE GROUND: grey brown CLAY	
			0.65	MADE GROUND: grey brown ashy loose SAND AND GRAVEL, occasional whole and broken glass bottles	
			0.8	MADE GROUND: beige, slightly sandy CLAY	
			1.00		
			1.3	Grey slightly clayey SAND	
			1.7	Yellow slightly clayey SAND	
			2.00		
			2.5	Trial pit terminated at 2.5m	
			3.00		
4.00					
5.00					

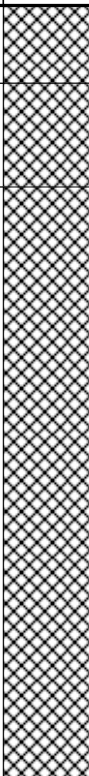
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk	GROUND WATER: Groundwater not encountered		
	REMARKS: PID 0.0 throughout		
	SCALE: 1:250	LOGGED BY: BH	FIGURE NO. 1

SHEET: 1 of 1	LOCATION: Rhos	PROJECT: Esclusham Mill	ENGINEER: BH	JOB NO. R2122	TRIAL PIT NO. TP3
		EXCAVATED BY: 360 Excavator	CLIENT: Axis Architectural Services Ltd	DATE: 4/28/2015	
DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
	TP3-ES1		0.00	MADE GROUND: grey brown ashy loose SAND AND GRAVEL of clinker, with occasional rootlets	
			0.9		
			1.00	MADE GROUND: yellow brown slightly clayey SAND	
			1.3	MADE GROUND: brown loose ashy SAND AND GRAVEL of clinker, glass (broken glass and occasional whole bottles) and brick (broken and whole)	
			2.00		
			3.00		
			3.2	MADE GROUND: grey clayey fine to coarse GRAVEL of shale	
			3.4	Yellow brown slightly sandy CLAY	
			3.6	Trial pit terminated at 3.6m	
			4.00		
5.00					
 SMITH GRANT <i>Environmental Consultancy</i> LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Groundwater not encountered			
		REMARKS: PID 0.0 throughout			
		SCALE: 1:250	LOGGED BY: BH	FIGURE NO. 1	

SHEET: 1 of 1	LOCATION: Rhos	PROJECT: Esclusham Mill	ENGINEER: BH	JOB NO. R2122	TRIAL PIT NO. TP4
		EXCAVATED BY: 360 Excavator	CLIENT: Axis Architectural Services Ltd	DATE: 4/28/2015	
DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
0.2	TP4-ES1	possibly burnt shales	0.00	MADE GROUND: brown slightly clayey SAND with gravel of rubber, brick and slate, occasional rootlets	
0.6	TP4-ES2		0.5	MADE GROUND: yellow brown slightly sandy CLAY	
			1.00 1	MADE GROUND: loose black ashy SAND with clinker and abundant fine gravel, occasional whole bricks and broken and whole glass bottles.	
			2.00		
			2.4	MADE GROUND: red loose ashy sandy GRAVEL of shale	
			3.00 3	Soft grey SANDY CLAY	
			3.2	Mottled orange grey damp SANDY CLAY	
3.4	TP4-ES3		3.4	Trial pit terminated at 3.4m	
			4.00		
			5.00		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Damp from 3.2m			
		REMARKS: PID 0.0 throughout			
		SCALE: 1:250	LOGGED BY: BH	FIGURE NO. 1	

SHEET: 1 of 1	LOCATION: Rhos	PROJECT: Esclusham Mill	ENGINEER: BH		JOB NO. R2122	TRIAL PIT NO. TP5
		EXCAVATED BY: 360 Excavator	CLIENT: Axis Architectural Services Ltd		DATE: 4/28/2015	
DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND	
			0.00	MADE GROUND: grey brown ashy loose SAND AND GRAVEL of clinker, ash, glass (broken and whole bottles) and brick (gravel and whole bricks)		
			1.00			
			1.7	MADE GROUND: grey very clayey fine loose GRAVEL		
			2.00			
			2.1	MADE GROUND: grey black coarse loose shale GRAVEL with occasional glass (whole and broken bottles)		
			3.00			
			3.5	Trial pit terminated at 3.5m		
			4.00			
			5.00			

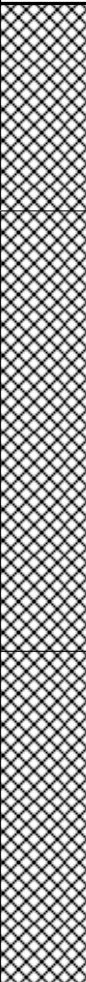
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk	GROUND WATER: Groundwater not encountered		
	REMARKS: PID 0.0 throughout		
	SCALE: 1:250	LOGGED BY: BH	FIGURE NO. 1

SHEET: 1 of 1	LOCATION: Rhos	PROJECT: Esclusham Mill	ENGINEER: BH	JOB NO. R2122	TRIAL PIT NO. TP6
		EXCAVATED BY: 360 Excavator	CLIENT: Axis Architectural Services Ltd	DATE: 4/28/2015	
DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
	TP6-ES1		0.00	MADE GROUND: grey brown ashy SAND with abundant gravel of ash, clinker and glass	
			0.3	MADE GROUND: pale grey ashy fine to coarse shale GRAVEL with glass, bottles and clinker	
			0.7	MADE GROUND: grey black shale GRAVEL with whole glass bottles, and broken glass	
			1.00		
			2.00		
			3.00	Trial pit terminated at 3m (due to spalling)	
			4.00		
			5.00		

 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk	GROUND WATER: Groundwater not encountered		
	REMARKS: PID 0.0 throughout		
	SCALE: 1:250	LOGGED BY: BH	FIGURE NO. 1

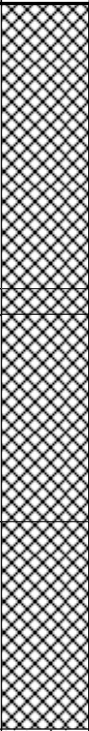
SHEET: 1 of 1	LOCATION: Rhos	PROJECT: Esclusham Mill	ENGINEER: BH		JOB NO. R2122	TRIAL PIT NO. TP8
		EXCAVATED BY: 360 Excavator	CLIENT: Axis Architectural Services Ltd		DATE: 4/28/2015	
DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND	
0.8 2.5	TP8-ES1	Frequent whole bricks	0.00	MADE GROUND: brown black ashy loose SAND with frequent fine to coarse, rounded to sub-rounded gravel and glass, brick, occasional plastic, newspaper, clinker metal, pottery and rubber	LEGEND	
	TP8-ES2	Solvent odour increasing with depth from 2.5m to base	1.00			
			2.00			
			3.00			
			3.8			
			4.00	Trial pit terminated at 3.8m		
			5.00			
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Groundwater not encountered				
		REMARKS: PID 0.0 throughout				
		SCALE: 1:250	LOGGED BY: BH		FIGURE NO. 1	

SHEET: 1 of 1	LOCATION: Rhos	PROJECT: Esclusham Mill	ENGINEER: BH	JOB NO. R2122	TRIAL PIT NO. TP9
		EXCAVATED BY: 360 Excavator	CLIENT: Axis Architectural Services Ltd	DATE: 4/28/2015	
DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
0.1	TP9-ES1	Burnt hydrocarbon / tcp odour at 2.5m	0.00	MADE GROUND: pink/brown, slightly clayey, dense, fine grained SAND with frequent gravel and occasional cobbles of mixed lithology and rare plastic	
			0.7	MADE GROUND: black ashy loose SAND with firm grey / orange mottled sandy clay pocket, frequent gravel of clinker, occasional gravel of glass and red brick, rare cobbles of red brick and occasional organic matter (roots)	
2.5	TP9-ES2		1.00		
			2.00		
			3.00		
			3.6	Trial pit terminated at 3.6m	
			4.00		
			5.00		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Groundwater not encountered			
		REMARKS: PID 0.0 throughout			
		SCALE: 1:250	LOGGED BY: BH	FIGURE NO. 1	

SHEET: 1 of 1	LOCATION: Rhos	PROJECT: Esclusham Mill	ENGINEER: BH	JOB NO. R2122	TRIAL PIT NO. TP10
		EXCAVATED BY: 360 Excavator	CLIENT: Axis Architectural Services Ltd	DATE: 4/28/2015	
DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
		Blue grey, soft clay pocket	0.00	MADE GROUND: pale brown grey CLAY with fine to coarse gravel of glass, brick and plastic	
			0.8	MADE GROUND: red brown loose, fine to coarse shale GRAVEL (burnt shales)	
			1.00		
			2.00		
			2.5	MADE GROUND: black / red loose fine to coarse shale GRAVEL (burnt shales)	
			3.00		
			3.8	Yellow grey clayey SAND	
			4.00	Trial pit terminated at 4m	
			5.00		

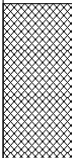
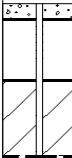
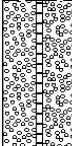
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk	GROUND WATER: Groundwater not encountered		
	REMARKS: PID 0.0 throughout		
	SCALE: 1:250	LOGGED BY: BH	FIGURE NO. 1

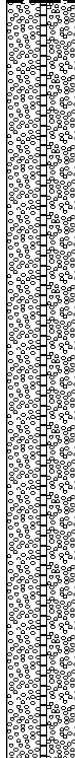
SHEET: 1 of 1	LOCATION: Rhos	PROJECT: Esclusham Mill	ENGINEER: BH		JOB NO. R2122	TRIAL PIT NO. TP11
		EXCAVATED BY: 360 Excavator	CLIENT: Axis Architectural Services Ltd		DATE: 4/28/2015	
DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
3	TP11-ES2		0.00	MADE GROUND: ashy loose SAND AND GRAVEL with glass, brick and plastic		
			1.00			
			2.00			
			3.00	MADE GROUND: pink brown, very gravelly, firm CLAY. Gravel of shale		
			3.3	Trial pit terminated at 3.3m		
			4.00			
			5.00			
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: Groundwater not encountered				
		REMARKS: PID 0.0 throughout				
		SCALE: 1:250	LOGGED BY: BH		FIGURE NO. 1	

SHEET: 1 of 1	LOCATION: Rhos	PROJECT: Esclusham Mill	ENGINEER: BH	JOB NO. R2122	TRIAL PIT NO. TP12
		EXCAVATED BY: 360 Excavator	CLIENT: Axis Architectural Services Ltd	DATE: 4/28/2015	
DEPTH (m)	SAMPLES/ TESTING	FIELD RECORDS	DEPTH (m)	DESCRIPTION OF STRATA	LEGEND
		Frequent rootlets	0.00	MADE GROUND: brown ashy SAND AND GRAVEL with abundant loose brick, glass, plastic and tile	
			1.00		
			1.1		
			1.2	MADE GROUND: Orange mottled grey slightly clayey dense SAND	
				MADE GROUND: grey black ashy loose SAND AND GRAVEL	
			2.00	MADE GROUND: grey slightly clayey GRAVEL of shale with slate and glass (broken and whole bottles) and whole bricks	
			2.8	Mottled orange grey SANDY CLAY	
			3.00	Trial pit terminated at 3m	
			4.00		
			5.00		

 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk	GROUND WATER: Groundwater not encountered		
	REMARKS: PID 0.0 throughout		
	SCALE: 1:250	LOGGED BY: BH	FIGURE NO. 1

Geo-Ventures (UK) Limited Geotechnical and Environmental Services							Site Esclusham Mill, Llwyneinion, Wrexham		Borehole Number BH 1	
Boring Method Cable Percussion		Casing Diameter 150mm cased to 3.00m		Ground Level (mOD)		Client			Job Number 15-1176	
		Location		Dates 30/04/2015		Engineer Smith Grant LLP			Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10	D						MADE GROUND : loose grey clayey mudstone fill with zones of black shale and coal			
1.00-1.45 1.00-1.45	SPT N=9 D			2,2/3,2,2,2		(3.50)				
2.00-2.45 2.00-2.45	SPT N=9 D			1,2/2,2,2,3						
3.00-3.45 3.00-3.45	SPT N=10 D			1,2/3,2,3,2						
3.50-4.50 3.60	B D					3.50	Firm to firm / stiff grey / brown CLAY (Made Ground?)			
4.00-4.45 4.00-4.45	SPT N=4 D			1,1/1,1,1,1		(2.50)				
5.00-5.45 5.00-5.45	SPT N=4 D			1,1/1,1,1,1						
6.00-6.45 6.00-6.45	SPT N=50 D			10,8/10,10,20,10		6.00 (0.45) 6.45	Stiff grey / yellow CLAY / very weak MUDSTONE			
							Complete at 6.45m			
Remarks								Scale (approx)	Logged By	
								1:50	Dr J Crook	
								Figure No. 15-1176.BH 3		

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>							Site Esclusham Mill, Llwyneinion, Wrexham		Borehole Number BH 2		
Boring Method Cable Percussion		Casing Diameter 150mm cased to 3.00m		Ground Level (mOD)		Client				Job Number 15-1176	
		Location		Dates 30/04/2015		Engineer Smith Grant LLP				Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr	
0.10-1.00	DB						MADE GROUND : black ash and cinder fill				
1.00-1.45 1.00-1.45	SPT N=11 D			2,3/2,4,3,2		(1.40) 1.40 (0.60)	MADE GROUND : firm grey / black shale / clay fill				
2.00-2.45 2.00-2.45	SPT N=14 D			2,3/3,3,4,4		2.00	Weak grey MUDSTONE				
3.00-3.45 3.00-3.45	SPT N=12 D			3,3/2,3,3,4		(2.50)					
4.00-4.45 4.00-4.45	SPT N=14 D			3,2/2,2,3,7		4.50	Complete at 4.50m				
Remarks								Scale (approx)	Logged By		
								1:50	Dr J Crook		
								Figure No. 15-1176.BH 3			

Geo-Ventures (UK) Limited <i>Geotechnical and Environmental Services</i>							Site Esclusham Mill, Llwyneinion, Wrexham		Borehole Number BH 3	
Boring Method Cable Percussion		Casing Diameter 150mm cased to 3.00m		Ground Level (mOD)		Client			Job Number 15-1176	
		Location		Dates 01/05/2015		Engineer Smith Grant LLP			Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10	D						MADE GROUND : loose black clay, soil, ash and cinder fill			
1.00-1.45 1.00-1.45	SPT N=9 D			2,2/2,2,2,3						
2.00-2.45 2.00-2.45 2.00-3.00	SPT N=8 D B			2,1/2,2,3,1		(4.40)				
3.00-3.45 3.00-3.45	SPT N=9 D			1,1/2,3,2,2						
4.00-4.45 4.00-4.45	SPT N=9 D			1,1/2,3,2,2		4.40				
4.50	D						Soft grey / brown / black CLAY with zones of black shale and coal (Made Ground?)			
5.00-5.45 5.00-5.45	SPT N=6 D			4,3/2,1,1,2		(2.60)				
6.00-6.45 6.00-6.45	SPT N=11 D			2,1/2,2,3,4						
7.00-7.45 7.00-7.45	SPT N=50 D			4,7/12,12,12,14		7.00 (0.45) 7.45	Stiff grey CLAY / very weak grey MUDSTONE			
							Complete at 7.45m			
Remarks								Scale (approx)	Logged By	
								1:50	Dr J Crook	
								Figure No. 15-1176.BH 3		

Geo-Ventures (UK) Limited Geotechnical and Environmental Services			Site Esclusham Mill, Llwyneinion, Wrexham	Borehole Number BH 1
Installation Type Single Installation	Dimensions Internal Diameter of Tube [A] = 50 mm Diameter of Filter Zone = 150 mm		Client	Job Number 15-1176
	Location	Ground Level (mOD)	Engineer Smith Grant LLP	Sheet 1/1

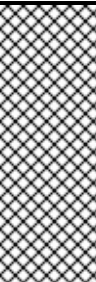
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Geo-Ventures (UK) Limited Geotechnical and Environmental Services					Site Esclusham Mill, Llwyneinion, Wrexham					Borehole Number BH 2					
Installation Type Single Installation			Dimensions Internal Diameter of Tube [A] = 50 mm Diameter of Filter Zone = 150 mm			Client					Job Number 15-1176				
			Location		Ground Level (mOD)		Engineer Smith Grant LLP					Sheet 1/1			
Legend	Water	Instr (A)	Level (mOD)	Depth (m)	Description	Groundwater Strikes During Drilling									
			0.10	Concrete	Date	Time	Depth Struck (m)	Casing Depth (m)	Inflow Rate	Readings				Depth Sealed (m)	
					5 min	10 min	15 min	20 min							
				Bentonite Seal											
				0.50	Topfill	Groundwater Observations During Drilling									
						Date	Start of Shift					End of Shift			
				1.00	Well Screen	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)	Time	Depth Hole (m)	Casing Depth (m)	Water Depth (m)	Water Level (mOD)
				3.00	Bottom Fill	Instrument Groundwater Observations									
						Inst. [A] Type : Slotted Standpipe									
4.50		Date	Instrument [A]			Remarks									
		Time	Depth (m)	Level (mOD)											

Geo-Ventures (UK) Limited Geotechnical and Environmental Services			Site Esclusham Mill, Llwyneinion, Wrexham	Borehole Number BH 3
Installation Type Single Installation	Dimensions Internal Diameter of Tube [A] = 50 mm Diameter of Filter Zone = 150 mm		Client	Job Number 15-1176
	Location	Ground Level (mOD)	Engineer Smith Grant LLP	Sheet 1/1

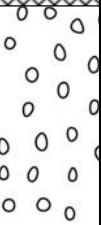
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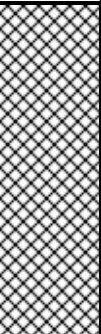
Remarks

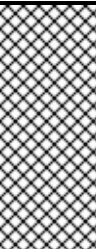
SHEET: 1 of 2	LOCATION: Llwyneinion	PROJECT: Former Scrap Yard, Esclusham Mill	ENGINEER: CS		JOB NO. R2499	TRIAL PIT NO. TP201
		EXCAVATED BY: 15 tonne excavator	CLIENT: The Paletta Pension Scheme		DATE: 15 November 2018	
DEPTH (m)	SAMPLES	Field Records	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.5	ES1	PP: 0.5kg/cm2-1kg/cm2	0	MADE GROUND: dark grey to dark brown slightly clayey sandy GRAVEL and cobbles of brick, gravel of mudstone, ceramic fragments, glass and occasional wires.		
			1	Firm bluish grey very gravelly CLAY. Gravel is fine to coarse very angular mudstone and slate (possible fill).		
			1.8	Dark grey locally weathered reddish grey slightly clayey GRAVEL of fine to coarse very angular slate and occasional cobbles of mudstone (possible fill).		
			2.2	Soft to firm light brown locally orangish brown gravelly CLAY. Gravel is fine to coarse angular mudstone and very angular slate (weathered Pennine Lower/Middle Coal Measures Formation).		
			Terminated at 3.7m			
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: Slight seepage at 1.2m, no groundwater observed REMARKS: Sidewalls unstable within gravel ES: environmental sample PP: pocket penetrometer						
SCALE: 1:250			LOGGED BY: CS		FIGURE NO. 2	

SHEET: 1 of 2	LOCATION: Llwyneinion	PROJECT: Former Scrap Yard, Esclusham Mill	ENGINEER: CS		JOB NO. R2499	TRIAL PIT NO. TP202
		EXCAVATED BY: 15 tonne excavator	CLIENT: The Paletta Pension Scheme		DATE: 15 November 2018	
DEPTH (m)	SAMPLES	Field Records	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
			0	MADE GROUND: light brown gravelly CLAY, gravel and cobbles of brick, scrap metal and occasional wires.		
			0.7	MADE GROUND: dark grey to dark brown slightly clayey slightly sandy GRAVEL and cobbles of brick, gravel of mudstone, ceramic fragments, occasional glass and plastic.		
			2	MADE GROUND: soft to firm light brown slightly gravelly CLAY, gravel is fine to coarse angular mudstone.		
			2.5	MADE GROUND: dark grey to dark brown slightly clayey slightly sandy GRAVEL and of brick, clinker, mudstone, glass, metal scrap, ceramic fragments and rare wood.		
				Terminated at 4.3m		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER:				
		No groundwater encountered				
		REMARKS:				
		Sidewalls unstable within gravel				
		SCALE:		LOGGED BY:	FIGURE NO.	
		1:250		CS	2	

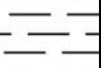
ES: environmental sample
PP: pocket penetrometer

SHEET: 1 of 2	LOCATION: Llwyneinion	PROJECT: Former Scrap Yard, Esclusham Mill	ENGINEER: CS		JOB NO. R2499	TRIAL PIT NO. TP203	
		EXCAVATED BY: 15 tonne excavator	CLIENT: The Paletta Pension Scheme		DATE: 15 November 2018		
DEPTH (m)	SAMPLES	Field Records	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND	
1.5	ES1		0	MADE GROUND: soft bluish light grey slightly gravelly CLAY, gravel is fine to coarse mudstone and brick.			
			0.3	MADE GROUND: soft light brown slightly gravelly CLAY, gravel is fine to coarse mudstone, presence of roots.			
			1.1	MADE GROUND: soft to firm grey gravelly, locally very gravelly, CLAY. Gravel is fine to coarse brick, cobbles of brick, ceramic fragments, rare rags. Presence of roots.			
				1.9	Slightly clayey GRAVEL and cobbles of very angular slate and occasional mudstone (possible fill).		
				2.7	Firm brown, locally reddish brown or bluish grey, slightly gravelly CLAY. Gravel is fine to coarse very angular slate (weathered Pennine Lower/Middle Coal Measures Formation).		
				Terminated at 3.6m			
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered					
		REMARKS: Sidewalls unstable within gravel					
		ES: environmental sample PP: pocket penetrometer					
SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 2			

SHEET: 1 of 2	LOCATION: Llwyneinion	PROJECT: Former Scrap Yard, Esclusham Mill	ENGINEER: CS		JOB NO. R2499	TRIAL PIT NO. TP204
		EXCAVATED BY: 15 tonne excavator	CLIENT: The Paletta Pension Scheme		DATE: 15 November 2018	
DEPTH (m)	SAMPLES	Field Records	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
0.5	ES1		0	MADE GROUND: brown clayey GRAVEL and cobbles of brick, mudstone, slate, occasional concrete with ceramic fragments, glass, rare wood and rags.		
			1.2	Grey, light grey, weathered reddish grey to the top, slightly clayey GRAVEL and cobbles of slate and occasional mudstone (weathered Pennine Lower/Middle Coal Measures Formation).		
				Terminated at 3m		
 SMITH GRANT Environmental Consultancy LLP Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk						
GROUND WATER: No groundwater encountered REMARKS: Sidewalls unstable within gravel ES: environmental sample PP: pocket penetrometer						
SCALE: 1:250			LOGGED BY: CS		FIGURE NO. 2	

SHEET: 1 of 2	LOCATION: Llwyneinion	PROJECT: Former Scrap Yard, Esclusham Mill	ENGINEER: CS		JOB NO. R2499	TRIAL PIT NO. TP205
		EXCAVATED BY: 15 tonne excavator	CLIENT: The Paletta Pension Scheme		DATE: 15 November 2018	
DEPTH (m)	SAMPLES	Field Records	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
			0	MADE GROUND: soft dark greyish brown, locally light brown, gravelly CLAY. Gravel is brick, cobbles of brick, mudstone, slate, ceramic fragments and glass.		
			0.9	Soft to firm dark grey slightly gravelly CLAY. Gravel is fine to coarse angular mudstone (weathered Pennine Lower/Middle Coal Measures Formation).		
			1.1	Grey, light grey, weathered reddish grey or brown to the top, slightly clayey GRAVEL and cobbles of slate and occasional mudstone (weathered Pennine Lower/Middle Coal Measures Formation).		
				Terminated at 2.6m		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk GROUND WATER: No groundwater encountered REMARKS: Sidewalls unstable within gravel ES: environmental sample PP: pocket penetrometer						
SCALE: 1:250			LOGGED BY: CS		FIGURE NO. 2	

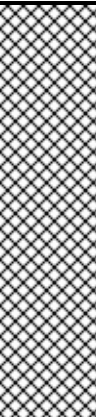
SHEET: 1 of 2	LOCATION: Llwyneinion	PROJECT: Former Scrap Yard, Esclusham Mill	ENGINEER: CS		JOB NO. R2499	TRIAL PIT NO. TP206
		EXCAVATED BY: 15 tonne excavator	CLIENT: The Paletta Pension Scheme		DATE: 15 November 2018	
DEPTH (m)	SAMPLES	Field Records	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
1.5	ES1		0	MADE GROUND: dark grey/dark brown slightly clayey slightly sandy/ashy fine to coarse angular GRAVEL of brick, slate, mudstone, clinker, glass bottles and jars, plastic.		
			2	GRAVEL and COBBLES of brick. Down to 2.6m - western wall of the pit, down to 3.4m - eastern wall of the pit.		
			3.4	Grey, light grey, weathered reddish grey or brown to the top, slightly clayey GRAVEL and cobbles of slate and occasional mudstone. From to 2.6m - western wall of the pit, from to 3.4m - eastern wall of the pit (weathered Pennine Lower/Middle Coal Measures Formation).		
				Terminated at 4.3m		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered				
		REMARKS: Sidewalls unstable within gravel				
		ES: environmental sample PP: pocket penetrometer				
SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 2		

SHEET: 1 of 2	LOCATION: Llwyneinion	PROJECT: Former Scrap Yard, Esclusham Mill	ENGINEER: CS		JOB NO. R2499	TRIAL PIT NO. TP207
		EXCAVATED BY: 15 tonne excavator	CLIENT: The Paletta Pension Scheme		DATE: 15 November 2018	
DEPTH (m)	SAMPLES	Field Records	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
			0	MADE GROUND: dark brown slightly sandy/ashy gravelly CLAY. Gravel is fine to coarse brick (cobbles), clinker, ceramic fragments, glass bottles and jars, rare wood and rags.		
			2.1	Soft to firm brown gravelly CLAY. Gravel is fine to coarse angular slate (weathered Pennine Lower/Middle Coal Measures Formation).		
			2.4	Light grey to dark grey fine to coarse angular GRAVEL of laminated slate (weathered Pennine Lower/Middle Coal Measures Formation).		
				Terminated at 3.1m		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered				
		REMARKS: Sidewalls unstable within gravel				
		SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 2

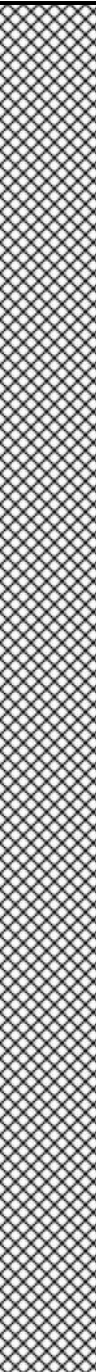
ES: environmental sample
PP: pocket penetrometer

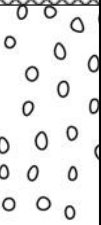
SHEET: 1 of 2	LOCATION: Llwyneinion	PROJECT: Former Scrap Yard, Esclusham Mill	ENGINEER: CS		JOB NO. R2499	TRIAL PIT NO. TP208
		EXCAVATED BY: 15 tonne excavator	CLIENT: The Paletta Pension Scheme		DATE: 15 November 2018	
DEPTH (m)	SAMPLES	Field Records	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
1	ES1		0	MADE GROUND: dark brown/grey slightly clayey sandy/ashy GRAVEL of mudstone, brick, clinker, glass, ceramic fragments and metal scrap, occasional wires. Lenses of brown clay.		
			1.8	Grey, locally reddish brown, slightly sandy fine to coarse angular and very angular GRAVEL of slate, occasional cobbles and rare boulders (weathered Pennine Lower/Middle Coal Measures Formation).		
				Terminated at 3.5m		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered				
		REMARKS: Sidewalls unstable within gravel				
		SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 2

ES: environmental sample
PP: pocket penetrometer

SHEET: 1 of 2	LOCATION: Llwyneinion	PROJECT: Former Scrap Yard, Esclusham Mill	ENGINEER: CS		JOB NO. R2499	TRIAL PIT NO. TP209
		EXCAVATED BY: 15 tonne excavator	CLIENT: The Paletta Pension Scheme		DATE: 15 November 2018	
DEPTH (m)	SAMPLES	Field Records	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
			0	MADE GROUND: dark brown slightly sandy very gravelly CLAY. Gravel is brick (cobbles), ceramic fragments, glass bottles and jars, occasional plastic, rags and wires.		
			1.5	Soft to firm bluish grey locally light brown slightly gravelly CLAY. Gravel is fine to coarse angular mudstone/slate (weathered Pennine Lower/Middle Coal Measures Formation).		
			1.8	Light grey locally light brown fine to coarse angular to very angular GRAVEL and COBBLES of mudstone and laminated slate (weathered Pennine Lower/Middle Coal Measures Formation).		
				Terminated at 3m		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered				
		REMARKS: Sidewalls unstable within gravel				
		SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 2

ES: environmental sample
PP: pocket penetrometer

SHEET: 1 of 2	LOCATION: Llwyneinion	PROJECT: Former Scrap Yard, Esclusham Mill	ENGINEER: CS		JOB NO. R2499	TRIAL PIT NO. TP210
		EXCAVATED BY: 15 tonne excavator	CLIENT: The Paletta Pension Scheme		DATE: 15 November 2018	
DEPTH (m)	SAMPLES	Field Records	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
			0	MADE GROUND: dark brown/grey slightly sandy gravelly CLAY. Gravel is fine to coarse brick, mudstone, slate, ceramic fragments, glass bottles and jars, occasional rags and metal scrap. Lenses of clay.		
			4.9	Grey fine to coarse angular to very angular GRAVEL and COBBLES of mudstone and laminated slate (weathered Pennine Lower/Middle Coal Measures Formation).		
				Terminated at 5m		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL146DL Tel: 01978822367 Fax: 019788247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER:				
		No groundwater encountered				
		REMARKS:				
		Sidewalls unstable within gravel				
		ES: environmental sample PP: pocket penetrometer				
		SCALE: 1:250	LOGGED BY: CS		FIGURE NO. 2	

SHEET: 1 of 2	LOCATION: Llwyneinion	PROJECT: Former Scrap Yard, Esclusham Mill	ENGINEER: CS		JOB NO. R2499	TRIAL PIT NO. TP211
		EXCAVATED BY: 15 tonne excavator	CLIENT: The Paletta Pension Scheme		DATE: 15 November 2018	
DEPTH (m)	SAMPLES	Field Records	DEPTH (m)	DESCRIPTION OF STRATA		LEGEND
			0	MADE GROUND: dark brown/grey slightly sandy/ashy clayey fine to coarse angular to very angular GRAVEL of brick, mudstone, slate, clinker, ceramic fragments, glass bottles and jars, occasional rags, plastic and metal scrap.		
			3.3	Grey, locally weathered reddish brown, fine to coarse angular to very angular GRAVEL and COBBLES of mudstone and laminated slate (weathered Pennine Lower/Middle Coal Measures Formation).		
				Terminated at 4.1m		
 Smith Grant LLP Station House, Station Road, Ruabon, Wrexham LL14 6DL Tel: 01978 822367 Fax: 01978 8247182 www.smithgrant.co.uk email: consult@smithgrant.co.uk		GROUND WATER: No groundwater encountered				
		REMARKS: Sidewalls unstable within gravel				
		ES: environmental sample PP: pocket penetrometer				
SCALE: 1:250		LOGGED BY: CS		FIGURE NO. 2		

TP201



TP202



TP203



TP204



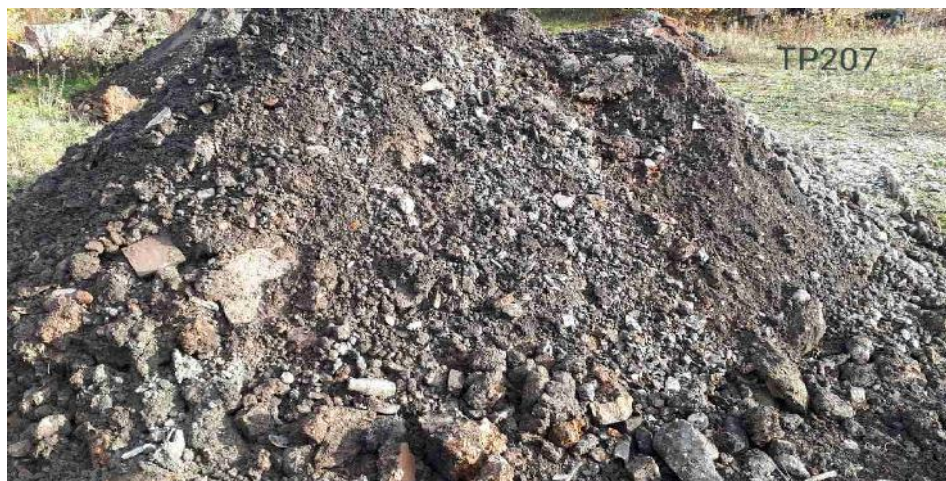
TP205



TP206



TP207



TP208



TP209



TP210



TP211



APPENDIX D

Chemical Analytical Results 2015 and 2018



Final Report

Report Number: 15-10027 Issue-1

Initial Date of Issue: 06-May-2015

Client: Smith Grant LLP

Client Address: Station House, Station Road
Ruabon
Wrexham
LL14 6DL

Contact(s): Briony Harvey

Project: R2122 - Esclusham Mill, Llwyneinion

Quotation No.: Q15-02887

Date Received: 30-Apr-2015

Order No.:

Date Instructed: 30-Apr-2015

No. of Samples: 19

Turnaround: (Wkdays) 4

Results Due Date: 06-May-2015

Date Approved: 06-May-2015

Approved By:



Details: Keith Jones, Technical Manager

Results Summary - Soil

Project: R2122 - Esclusham Mill, Llwyneinion

Client: Smith Grant LLP	Chemtest Job No.:				15-10027	15-10027	15-10027	15-10027	15-10027	15-10027	15-10027	15-10027	15-10027
Quotation No.: Q15-02887	Chemtest Sample ID.:				135370	135372	135374	135375	135376	135377	135379	135380	135381
Order No.:	Client Sample Ref.:				ES1	ES1	ES2	ES1	ES2	ES3	ES1	ES2	ES1
	Client Sample ID.:				TP3	TP6	TP2	TP4	TP4	TP4	TP9	TP9	TP8
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.20	0.60	0.20	0.60	3.40	0.10	2.50	0.80
	Bottom Depth(m):												
	Date Sampled:				28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15
Determinand	Accred.	SOP	Units	LOD									
ACM Type	U	2192			-	-	-	-	-		-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.02	20	15	16	14	18	15	8.8	26	29
Soil Colour	N				brown	brown	brown	brown	brown	brown	brown	brown	brown
Other Material	N				stones roots	stones roots	stones	stones	stones	stones	stones	stones	stones roots
Soil Texture	N				sand	sand	clay	sand	sand	clay	sand	sand	sand
pH	M	2010			7.7	7.2	7.6	7.4	7.4	7.0	7.6	7.0	7.3
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.01			0.063			0.097			
Calorific Value	N	2140	MJ/kg	0.1	5.6								6.2
Cyanide (Complex)	M	2300	mg/kg	0.5				0.50					0.90
Cyanide (Free)	M	2300	mg/kg	0.5				< 0.50					< 0.50
Cyanide (Total)	M	2300	mg/kg	0.5				0.60					0.90
Thiocyanate	M	2300	mg/kg	5				< 5.0					7.3
Sulphide (Easily Liberatable)	M	2325	mg/kg	0.5				5.9					12
Arsenic	M	2450	mg/kg	1	62	75	19	24	16		14	150	75
Cadmium	M	2450	mg/kg	0.1	7.1	2.0	0.48	2.2	1.1		0.31	1.2	1.1
Chromium	M	2450	mg/kg	1	34	42	20	27	18		18	50	110
Copper	M	2450	mg/kg	0.5	140	210	41	130	39		27	260	450
Mercury	M	2450	mg/kg	0.1	0.39	0.20	< 0.10	< 0.10	< 0.10		< 0.10	0.54	0.64
Nickel	M	2450	mg/kg	0.5	92	120	27	50	21		28	140	140
Lead	M	2450	mg/kg	0.5	370	440	110	310	220		92	650	420
Selenium	M	2450	mg/kg	0.2	1.4	1.8	0.75	0.98	0.58		0.50	3.4	1.8
Zinc	M	2450	mg/kg	0.5	1300	600	120	390	370		95	2000	740
Chromium (Hexavalent)	N	2490	mg/kg	0.5	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		< 0.50	< 0.50	< 0.50
Organic Matter	M	2625	%	0.4	34	47	2.4	7.6	6.4		1.7	45	48
Aliphatic TPH >C5-C6	N	2675	mg/kg	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	2675	mg/kg	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Aliphatic TPH >C8-C10	M	2675	mg/kg	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Aliphatic TPH >C10-C12	M	2675	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2675	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2675	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2675	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0

Results Summary - Soil

Project: R2122 - Esclusham Mill, Llwyneinion

Client: Smith Grant LLP	Chemtest Job No.:				15-10027	15-10027	15-10027	15-10027	15-10027	15-10027	15-10027	15-10027	15-10027
Quotation No.: Q15-02887	Chemtest Sample ID.:				135370	135372	135374	135375	135376	135377	135379	135380	135381
Order No.:	Client Sample Ref.:				ES1	ES1	ES2	ES1	ES2	ES3	ES1	ES2	ES1
	Client Sample ID.:				TP3	TP6	TP2	TP4	TP4	TP4	TP9	TP9	TP8
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.20	0.60	0.20	0.60	3.40	0.10	2.50	0.80
	Bottom Depth(m):												
	Date Sampled:				28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15
Determinand	Accred.	SOP	Units	LOD									
Aliphatic TPH >C35-C44	M	2675	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	M	2675	mg/kg	5	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0		< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2675	mg/kg	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Aromatic TPH >C7-C8	N	2675	mg/kg	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Aromatic TPH >C8-C10	M	2675	mg/kg	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Aromatic TPH >C10-C12	M	2675	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2675	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	M	2675	mg/kg	1	16	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	M	2675	mg/kg	1	51	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2675	mg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	M	2675	mg/kg	5	67	< 5.0	< 5.0	< 5.0	< 5.0		< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	M	2675	mg/kg	10	66	< 10	< 10	< 10	< 10		< 10	< 10	< 10
Naphthalene	M	2700	mg/kg	0.1	1.2	2.1	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	1.5
Acenaphthylene	M	2700	mg/kg	0.1	0.59	0.39	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.25
Acenaphthene	M	2700	mg/kg	0.1	0.20	0.17	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.13
Fluorene	M	2700	mg/kg	0.1	0.32	0.46	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.32
Phenanthrene	M	2700	mg/kg	0.1	1.4	0.91	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	0.67
Anthracene	M	2700	mg/kg	0.1	0.37	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.1	3.6	0.23	< 0.10	0.20	0.42		< 0.10	0.21	0.50
Pyrene	M	2700	mg/kg	0.1	3.9	0.35	< 0.10	0.21	0.37		< 0.10	0.28	0.58
Benzo[a]anthracene	M	2700	mg/kg	0.1	1.8	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.1	2.2	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.1	3.8	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.1	1.3	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.1	2.6	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.1	1.7	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.1	1.5	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2	27	4.6	< 2.0	< 2.0	< 2.0		< 2.0	< 2.0	4.0
Dichlorodifluoromethane	U	2760	µg/kg	1								< 1.0	< 1.0
Chloromethane	M	2760	µg/kg	1								< 1.0	< 1.0
Vinyl Chloride	M	2760	µg/kg	1								< 1.0	< 1.0
Bromomethane	M	2760	µg/kg	20								< 20	< 20

Results Summary - Soil

Project: R2122 - Esclusham Mill, Llwyneinion

Client: Smith Grant LLP	Chemtest Job No.:				15-10027	15-10027	15-10027	15-10027	15-10027	15-10027	15-10027	15-10027
Quotation No.: Q15-02887	Chemtest Sample ID.:				135370	135372	135374	135375	135376	135377	135379	135381
Order No.:	Client Sample Ref.:				ES1	ES1	ES2	ES1	ES2	ES3	ES1	ES1
	Client Sample ID.:				TP3	TP6	TP2	TP4	TP4	TP4	TP9	TP8
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.20	0.60	0.20	0.60	3.40	0.10	2.50
	Bottom Depth(m):											
	Date Sampled:				28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15
Determinand	Accred.	SOP	Units	LOD								
Chloroethane	U	2760	µg/kg	2							< 2.0	< 2.0
Trichlorofluoromethane	M	2760	µg/kg	1							< 1.0	< 1.0
1,1-Dichloroethene	M	2760	µg/kg	1							< 1.0	< 1.0
Trans 1,2-Dichloroethene	M	2760	µg/kg	1							< 1.0	< 1.0
1,1-Dichloroethane	M	2760	µg/kg	1							< 1.0	< 1.0
cis 1,2-Dichloroethene	M	2760	µg/kg	1							< 1.0	< 1.0
Bromochloromethane	U	2760	µg/kg	5							< 5.0	< 5.0
Trichloromethane	M	2760	µg/kg	1							< 1.0	< 1.0
1,1,1-Trichloroethane	M	2760	µg/kg	1							< 1.0	< 1.0
Tetrachloromethane	M	2760	µg/kg	1							< 1.0	< 1.0
1,1-Dichloropropene	U	2760	µg/kg	1							< 1.0	< 1.0
Benzene	M	2760	µg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	37
1,2-Dichloroethane	M	2760	µg/kg	2							< 2.0	< 2.0
Trichloroethene	M	2760	µg/kg	1							< 1.0	< 1.0
1,2-Dichloropropane	M	2760	µg/kg	1							< 1.0	< 1.0
Dibromomethane	M	2760	µg/kg	1							< 1.0	< 1.0
Bromodichloromethane	M	2760	µg/kg	5							< 5.0	< 5.0
cis-1,3-Dichloropropene	N	2760	µg/kg	10							< 10	< 10
Toluene	M	2760	µg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	11
Trans-1,3-Dichloropropene	N	2760	µg/kg	10							< 10	< 10
1,1,2-Trichloroethane	M	2760	µg/kg	10							< 10	< 10
Tetrachloroethene	M	2760	µg/kg	1							< 1.0	< 1.0
1,3-Dichloropropane	U	2760	µg/kg	2							< 2.0	< 2.0
Dibromochloromethane	U	2760	µg/kg	10							< 10	< 10
1,2-Dibromoethane	M	2760	µg/kg	5							< 5.0	< 5.0
Chlorobenzene	M	2760	µg/kg	1							< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2							< 2.0	< 2.0
Ethylbenzene	M	2760	µg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	9.7
m & p-Xylene	M	2760	µg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	34
o-Xylene	M	2760	µg/kg	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0		< 1.0	12
Styrene	M	2760	µg/kg	1							< 1.0	< 1.0
Tribromomethane	U	2760	µg/kg	1							< 1.0	< 1.0
Isopropylbenzene	M	2760	µg/kg	1							< 1.0	< 1.0

Results Summary - Soil

Project: R2122 - Esclusham Mill, Llwyneinion

Client: Smith Grant LLP	Chemtest Job No.:				15-10027	15-10027	15-10027	15-10027	15-10027	15-10027	15-10027	15-10027
Quotation No.: Q15-02887	Chemtest Sample ID.:				135370	135372	135374	135375	135376	135377	135379	135380
Order No.:	Client Sample Ref.:				ES1	ES1	ES2	ES1	ES2	ES3	ES1	ES2
	Client Sample ID.:				TP3	TP6	TP2	TP4	TP4	TP4	TP9	TP8
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.20	0.60	0.20	0.60	3.40	0.10	2.50
	Bottom Depth(m):											
	Date Sampled:				28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15
Determinand	Accred.	SOP	Units	LOD								
Bromobenzene	M	2760	µg/kg	1							< 1.0	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50							< 50	< 50
N-Propylbenzene	U	2760	µg/kg	1							< 1.0	< 1.0
2-Chlorotoluene	M	2760	µg/kg	1							< 1.0	< 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1							< 1.0	< 1.0
4-Chlorotoluene	U	2760	µg/kg	1							< 1.0	< 1.0
Tert-Butylbenzene	U	2760	µg/kg	1							< 1.0	< 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1							< 1.0	17
Sec-Butylbenzene	U	2760	µg/kg	1							< 1.0	< 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1							< 1.0	< 1.0
4-Isopropyltoluene	U	2760	µg/kg	1							< 1.0	< 1.0
1,4-Dichlorobenzene	M	2760	µg/kg	1							< 1.0	< 1.0
N-Butylbenzene	U	2760	µg/kg	1							< 1.0	< 1.0
1,2-Dichlorobenzene	M	2760	µg/kg	1							< 1.0	< 1.0
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50							< 50	< 50
1,2,4-Trichlorobenzene	M	2760	µg/kg	1							< 1.0	< 1.0
Hexachlorobutadiene	U	2760	µg/kg	1							< 1.0	< 1.0
1,2,3-Trichlorobenzene	U	2760	µg/kg	2							< 2.0	< 2.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1							< 1.0	< 1.0
N-Nitrosodimethylamine	N	2790	mg/kg	0.5							< 0.50	< 0.50
Phenol	N	2790	mg/kg	0.5							< 0.50	< 0.50
2-Chlorophenol	N	2790	mg/kg	0.5							< 0.50	< 0.50
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.5							< 0.50	< 0.50
1,3-Dichlorobenzene	N	2790	mg/kg	0.5							< 0.50	< 0.50
1,4-Dichlorobenzene	N	2790	mg/kg	0.5							< 0.50	< 0.50
1,2-Dichlorobenzene	N	2790	mg/kg	0.5							< 0.50	< 0.50
2-Methylphenol	N	2790	mg/kg	0.5							< 0.50	< 0.50
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.5							< 0.50	< 0.50
Hexachloroethane	N	2790	mg/kg	0.5							< 0.50	< 0.50
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.5							< 0.50	< 0.50
4-Methylphenol	N	2790	mg/kg	0.5							< 0.50	< 0.50
Nitrobenzene	N	2790	mg/kg	0.5							< 0.50	< 0.50
Isophorone	N	2790	mg/kg	0.5							< 0.50	< 0.50

Results Summary - Soil

Project: R2122 - Esclusham Mill, Llwyneinion

Client: Smith Grant LLP	Chemtest Job No.:				15-10027	15-10027	15-10027	15-10027	15-10027	15-10027	15-10027	15-10027
Quotation No.: Q15-02887	Chemtest Sample ID.:				135370	135372	135374	135375	135376	135377	135379	135380
Order No.:	Client Sample Ref.:				ES1	ES1	ES2	ES1	ES2	ES3	ES1	ES2
	Client Sample ID.:				TP3	TP6	TP2	TP4	TP4	TP4	TP9	TP8
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.20	0.60	0.20	0.60	3.40	0.10	2.50
	Bottom Depth(m):											
	Date Sampled:				28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15
Determinand	Accred.	SOP	Units	LOD								
2-Nitrophenol	N	2790	mg/kg	0.5								< 0.50
2,4-Dimethylphenol	N	2790	mg/kg	0.5								< 0.50
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.5								< 0.50
2,4-Dichlorophenol	N	2790	mg/kg	0.5								< 0.50
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.5								< 0.50
Naphthalene	N	2790	mg/kg	0.5								< 0.50
4-Chloroaniline	N	2790	mg/kg	0.5								< 0.50
Hexachlorobutadiene	N	2790	mg/kg	0.5								< 0.50
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.5								< 0.50
2-Methylnaphthalene	N	2790	mg/kg	0.5								< 0.50
Hexachlorocyclopentadiene	N	2790	mg/kg	0.5								< 0.50
2,4,6-Trichlorophenol	N	2790	mg/kg	0.5								< 0.50
2,4,5-Trichlorophenol	N	2790	mg/kg	0.5								< 0.50
2-Chloronaphthalene	N	2790	mg/kg	0.5								< 0.50
2-Nitroaniline	N	2790	mg/kg	0.5								< 0.50
Acenaphthylene	N	2790	mg/kg	0.5								< 0.50
Dimethylphthalate	N	2790	mg/kg	0.5								< 0.50
2,6-Dinitrotoluene	N	2790	mg/kg	0.5								< 0.50
Acenaphthene	N	2790	mg/kg	0.5								< 0.50
Dibenzofuran	N	2790	mg/kg	0.5								< 0.50
4-Chlorophenylphenylether	N	2790	mg/kg	0.5								< 0.50
2,4-Dinitrotoluene	N	2790	mg/kg	0.5								< 0.50
Fluorene	N	2790	mg/kg	0.5								< 0.50
Diethyl Phthalate	N	2790	mg/kg	0.5								< 0.50
4-Nitroaniline	N	2790	mg/kg	0.5								< 0.50
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.5								< 0.50
Azobenzene	N	2790	mg/kg	0.5								< 0.50
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.5								< 0.50
Hexachlorobenzene	N	2790	mg/kg	0.5								< 0.50
Pentachlorophenol	N	2790	mg/kg	0.5								< 0.50
Phenanthrene	N	2790	mg/kg	0.5								< 0.50
Anthracene	N	2790	mg/kg	0.5								< 0.50
Carbazole	N	2790	mg/kg	0.5								< 0.50

Results Summary - Soil

Project: R2122 - Esclusham Mill, Llwyneinion

Client: Smith Grant LLP	Chemtest Job No.:				15-10027	15-10027	15-10027	15-10027	15-10027	15-10027	15-10027	15-10027
Quotation No.: Q15-02887	Chemtest Sample ID.:				135370	135372	135374	135375	135376	135377	135379	135380
Order No.:	Client Sample Ref.:				ES1	ES1	ES2	ES1	ES2	ES3	ES1	ES2
	Client Sample ID.:				TP3	TP6	TP2	TP4	TP4	TP4	TP9	TP8
	Sample Type:				SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				0.50	0.20	0.60	0.20	0.60	3.40	0.10	2.50
	Bottom Depth(m):											
	Date Sampled:				28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15
Determinand	Accred.	SOP	Units	LOD								
Di-N-Butyl Phthalate	N	2790	mg/kg	0.5								< 0.50
Fluoranthene	N	2790	mg/kg	0.5								< 0.50
Pyrene	N	2790	mg/kg	0.5								< 0.50
Butylbenzyl Phthalate	N	2790	mg/kg	0.5								< 0.50
Benzo[a]anthracene	N	2790	mg/kg	0.5								< 0.50
Chrysene	N	2790	mg/kg	0.5								< 0.50
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.5								< 0.50
Di-N-Octyl Phthalate	N	2790	mg/kg	0.5								< 0.50
Benzo[b]fluoranthene	N	2790	mg/kg	0.5								< 0.50
Benzo[k]fluoranthene	N	2790	mg/kg	0.5								< 0.50
Benzo[a]pyrene	N	2790	mg/kg	0.5								< 0.50
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.5								< 0.50
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.5								< 0.50
Benzo[g,h,i]perylene	N	2790	mg/kg	0.5								< 0.50
PCB 28	M	2810	mg/kg	0.01								< 0.010
PCB 52	M	2815	mg/kg	0.01								< 0.010
PCB 101	M	2815	mg/kg	0.01								< 0.010
PCB 118	M	2815	mg/kg	0.01								< 0.010
PCB 153	M	2815	mg/kg	0.01								< 0.010
PCB 138	M	2815	mg/kg	0.01								< 0.010
PCB 180	M	2810	mg/kg	0.01								< 0.010
Total PCBs (7 Congeners)	N	2815	mg/kg	0.1								< 0.10
Total Phenols	M	2920	mg/kg	0.3								< 0.30
VOC TIC	N	2760	µg/kg									None Detected
SVOC TIC	N	2790	mg/kg									None Detected

Results Summary - Soil

Project: R2122 - Esclusham Mill, Llwyneinion

Client: Smith Grant LLP	Chemtest Job No.:				15-10027	15-10027	15-10027	15-10027
Quotation No.: Q15-02887	Chemtest Sample ID.:				135382	135384	135385	135386
Order No.:	Client Sample Ref.:				ES2	ES2	ES1	ES2
	Client Sample ID.:				TP8	TP11	TP1	TP1
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				2.50	3.00	0.10	0.60
	Bottom Depth(m):							
	Date Sampled:				28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15
Determinand	Accred.	SOP	Units	LOD				
ACM Type	U	2192			-		-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected		No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.02	30	13	8.8	9.0
Soil Colour	N				brown	brown	brown	brown
Other Material	N				stones	stones	stones	stones
Soil Texture	N				sand	clay	sand	sand
pH	M	2010			7.5	7.3	8.0	8.0
Sulphate (2:1 Water Soluble) as SO ₄	M	2120	g/l	0.01	1.3	0.66		0.091
Calorific Value	N	2140	MJ/kg	0.1			2.3	
Cyanide (Complex)	M	2300	mg/kg	0.5			< 0.50	
Cyanide (Free)	M	2300	mg/kg	0.5			< 0.50	
Cyanide (Total)	M	2300	mg/kg	0.5			< 0.50	
Thiocyanate	M	2300	mg/kg	5			< 5.0	
Sulphide (Easily Liberatable)	M	2325	mg/kg	0.5			610	
Arsenic	M	2450	mg/kg	1	72		19	15
Cadmium	M	2450	mg/kg	0.1	3.0		2.0	0.53
Chromium	M	2450	mg/kg	1	61		16	21
Copper	M	2450	mg/kg	0.5	280		71	49
Mercury	M	2450	mg/kg	0.1	0.26		< 0.10	< 0.10
Nickel	M	2450	mg/kg	0.5	120		37	45
Lead	M	2450	mg/kg	0.5	990		220	72
Selenium	M	2450	mg/kg	0.2	1.4		< 0.20	< 0.20
Zinc	M	2450	mg/kg	0.5	1200		410	140
Chromium (Hexavalent)	N	2490	mg/kg	0.5	< 0.50		< 0.50	< 0.50
Organic Matter	M	2625	%	0.4	38		12	3.3
Aliphatic TPH >C5-C6	N	2675	mg/kg	0.1	< 0.10		< 0.10	< 0.10
Aliphatic TPH >C6-C8	N	2675	mg/kg	0.1	< 0.10		< 0.10	< 0.10
Aliphatic TPH >C8-C10	M	2675	mg/kg	0.1	8.9		< 0.10	< 0.10
Aliphatic TPH >C10-C12	M	2675	mg/kg	1	76		< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2675	mg/kg	1	50		< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2675	mg/kg	1	61		< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2675	mg/kg	1	1800		< 1.0	< 1.0

Results Summary - Soil

Project: R2122 - Esclusham Mill, Llwyneinion

Client: Smith Grant LLP	Chemtest Job No.: 15-10027					15-10027	15-10027	15-10027	15-10027
Quotation No.: Q15-02887	Chemtest Sample ID.: 135382					135382	135384	135385	135386
Order No.:	Client Sample Ref.: ES2					ES2	ES2	ES1	ES2
	Client Sample ID.: TP8					TP8	TP11	TP1	TP1
	Sample Type: SOIL					SOIL	SOIL	SOIL	SOIL
	Top Depth (m): 2.50					2.50	3.00	0.10	0.60
	Bottom Depth(m):								
	Date Sampled: 28-Apr-15					28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15
Determinand	Accred.	SOP	Units	LOD					
Aliphatic TPH >C35-C44	M	2675	mg/kg	1	93		< 1.0	< 1.0	
Total Aliphatic Hydrocarbons	M	2675	mg/kg	5	2100		< 5.0	< 5.0	
Aromatic TPH >C5-C7	N	2675	mg/kg	0.1	< 0.10		< 0.10	< 0.10	
Aromatic TPH >C7-C8	N	2675	mg/kg	0.1	< 0.10		< 0.10	< 0.10	
Aromatic TPH >C8-C10	M	2675	mg/kg	0.1	75		< 0.10	< 0.10	
Aromatic TPH >C10-C12	M	2675	mg/kg	1	330		< 1.0	< 1.0	
Aromatic TPH >C12-C16	M	2675	mg/kg	1	200		< 1.0	< 1.0	
Aromatic TPH >C16-C21	M	2675	mg/kg	1	56		13	< 1.0	
Aromatic TPH >C21-C35	M	2675	mg/kg	1	1900		33	< 1.0	
Aromatic TPH >C35-C44	N	2675	mg/kg	1	98		< 1.0	< 1.0	
Total Aromatic Hydrocarbons	M	2675	mg/kg	5	2700		45	< 5.0	
Total Petroleum Hydrocarbons	M	2675	mg/kg	10	4800		45	< 10	
Naphthalene	M	2700	mg/kg	0.1	< 0.10		1.4	< 0.10	
Acenaphthylene	M	2700	mg/kg	0.1	< 0.10		0.29	< 0.10	
Acenaphthene	M	2700	mg/kg	0.1	< 0.10		0.10	< 0.10	
Fluorene	M	2700	mg/kg	0.1	< 0.10		0.34	< 0.10	
Phenanthrene	M	2700	mg/kg	0.1	< 0.10		1.5	< 0.10	
Anthracene	M	2700	mg/kg	0.1	< 0.10		0.41	< 0.10	
Fluoranthene	M	2700	mg/kg	0.1	< 0.10		3.8	0.22	
Pyrene	M	2700	mg/kg	0.1	< 0.10		4.3	0.27	
Benzo[a]anthracene	M	2700	mg/kg	0.1	< 0.10		1.9	< 0.10	
Chrysene	M	2700	mg/kg	0.1	< 0.10		1.8	< 0.10	
Benzo[b]fluoranthene	M	2700	mg/kg	0.1	< 0.10		3.2	< 0.10	
Benzo[k]fluoranthene	M	2700	mg/kg	0.1	< 0.10		0.98	< 0.10	
Benzo[a]pyrene	M	2700	mg/kg	0.1	< 0.10		2.1	< 0.10	
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.1	< 0.10		1.6	< 0.10	
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.1	< 0.10		< 0.10	< 0.10	
Benzo[g,h,i]perylene	M	2700	mg/kg	0.1	< 0.10		1.3	< 0.10	
Total Of 16 PAH's	M	2700	mg/kg	2	< 2.0		25	< 2.0	
Dichlorodifluoromethane	U	2760	µg/kg	1	< 1.0				
Chloromethane	M	2760	µg/kg	1	< 1.0				
Vinyl Chloride	M	2760	µg/kg	1	< 1.0				
Bromomethane	M	2760	µg/kg	20	< 20				

Results Summary - Soil

Project: R2122 - Esclusham Mill, Llwyneinion

Client: Smith Grant LLP	Chemtest Job No.:				15-10027	15-10027	15-10027	15-10027
Quotation No.: Q15-02887	Chemtest Sample ID.:				135382	135384	135385	135386
Order No.:	Client Sample Ref.:				ES2	ES2	ES1	ES2
	Client Sample ID.:				TP8	TP11	TP1	TP1
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				2.50	3.00	0.10	0.60
	Bottom Depth(m):							
	Date Sampled:				28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15
Determinand	Accred.	SOP	Units	LOD				
Chloroethane	U	2760	µg/kg	2	< 2.0			
Trichlorofluoromethane	M	2760	µg/kg	1	< 1.0			
1,1-Dichloroethene	M	2760	µg/kg	1	< 1.0			
Trans 1,2-Dichloroethene	M	2760	µg/kg	1	< 1.0			
1,1-Dichloroethane	M	2760	µg/kg	1	< 1.0			
cis 1,2-Dichloroethene	M	2760	µg/kg	1	< 1.0			
Bromochloromethane	U	2760	µg/kg	5	< 5.0			
Trichloromethane	M	2760	µg/kg	1	< 1.0			
1,1,1-Trichloroethane	M	2760	µg/kg	1	< 1.0			
Tetrachloromethane	M	2760	µg/kg	1	< 1.0			
1,1-Dichloropropene	U	2760	µg/kg	1	< 1.0			
Benzene	M	2760	µg/kg	1	15		< 1.0	< 1.0
1,2-Dichloroethane	M	2760	µg/kg	2	< 2.0			
Trichloroethene	M	2760	µg/kg	1	< 1.0			
1,2-Dichloropropane	M	2760	µg/kg	1	< 1.0			
Dibromomethane	M	2760	µg/kg	1	< 1.0			
Bromodichloromethane	M	2760	µg/kg	5	< 5.0			
cis-1,3-Dichloropropene	N	2760	µg/kg	10	< 10			
Toluene	M	2760	µg/kg	1	35		< 1.0	< 1.0
Trans-1,3-Dichloropropene	N	2760	µg/kg	10	< 10			
1,1,2-Trichloroethane	M	2760	µg/kg	10	< 10			
Tetrachloroethene	M	2760	µg/kg	1	< 1.0			
1,3-Dichloropropane	U	2760	µg/kg	2	< 2.0			
Dibromochloromethane	U	2760	µg/kg	10	< 10			
1,2-Dibromoethane	M	2760	µg/kg	5	< 5.0			
Chlorobenzene	M	2760	µg/kg	1	< 1.0			
1,1,1,2-Tetrachloroethane	M	2760	µg/kg	2	< 2.0			
Ethylbenzene	M	2760	µg/kg	1	23		< 1.0	< 1.0
m & p-Xylene	M	2760	µg/kg	1	100		< 1.0	< 1.0
o-Xylene	M	2760	µg/kg	1	120		< 1.0	< 1.0
Styrene	M	2760	µg/kg	1	6.6			
Tribromomethane	U	2760	µg/kg	1	< 1.0			
Isopropylbenzene	M	2760	µg/kg	1	3.5			

Results Summary - Soil

Project: R2122 - Esclusham Mill, Llwyneinion

Client: Smith Grant LLP	Chemtest Job No.: 15-10027 15-10027 15-10027 15-10027				
Quotation No.: Q15-02887	Chemtest Sample ID.: 135382 135384 135385 135386				
Order No.:	Client Sample Ref.: ES2 ES2 ES1 ES2				
	Client Sample ID.: TP8 TP11 TP1 TP1				
	Sample Type: SOIL SOIL SOIL SOIL				
	Top Depth (m): 2.50 3.00 0.10 0.60				
	Bottom Depth(m):				
	Date Sampled: 28-Apr-15 28-Apr-15 28-Apr-15 28-Apr-15				
Determinand	Accred.	SOP	Units	LOD	
Bromobenzene	M	2760	µg/kg	1	< 1.0
1,2,3-Trichloropropane	N	2760	µg/kg	50	< 50
N-Propylbenzene	U	2760	µg/kg	1	22
2-Chlorotoluene	M	2760	µg/kg	1	< 1.0
1,3,5-Trimethylbenzene	M	2760	µg/kg	1	620
4-Chlorotoluene	U	2760	µg/kg	1	< 1.0
Tert-Butylbenzene	U	2760	µg/kg	1	< 1.0
1,2,4-Trimethylbenzene	M	2760	µg/kg	1	300
Sec-Butylbenzene	U	2760	µg/kg	1	< 1.0
1,3-Dichlorobenzene	M	2760	µg/kg	1	< 1.0
4-Isopropyltoluene	U	2760	µg/kg	1	< 1.0
1,4-Dichlorobenzene	M	2760	µg/kg	1	< 1.0
N-Butylbenzene	U	2760	µg/kg	1	< 1.0
1,2-Dichlorobenzene	M	2760	µg/kg	1	< 1.0
1,2-Dibromo-3-Chloropropane	U	2760	µg/kg	50	< 50
1,2,4-Trichlorobenzene	M	2760	µg/kg	1	< 1.0
Hexachlorobutadiene	U	2760	µg/kg	1	< 1.0
1,2,3-Trichlorobenzene	U	2760	µg/kg	2	< 2.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1	< 1.0
N-Nitrosodimethylamine	N	2790	mg/kg	0.5	< 0.50
Phenol	N	2790	mg/kg	0.5	< 0.50
2-Chlorophenol	N	2790	mg/kg	0.5	< 0.50
Bis-(2-Chloroethyl)Ether	N	2790	mg/kg	0.5	< 0.50
1,3-Dichlorobenzene	N	2790	mg/kg	0.5	< 0.50
1,4-Dichlorobenzene	N	2790	mg/kg	0.5	< 0.50
1,2-Dichlorobenzene	N	2790	mg/kg	0.5	< 0.50
2-Methylphenol	N	2790	mg/kg	0.5	< 0.50
Bis(2-Chloroisopropyl)Ether	N	2790	mg/kg	0.5	< 0.50
Hexachloroethane	N	2790	mg/kg	0.5	< 0.50
N-Nitrosodi-n-propylamine	N	2790	mg/kg	0.5	< 0.50
4-Methylphenol	N	2790	mg/kg	0.5	< 0.50
Nitrobenzene	N	2790	mg/kg	0.5	< 0.50
Isophorone	N	2790	mg/kg	0.5	< 0.50

Results Summary - Soil

Project: R2122 - Esclusham Mill, Llwyneinion

Client: Smith Grant LLP	Chemtest Job No.:				15-10027	15-10027	15-10027	15-10027
Quotation No.: Q15-02887	Chemtest Sample ID.:				135382	135384	135385	135386
Order No.:	Client Sample Ref.:				ES2	ES2	ES1	ES2
	Client Sample ID.:				TP8	TP11	TP1	TP1
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				2.50	3.00	0.10	0.60
	Bottom Depth(m):							
	Date Sampled:				28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15
Determinand	Accred.	SOP	Units	LOD				
2-Nitrophenol	N	2790	mg/kg	0.5	< 0.50			
2,4-Dimethylphenol	N	2790	mg/kg	0.5	< 0.50			
Bis(2-Chloroethoxy)Methane	N	2790	mg/kg	0.5	< 0.50			
2,4-Dichlorophenol	N	2790	mg/kg	0.5	< 0.50			
1,2,4-Trichlorobenzene	N	2790	mg/kg	0.5	< 0.50			
Naphthalene	N	2790	mg/kg	0.5	< 0.50			
4-Chloroaniline	N	2790	mg/kg	0.5	< 0.50			
Hexachlorobutadiene	N	2790	mg/kg	0.5	< 0.50			
4-Chloro-3-Methylphenol	N	2790	mg/kg	0.5	< 0.50			
2-Methylnaphthalene	N	2790	mg/kg	0.5	< 0.50			
Hexachlorocyclopentadiene	N	2790	mg/kg	0.5	< 0.50			
2,4,6-Trichlorophenol	N	2790	mg/kg	0.5	< 0.50			
2,4,5-Trichlorophenol	N	2790	mg/kg	0.5	< 0.50			
2-Chloronaphthalene	N	2790	mg/kg	0.5	< 0.50			
2-Nitroaniline	N	2790	mg/kg	0.5	< 0.50			
Acenaphthylene	N	2790	mg/kg	0.5	< 0.50			
Dimethylphthalate	N	2790	mg/kg	0.5	< 0.50			
2,6-Dinitrotoluene	N	2790	mg/kg	0.5	< 0.50			
Acenaphthene	N	2790	mg/kg	0.5	< 0.50			
Dibenzofuran	N	2790	mg/kg	0.5	< 0.50			
4-Chlorophenylphenylether	N	2790	mg/kg	0.5	< 0.50			
2,4-Dinitrotoluene	N	2790	mg/kg	0.5	< 0.50			
Fluorene	N	2790	mg/kg	0.5	< 0.50			
Diethyl Phthalate	N	2790	mg/kg	0.5	< 0.50			
4-Nitroaniline	N	2790	mg/kg	0.5	< 0.50			
2-Methyl-4,6-Dinitrophenol	N	2790	mg/kg	0.5	< 0.50			
Azobenzene	N	2790	mg/kg	0.5	< 0.50			
4-Bromophenylphenyl Ether	N	2790	mg/kg	0.5	< 0.50			
Hexachlorobenzene	N	2790	mg/kg	0.5	< 0.50			
Pentachlorophenol	N	2790	mg/kg	0.5	< 0.50			
Phenanthrene	N	2790	mg/kg	0.5	< 0.50			
Anthracene	N	2790	mg/kg	0.5	< 0.50			
Carbazole	N	2790	mg/kg	0.5	< 0.50			

Results Summary - Soil

Project: R2122 - Esclusham Mill, Llwyneinion

Client: Smith Grant LLP	Chemtest Job No.:				15-10027	15-10027	15-10027	15-10027
Quotation No.: Q15-02887	Chemtest Sample ID.:				135382	135384	135385	135386
Order No.:	Client Sample Ref.:				ES2	ES2	ES1	ES2
	Client Sample ID.:				TP8	TP11	TP1	TP1
	Sample Type:				SOIL	SOIL	SOIL	SOIL
	Top Depth (m):				2.50	3.00	0.10	0.60
	Bottom Depth(m):							
	Date Sampled:				28-Apr-15	28-Apr-15	28-Apr-15	28-Apr-15
Determinand	Accred.	SOP	Units	LOD				
Di-N-Butyl Phthalate	N	2790	mg/kg	0.5	< 0.50			
Fluoranthene	N	2790	mg/kg	0.5	< 0.50			
Pyrene	N	2790	mg/kg	0.5	< 0.50			
Butylbenzyl Phthalate	N	2790	mg/kg	0.5	< 0.50			
Benzo[a]anthracene	N	2790	mg/kg	0.5	< 0.50			
Chrysene	N	2790	mg/kg	0.5	< 0.50			
Bis(2-Ethylhexyl)Phthalate	N	2790	mg/kg	0.5	< 0.50			
Di-N-Octyl Phthalate	N	2790	mg/kg	0.5	< 0.50			
Benzo[b]fluoranthene	N	2790	mg/kg	0.5	< 0.50			
Benzo[k]fluoranthene	N	2790	mg/kg	0.5	< 0.50			
Benzo[a]pyrene	N	2790	mg/kg	0.5	< 0.50			
Indeno(1,2,3-c,d)Pyrene	N	2790	mg/kg	0.5	< 0.50			
Dibenz(a,h)Anthracene	N	2790	mg/kg	0.5	< 0.50			
Benzo[g,h,i]perylene	N	2790	mg/kg	0.5	< 0.50			
PCB 28	M	2810	mg/kg	0.01	< 0.010			
PCB 52	M	2815	mg/kg	0.01	< 0.010			
PCB 101	M	2815	mg/kg	0.01	< 0.010			
PCB 118	M	2815	mg/kg	0.01	< 0.010			
PCB 153	M	2815	mg/kg	0.01	< 0.010			
PCB 138	M	2815	mg/kg	0.01	< 0.010			
PCB 180	M	2810	mg/kg	0.01	< 0.010			
Total PCBs (7 Congeners)	N	2815	mg/kg	0.1	< 0.10			
Total Phenols	M	2920	mg/kg	0.3	< 0.30			
VOC TIC	N	2760	µg/kg		None Detected			
SVOC TIC	N	2790	mg/kg		None Detected			

Report Information

Key

- U UKAS accredited
- M MCERTS and UKAS accredited
- N Unaccredited
- S This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
- SN This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
- T This analysis has been subcontracted to an unaccredited laboratory
- I/S Insufficient Sample
- U/S Unsuitable Sample
- N/E not evaluated
- < "less than"
- > "greater than"

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVCOs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at our Coventry laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container

Sample Retention and Disposal

All soil samples will be retained for a period of 60 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.co.uk



Jones Environmental Laboratory

Registered Address : Unit 3 Deeside Point, Zone 3, Deeside Industrial Park, Deeside, CH5 2UA. UK

Unit 3 Deeside Point
Zone 3
Deeside Industrial Park
Deeside
CH5 2UA

Smith Grant LLP
Station House
Station Road
Ruabon
Wrexham
LL14 6DL

Tel: +44 (0) 1244 833780
Fax: +44 (0) 1244 833781



Attention :	Scott Miller
Date :	8th June, 2015
Your reference :	R2122
Our reference :	Test Report 15/7722 Batch 1
Location :	Esclusham Mill
Date samples received :	22nd May, 2015
Status :	Final report
Issue :	1

One sample was received for analysis on 22nd May, 2015 of which one were scheduled for analysis. Please find attached our Test Report which should be read with notes at the end of the report and should include all sections if reproduced. Interpretations and opinions are outside the scope of any accreditation, and all results relate only to samples supplied.
All analysis is carried out on as received samples and reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected.

Compiled By:

Phil Sommerton BSc
Project Manager

Bob Millward BSc FRSC
Principal Chemist

Jones Environmental Laboratory

Client Name: Smith Grant LLP
Reference: R2122
Location: Esclusham Mill
Contact: Scott Miller
JE Job No.: 15/7722

Report : Liquid

Liquids/products: V=40ml vial, G=glass bottle, P=plastic bottle
H=H₂SO₄, Z=ZnAc, N=NaOH, HN=HNO₃

J E Sample No.	1-5												
Sample ID	BH1												
Depth	5.5												
COC No / misc													
Containers	V P G												
Sample Date	22/05/2015												
Sample Type	Ground Water												
Batch Number	1												
Date of Receipt	22/05/2015												
Dissolved Arsenic #	<0.9										<0.9	ug/l	TM30/PM14
Dissolved Boron	384										<2	ug/l	TM30/PM14
Dissolved Cadmium #	0.34										<0.03	ug/l	TM30/PM14
Total Dissolved Chromium #	0.3										<0.2	ug/l	TM30/PM14
Dissolved Copper #	<3										<3	ug/l	TM30/PM14
Dissolved Lead #	6.2										<0.4	ug/l	TM30/PM14
Dissolved Nickel #	2.0										<0.2	ug/l	TM30/PM14
Dissolved Selenium #	<1.2										<1.2	ug/l	TM30/PM14
Dissolved Zinc #	2.6										<1.5	ug/l	TM30/PM14
Mercury Dissolved by CVA#	<0.01										<0.01	ug/l	TM61/PM38
PAH MS													
Naphthalene #	<0.014										<0.014	ug/l	TM4/PM30
Acenaphthylene #	<0.013										<0.013	ug/l	TM4/PM30
Acenaphthene #	<0.013										<0.013	ug/l	TM4/PM30
Fluorene #	<0.014										<0.014	ug/l	TM4/PM30
Phenanthrene #	<0.011										<0.011	ug/l	TM4/PM30
Anthracene #	<0.013										<0.013	ug/l	TM4/PM30
Fluoranthene #	<0.012										<0.012	ug/l	TM4/PM30
Pyrene #	<0.013										<0.013	ug/l	TM4/PM30
Benzo(a)anthracene #	<0.015										<0.015	ug/l	TM4/PM30
Chrysene #	<0.011										<0.011	ug/l	TM4/PM30
Benzo(b)fluoranthene #	<0.018										<0.018	ug/l	TM4/PM30
Benzo(a)pyrene #	<0.016										<0.016	ug/l	TM4/PM30
Indeno(123cd)pyrene #	<0.011										<0.011	ug/l	TM4/PM30
Dibenzo(ah)anthracene #	<0.01										<0.01	ug/l	TM4/PM30
Benzo(ghi)perylene #	<0.011										<0.011	ug/l	TM4/PM30
PAH 16 Total #	<0.195										<0.195	ug/l	TM4/PM30
Benzo(b)fluoranthene	<0.01										<0.01	ug/l	TM4/PM30
Benzo(k)fluoranthene	<0.01										<0.01	ug/l	TM4/PM30
PAH Surrogate % Recovery	74										<0	%	TM4/PM30
VOC TICs	ND											None	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1										<0.1	ug/l	TM15/PM10
Benzene #	<0.5										<0.5	ug/l	TM15/PM10
Toluene #	<0.5										<0.5	ug/l	TM15/PM10
Ethylbenzene #	<0.5										<0.5	ug/l	TM15/PM10
p/m-Xylene #	<1										<1	ug/l	TM15/PM10
o-Xylene #	<0.5										<0.5	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	97										<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	98										<0	%	TM15/PM10
SVOC TICs	ND											None	TM16/PM30

Please see attached notes for all abbreviations and acronyms

Please see attached notes for all abbreviations and acronyms

Client Name: Smith Grant LLP
Reference: R2122
Location: Esclusham Mill
Contact: Scott Miller
JE Job No.: 15/7722

VOC Report : Liquid

J E Sample No.	1-5												
Sample ID	BH1												
Depth	5.5												
COC No / misc													
Containers	V P G												
Sample Date	22/05/2015												
Sample Type	Ground Water												
Batch Number	1												
Date of Receipt	22/05/2015												
											LOD/LOR	Units	Method No.
VOC MS													
Dichlorodifluoromethane	<2										<2	ug/l	TM15/PM10
Methyl Tertiary Butyl Ether #	<0.1										<0.1	ug/l	TM15/PM10
Chloromethane #	<3										<3	ug/l	TM15/PM10
Vinyl Chloride #	<0.1										<0.1	ug/l	TM15/PM10
Bromomethane	<1										<1	ug/l	TM15/PM10
Chloroethane #	<3										<3	ug/l	TM15/PM10
Trichlorofluoromethane #	<3										<3	ug/l	TM15/PM10
1,1-Dichloroethene (1,1 DCE) #	<3										<3	ug/l	TM15/PM10
Dichloromethane (DCM) #	<3										<3	ug/l	TM15/PM10
trans-1,2-Dichloroethene #	<3										<3	ug/l	TM15/PM10
1,1-Dichloroethane #	<3										<3	ug/l	TM15/PM10
cis-1,2-Dichloroethene #	<3										<3	ug/l	TM15/PM10
2,2-Dichloropropane	<1										<1	ug/l	TM15/PM10
Bromochloromethane #	<2										<2	ug/l	TM15/PM10
Chloroform #	<2										<2	ug/l	TM15/PM10
1,1,1-Trichloroethane #	<2										<2	ug/l	TM15/PM10
1,1-Dichloropropene #	<3										<3	ug/l	TM15/PM10
Carbon tetrachloride #	<2										<2	ug/l	TM15/PM10
1,2-Dichloroethane #	<2										<2	ug/l	TM15/PM10
Benzene #	<0.5										<0.5	ug/l	TM15/PM10
Trichloroethene (TCE) #	<3										<3	ug/l	TM15/PM10
1,2-Dichloropropane #	<2										<2	ug/l	TM15/PM10
Dibromomethane #	<3										<3	ug/l	TM15/PM10
Bromodichloromethane #	<2										<2	ug/l	TM15/PM10
cis-1,3-Dichloropropene	<2										<2	ug/l	TM15/PM10
Toluene #	<0.5										<0.5	ug/l	TM15/PM10
trans-1,3-Dichloropropene	<2										<2	ug/l	TM15/PM10
1,1,2-Trichloroethane #	<2										<2	ug/l	TM15/PM10
Tetrachloroethene (PCE) #	<3										<3	ug/l	TM15/PM10
1,3-Dichloropropane #	<2										<2	ug/l	TM15/PM10
Dibromochloromethane #	<2										<2	ug/l	TM15/PM10
1,2-Dibromoethane #	<2										<2	ug/l	TM15/PM10
Chlorobenzene #	<2										<2	ug/l	TM15/PM10
1,1,1,2-Tetrachloroethane #	<2										<2	ug/l	TM15/PM10
Ethylbenzene #	<0.5										<0.5	ug/l	TM15/PM10
p/m-Xylene #	<1										<1	ug/l	TM15/PM10
o-Xylene #	<0.5										<0.5	ug/l	TM15/PM10
Styrene	<2										<2	ug/l	TM15/PM10
Bromoform #	<2										<2	ug/l	TM15/PM10
Isopropylbenzene #	<3										<3	ug/l	TM15/PM10
1,1,2,2-Tetrachloroethane	<4										<4	ug/l	TM15/PM10
Bromobenzene #	<2										<2	ug/l	TM15/PM10
1,2,3-Trichloropropane #	<3										<3	ug/l	TM15/PM10
Propylbenzene #	<3										<3	ug/l	TM15/PM10
2-Chlorotoluene #	<3										<3	ug/l	TM15/PM10
1,3,5-Trimethylbenzene #	<3										<3	ug/l	TM15/PM10
4-Chlorotoluene #	<3										<3	ug/l	TM15/PM10
tert-Butylbenzene #	<3										<3	ug/l	TM15/PM10
1,2,4-Trimethylbenzene #	<3										<3	ug/l	TM15/PM10
sec-Butylbenzene #	<3										<3	ug/l	TM15/PM10
4-Isopropyltoluene #	<3										<3	ug/l	TM15/PM10
1,3-Dichlorobenzene #	<3										<3	ug/l	TM15/PM10
1,4-Dichlorobenzene #	<3										<3	ug/l	TM15/PM10
n-Butylbenzene #	<3										<3	ug/l	TM15/PM10
1,2-Dichlorobenzene #	<3										<3	ug/l	TM15/PM10
1,2-Dibromo-3-chloropropane	<2										<2	ug/l	TM15/PM10
1,2,4-Trichlorobenzene	<3										<3	ug/l	TM15/PM10
Hexachlorobutadiene	<3										<3	ug/l	TM15/PM10
1,2,3-Trichlorobenzene	<3										<3	ug/l	TM15/PM10
Surrogate Recovery Toluene D8	97										<0	%	TM15/PM10
Surrogate Recovery 4-Bromofluorobenzene	98										<0	%	TM15/PM10

Please see attached notes for all abbreviations and acronyms

NOTES TO ACCOMPANY ALL SCHEDULES AND REPORTS

JE Job No.: 15/7722

SOILS

Please note we are only MCERTS accredited (UK soils only) for sand, loam and clay and any other matrix is outside our scope of accreditation.

Where an MCERTS report has been requested, you will be notified within 48 hours of any samples that have been identified as being outside our MCERTS scope. As validation has been performed on clay, sand and loam, only samples that are predominantly these matrices, or combinations of them will be within our MCERTS scope. If samples are not one of a combination of the above matrices they will not be marked as MCERTS accredited.

It is assumed that you have taken representative samples on site and require analysis on a representative subsample. Stones will generally be included unless we are requested to remove them.

All samples will be discarded one month after the date of reporting, unless we are instructed to the contrary.

If you have not already done so, please send us a purchase order if this is required by your company.

Where appropriate please make sure that our detection limits are suitable for your needs, if they are not, please notify us immediately.

All analysis is reported on a dry weight basis unless stated otherwise. Results are not surrogate corrected. Samples are dried at 35°C ±5°C unless otherwise stated. Moisture content for CEN Leachate tests are dried at 105°C ±5°C.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

Where a CEN 10:1 ZERO Headspace VOC test has been carried out, a 10:1 ratio of water to wet (as received) soil has been used.

% Asbestos in Asbestos Containing Materials (ACMs) is determined by reference to HSG 264 The Survey Guide - Appendix 2 : ACMs in buildings listed in order of ease of fibre release.

WATERS

Please note we are not a UK Drinking Water Inspectorate (DWI) Approved Laboratory .

ISO17025 (UKAS) accreditation applies to surface water and groundwater and one other matrix which is analysis specific, any other liquids are outside our scope of accreditation.

As surface waters require different sample preparation to groundwaters the laboratory must be informed of the water type when submitting samples.

Where Mineral Oil or Fats, Oils and Grease is quoted, this refers to Total Aliphatics C10-C40.

DEVIATING SAMPLES

Samples must be received in a condition appropriate to the requested analyses. All samples should be submitted to the laboratory in suitable containers with sufficient ice packs to sustain an appropriate temperature for the requested analysis. If this is not the case you will be informed and any test results that may be compromised highlighted on your deviating samples report.

SURROGATES

Surrogate compounds are added during the preparation process to monitor recovery of analytes. However low recovery in soils is often due to peat, clay or other organic rich matrices. For waters this can be due to oxidants, surfactants, organic rich sediments or remediation fluids. Acceptable limits for most organic methods are 70 - 130% and for VOCs are 50 - 150%. When surrogate recoveries are outside the performance criteria but the associated AQC passes this is assumed to be due to matrix effect. Results are not surrogate corrected.

DILUTIONS

A dilution suffix indicates a dilution has been performed and the reported result takes this into account. No further calculation is required.

NOTE

Data is only reported if the laboratory is confident that the data is a true reflection of the samples analysed. Data is only reported as accredited when all the requirements of our Quality System have been met. In certain circumstances where all the requirements of the Quality System have not been met, for instance if the associated AQC has failed, the reason is fully investigated and documented. The sample data is then evaluated alongside the other quality control checks performed during analysis to determine its suitability. Following this evaluation, provided the sample results have not been effected, the data is reported but accreditation is removed. It is a UKAS requirement for data not reported as accredited to be considered indicative only, but this does not mean the data is not valid.

Where possible, and if requested, samples will be re-extracted and a revised report issued with accredited results. Please do not hesitate to contact the laboratory if further details are required of the circumstances which have led to the removal of accreditation.

ABBREVIATIONS and ACRONYMS USED

#	ISO17025 (UKAS) accredited - UK.
B	Indicates analyte found in associated method blank.
DR	Dilution required.
M	MCERTS accredited.
NA	Not applicable
NAD	No Asbestos Detected.
ND	None Detected (usually refers to VOC and/SVOC TICs).
NDP	No Determination Possible
SS	Calibrated against a single substance
SV	Surrogate recovery outside performance criteria. This may be due to a matrix effect.
W	Results expressed on as received basis.
+	AQC failure, accreditation has been removed from this result, if appropriate, see 'Note' on previous page.
++	Result outside calibration range, results should be considered as indicative only and are not accredited.
*	Analysis subcontracted to a Jones Environmental approved laboratory.
AD	Samples are dried at 35°C ±5°C
CO	Suspected carry over
LOD/LOR	Limit of Detection (Limit of Reporting) in line with ISO 17025 and MCERTS
ME	Matrix Effect
NFD	No Fibres Detected
BS	AQC Sample
LB	Blank Sample
N	Client Sample
TB	Trip Blank Sample
OC	Outside Calibration Range

JE Job No: 15/7722

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM4	Modified USEPA 8270 method for the solvent extraction and determination of 16 PAHs by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5	Modified USEPA 8015B method for the determination of solvent Extractable Petroleum Hydrocarbons (EPH) with carbon banding within the range C8-C40 GC-FID.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM5/TM36	TM005: Modified USEPA 8015B. Determination of solvent Extractable Petroleum Hydrocarbons (EPH) including column fractionation in the carbon range of C10-35 into aliphatic and aromatic fractions by GC-FID. TM036: Modified USEPA 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C5-10 by headspace GC-FID.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.				
TM15	Modified USEPA 8260. Quantitative Determination of Volatile Organic Compounds (VOCs) by Headspace GC-MS.	PM10	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM16	Modified USEPA 8270. Quantitative determination of Semi-Volatile Organic compounds (SVOCs) by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.	Yes			
TM17	Modified US EPA method 8270. Determination of specific Polychlorinated Biphenyl congeners by GC-MS.	PM30	Water samples are extracted with solvent using a magnetic stirrer to create a vortex.				
TM26	Determination of phenols by Reversed Phased High Performance Liquid Chromatography and Electro-Chemical Detection.	PM0	No preparation is required.				

JE Job No: 15/7722

Test Method No.	Description	Prep Method No. (if appropriate)	Description	ISO 17025 (UKAS)	MCERTS (UK soils only)	Analysis done on As Received (AR) or Dried (AD)	Reported on dry weight basis
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM14	Analysis of waters and leachates for metals by ICP OES. Samples are filtered for dissolved metals and acidified if required.				
TM30	Determination of Trace Metal elements by ICP-OES (Inductively Coupled Plasma - Optical Emission Spectrometry). Modified US EPA Method 200.7	PM14	Analysis of waters and leachates for metals by ICP OES. Samples are filtered for dissolved metals and acidified if required.	Yes			
TM36	Modified US EPA method 8015B. Determination of Gasoline Range Organics (GRO) in the carbon chain range of C4-12 by headspace GC-FID.	PM12	Modified US EPA method 5021. Preparation of solid and liquid samples for GC headspace analysis.	Yes			
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.				
TM38	Soluble Ion analysis using the Thermo Aquakem Photometric Automatic Analyser. Modified US EPA methods 325.2, 375.4, 365.2, 353.1, 354.1	PM0	No preparation is required.	Yes			
TM61	Modified US EPA methods 245.7 and 200.7. Determination of Mercury by Cold Vapour Atomic Fluorescence.	PM38	Samples are brominated to reduce all mercury compounds to Mercury (II) which is analysed using method TM061.	Yes			
TM73	Modified US EPA methods 150.1 and 9045D. Determination of pH by Metrohm automated probe analyser.	PM0	No preparation is required.	Yes			
NONE	No Method Code	NONE	No Method Code				

Our Ref: EFS/192883M (Ver. 1)

Your Ref: R2499

December 3, 2018



Environmental Chemistry

SOCOTEC UK Limited

Bretby Business Park

Ashby Road

Burton-on-Trent

Staffordshire

DE15 0YZ

Telephone: 01283 554400

Facsimile: 01283 554422

Ben Thomas
Smith Grant LLP
Station House
Station Road
Ruabon
Wrexham
LL14 6DL

For the attention of Ben Thomas

Dear Ben Thomas

Sample Analysis - R2499 Legacy Scrap Yard

Samples from the above site have been analysed in accordance with the schedule supplied.

The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 02/01/19 when they will be discarded. Please call 01283 554400 for an extension of this date.

Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with SOCOTEC UK Limited (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for SOCOTEC UK Limited

A handwritten signature in black ink, appearing to read 'M Palmer'.

M Palmer
Project Co-ordinator
01283 554400

TEST REPORT



Report No. EFS/192883M (Ver. 1)

Smith Grant LLP
Station House
Station Road
Ruabon
Wrexham
LL14 6DL

Site: Legacy Scrap Yard

The 5 samples described in this report were registered for analysis by SOCOTEC UK Limited on 21-Nov-2018. This report supersedes any versions previously issued by the laboratory.

The analysis was completed by: 03-Dec-2018

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS or MCERTS accredited. Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by SOCOTEC UK Limited.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 5)
Table of Asbestos Screening Results (Page 6)
Analytical and Deviating Sample Overview (Pages 7 to 8)
Table of Additional Report Notes (Page 9)
Table of Method Descriptions (Page 10)
Table of Report Notes (Page 11)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
SOCOTEC UK Lim
Becky Batham

Operations Manager
Energy & Waste Services

Date of Issue: 03-Dec-2018

Accreditation Codes: **N** (Not Accredited), **U** (UKAS), **UM** (UKAS & MCERTS)

Tests marked '^' have been subcontracted to another laboratory.

(NVM) - denotes the sample matrix is dissimilar to matrices upon which the MCERTS validation was based, and is therefore not accredited for MCERTS.

All results are reported on a dry weight basis at 105°C unless otherwise stated. (except QC samples)

SOCOTEC UK Limited accepts no responsibility for any sampling not carried out by our personnel.

Customer
Site
Report No

Smith Grant LLP
R2499 Legacy Scrap Yard
S192883M

Consignment No S80685
Date Logged 21-Nov-2018
In-House Report Due 27-Nov-2018

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	MethodID	BITXHSA	CUSIServ	FOCS	GROHSA	ICPMSS	KONECR	MCErTS	PAMHSUS	PHSOIL	Sub002	TMSS	TPHUSSI	TPH Ali Band >C8-C40	TPH Ali Band >C8-C10	TPH Ali Band >C21-C35	TPH Ali Band >C16-C21	TPH Ali Band >C12-C16	TPH Ali Band >C10-C12
		Sampled	MTBE (µg/kg)	REPORT A	S.O.M. % (Calc)	GRO (AA) by HSA GC-FID	Arsenic (MS)													
			✓			✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CL/1933760	TP201 0.50	15/11/18																		
CL/1933761	TP203 1.50	15/11/18																		
CL/1933762	TP204 0.50	15/11/18																		
CL/1933763	TP206 1.50	15/11/18																		
CL/1933764	TP208 1.00	15/11/18																		

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key

A

The sample was received in an inappropriate container for this analysis

B

The sample was received without the correct preservation for this analysis

C

Headspace present in the sample container

D

The sampling date was not supplied so holding time may be compromised - applicable to all analysis

E

Sample processing did not commence within the appropriate holding time

F

Sample processing did not commence within the appropriate handling time

Requested Analysis Key

Analysis Required

Analysis dependant upon trigger result - Note: due date may be affected if triggered

No analysis scheduled

^

Analysis Subcontracted - Note: due date may vary

Customer
Site
Report No

Smith Grant LLP
R2499 Legacy Scrap Yard
S192883M

Consignment No S80685
Date Logged 21-Nov-2018
In-House Report Due 27-Nov-2018

Please note the results for any subcontracted analysis (identified with a '^') is likely to take up to an additional five working days.

ID Number	Description	MethodID	TPHUSI							WSLMS9
		Sampled	TPH Aro Band >C10-C12	TPH Aro Band >C12-C16	TPH Aro Band >C16-C21	TPH Aro Band >C21-C35	TPH Aro Band >C8-C10	TPH Aro Band >C8-C40	TPH by GC/ID (AR/SI)	Total Organic Carbon
			✓	✓	✓	✓	✓	✓	✓	✓
CL/1933760	TP201 0.50	15/11/18								
CL/1933761	TP203 1.50	15/11/18								
CL/1933762	TP204 0.50	15/11/18								
CL/1933763	TP206 1.50	15/11/18								
CL/1933764	TP208 1.00	15/11/18								

Note: We will endeavour to prioritise samples to complete analysis within holding time; however any delay could result in samples becoming deviant whilst being processed in the laboratory.

If sampling dates are missing or matrices unclassified then results will not be ISO 17025 accredited. Please contact us as soon as possible to provide missing information in order to reinstate accreditation.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - Note: due date may be affected if triggered
	No analysis scheduled
^	Analysis Subcontracted - Note: due date may vary

Report Number : EFS/192883

Additional Report Notes

Method Code	Sample ID	The following information should be taken into consideration when using the data contained within this report
GROHSA	CL1933763	Due to matrix interference, the Internal Standard recovery for this Test is below the required QMS specification. This has been confirmed by repeating the analysis. All other Laboratory Process Controls meet the requirements of the QMS unless otherwise stated. These circumstances should be taken into consideration when utilising the data.
BTEXHSA	CL1933763	Due to matrix interference, the Internal Standard recovery for this Test is below the required QMS specification. This has been confirmed by repeating the analysis. All other Laboratory Process Controls meet the requirements of the QMS unless otherwise stated. These circumstances should be taken into consideration when utilising the data.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	FOCS	Oven Dried @ < 35°C	Calculation of Soil Organic Matter content from Organic Carbon content of soil samples
Soil	GROHSA	As Received	Determination of Total Gasoline Range Organics Hydrocarbons (GRO) by Headspace GCFID
Soil	ICPMSS	Oven Dried @ < 35°C	Determination of Metals in Marine Sediments and Soil samples by aqua regia digestion followed by ICPMS detection
Soil	KONECR	Oven Dried @ < 35°C	Determination of Chromium vi in soil samples by water extraction followed by colorimetric detection
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	SubCon*	*	Contact Laboratory for details of the methodology used by the sub-contractor.
Soil	TMSS	As Received	Determination of the Total Moisture content at 105°C by loss on oven drying gravimetric analysis (% based upon wet weight)
Soil	TPHUSSI	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection including quantitation of Aromatic and Aliphatic fractions.
Soil	WSLM59	Oven Dried @ < 35°C	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,

- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,

- Results are expressed as mg/kg
- SG is expressed as g/cm³@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile

TR Denotes Tremolite

CR Denotes Crocidolite

AC Denotes Actinolite

AM Denotes Amosite

AN Denotes Anthophyllite

NAIIS No Asbestos Identified in Sample

NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.

\$\$ Unable to analyse due to the nature of the sample

¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols.

This may have resulted in deterioration of the sample(s) during transit to the laboratory.

Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling

¥ Results for guidance only due to possible interference

& Blank corrected result

I.S Insufficient sample to complete requested analysis

I.S(g) Insufficient sample to re-analyse, results for guidance only

Intf Unable to analyse due to interferences

N.D Not determined

N.Det Not detected

N.F No Flow

NS Information Not Supplied

Req Analysis requested, see attached sheets for results

▮ Raised detection limit due to nature of the sample

* All accreditation has been removed by the laboratory for this result

‡ MCERTS accreditation has been removed for this result

§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : Smith Grant LLP
Site : R2499 Legacy Scrap Yard
Report Number : S19_2883

Note: major constituent in upper case

APPENDIX E

Gas and Groundwater Monitoring Results

GROUND GAS MONITORING REPORT

Site name:	Esclusham Mill	Job number:	R2122	Barometric pressure at:	start:	997	mb	finish:	997	mb	
Time at:	start	9.10	Date:	12.06.15	Pressure trend	1036-1031-1026mb (Falling)					(previous 3 days)
	finish	9.35	Staff:	SM	Instruments:	GFM430 ¹ / MiniRae 2000					
Record code:	G06	Weather conditions:	4/8 cloud / sunny / warm					Ground conditions:	Dry		

Well No.	Methane %vol		Carbon dioxide %vol		Oxygen %vol		Carbon monoxide ppm	Hydrogen sulphide ppm	VOCs ppm	Gas flow l/hr		Well pressure mb	Depth to water m bgl	Notes
	Peak	steady	peak	steady	min	steady				peak	steady			
BH1	<0.1	<0.1	4.7	4.7	14.2	14.2	<1	<1	<0.1	<0.1	<0.1	0	3.4	Base @ 5.71
BH2	<0.1	<0.1	2.2	2.2	18.4	18.4	<1	<1	<0.1	<0.1	<0.1	0	-	Base @ 3.13
BH3	<0.1	<0.1	11.4	11.4	8	8	<1	<1	0.8	<0.1	<0.1	0	-	Base @ 5.93
Limit of Detection	0.1%		0.1%		0.1%		1ppm	1ppm	0.1ppm	0.1l/hr (-60/+100)	0.1l/hr (-60/+100)	1Pa_0.01mb (-800/+1500)		
Accuracy (% of reading)	±3.0%		±3.0%		±0.5%		±5%	±5%	±5%					

1. Date of last calibration 07/05/15

GROUND GAS MONITORING REPORT

Site name:	Esclusham Mill	Job number:	R2122	Barometric pressure at:	start:	1005	mb	finish:	1004	mb	
Time at:	start	16.10	Date:	04.06.15	Pressure trend	1008 - 998 - 1022 (rise - fall - rise - fall)					(previous 3 days)
	finish	16.30	Staff:	SM	Instruments:	GFM430 ¹					
Record code:	G05	Weather conditions:	2/8 cloud cover, sunny, moderate strong gusts from north					Ground conditions:	Mainly dry, damp patches, standing water by BH3		

Well No.	Methane %vol		Carbon dioxide %vol		Oxygen %vol		Carbon monoxide ppm	Hydrogen sulphide ppm	VOCs ppm	Gas flow l/hr		Well pressure mb	Depth to water m bgl	Notes
	Peak	steady	peak	steady	min	steady				peak	steady			
BH1	<0.1	<0.1	4.5	4.5	14.8	14.8	<1	<1	-	<0.1	<0.1	<0.01	3.41	Base at 5.70m
BH2	<0.1	<0.1	1.3	1.3	18.9	18.9	<1	<1	-	<0.1	<0.1	<0.01	3.13	Base at 3.13m (water at bottom of BH only)
BH3	<0.1	<0.1	11.3	11.3	6.6	6.6	<1	<1	-	<0.1	<0.1	<0.01	-	Base at 5.89m
Limit of Detection	0.1%		0.1%		0.1%		1ppm	1ppm	0.1ppm	0.1l/hr (-60/+100)	0.1l/hr (-60/+100)	1Pa_0.01mb (-800/+1500)		
Accuracy (% of reading)	±3.0%		±3.0%		±0.5%		±5%	±5%	±5%					

1. Date of last calibration 07/05/15

GROUND GAS MONITORING REPORT

Site name:	Esclusham Mill	Job number:	R2122	Barometric pressure at:	start:	988	mb	finish:	985	mb	
Time at:	start	14.30	Date:	29.05.15	Pressure trend	1025 - 1022 -1014mb - Steep decline in pressure					(previous 3 days)
	finish	14.45	Staff:	SM	Instruments:	GFM430 ¹					
Record code:	G04	Weather conditions:	4/8 cloud / sunny intervals / moderate NE wind					Ground conditions:	Mix of dry and damp patches / standing water present		

Well No.	Methane %vol		Carbon dioxide %vol		Oxygen %vol		Carbon monoxide ppm	Hydrogen sulphide ppm	VOCs ppm	Gas flow l/hr		Well pressure mb	Depth to water m bgl	Notes
	Peak	steady	peak	steady	min	steady				peak	steady			
BH1	<0.1	<0.1	4.2	4.2	15.1	15.1	<1	<1	-	<0.1	<0.1	<0.01	3.4	Base at 5.71m
BH2	<0.1	<0.1	1.1	1.1	19.1	19.2	<1	<1	-	<0.1	<0.1	<0.01	3.12	Base at 3.12m (water at bottom of BH only)
BH3	<0.1	<0.1	11.1	11.1	7	7	<1	<1	-	<0.1	<0.1	<0.01	-	Base at 5.89m
Limit of Detection	0.1%		0.1%		0.1%		1ppm	1ppm	0.1ppm	0.1l/hr (-60/+100)	0.1l/hr (-60/+100)	1Pa_0.01mb (-800/+1500)		
Accuracy (% of reading)	±3.0%		±3.0%		±0.5%		±5%	±5%	±5%					

1. Date of last calibration 07/05/15

GROUND GAS MONITORING REPORT

Site name:	Esclusham Mill	Job number:	R2122	Barometric pressure at:	start:	1009	mb	finish:	1009	mb	
Time at:	start	12.15	Date:	22.05.15	Pressure trend	1008 - 1018 - 1026mb	pressure increasing			(previous 3 days)	
	finish	12.35	Staff:	SM	Instruments:	GFM430 ¹					
Record code:	G03	Weather conditions:	7/8 cloud cover, v slight rain, sunny intervals					Ground conditions:	Slight dampness		

Well No.	Methane %vol		Carbon dioxide %vol		Oxygen %vol		Carbon monoxide ppm	Hydrogen sulphide ppm	VOCs ppm	Gas flow l/hr		Well pressure mb	Depth to water m bgl	Notes
	Peak	steady	peak	steady	min	steady				peak	steady			
BH1	<0.1	<0.1	4.3	4.3	14.8	14.8	<1	<1	-	<0.1	<0.1	<0.01	3.43	Base @ 5.81
BH2	<0.1	<0.1	0.9	0.9	19.5	19.5	<1	<1	-	<0.1	<0.1	<0.01	3.12	Base @ 3.12
BH3	<0.1	<0.1	11.5	11.5	6.6	6.6	<1	<1	-	<0.1	<0.1	<0.01	-	Base @ 5.89
Limit of Detection	0.1%		0.1%		0.1%		1ppm	1ppm	0.1ppm	0.1l/hr (-60/+100)	0.1l/hr (-60/+100)	1Pa_0.01mb (-800/+1500)		
Accuracy (% of reading)	±3.0%		±3.0%		±0.5%		±5%	±5%	±5%					

1. Date of last calibration 07/05/15

GROUND GAS MONITORING REPORT

Site name:	Esclusham Mill	Job number:	R2122	Barometric pressure at:	start:	1005	mb	finish:	1003	mb	
Time at:	start	3.15	Date:	15.05.15	Pressure trend	1011 - 1019 -1015mb Fairly steady, beginning to fall					(previous 3 days)
	finish	3.40	Staff:	SM	Instruments:	GFM430 ¹					
Record code:	G02	Weather conditions:	6/8 thin cloud cover, slight breeze					Ground conditions:	Dry		

Well No.	Methane %vol		Carbon dioxide %vol		Oxygen %vol		Carbon monoxide ppm	Hydrogen sulphide ppm	VOCs ppm	Gas flow l/hr		Well pressure mb	Depth to water m bgl	Notes
	Peak	steady	peak	steady	min	steady				peak	steady			
BH1	<0.1	<0.1	4.3	4.3	15.7	15.7	<1	<1	-	<0.1	<0.1	<0.01	3.4	Base at 5.80m
BH2	<0.1	<0.1	2.1	2	18.2	18.3	<1	<1	-	<0.1	<0.1	<0.01	3.11	Base at 3.12m
BH3	<0.1	<0.1	11.8	11.8	6.6	6.6	<1	<1	-	<0.1	<0.1	<0.01	-	Base at 5.93m
Limit of Detection	0.1%		0.1%		0.1%		1ppm	1ppm	0.1ppm	0.1l/hr (-60/+100)	0.1l/hr (-60/+100)	1Pa_0.01mb (-800/+1500)		
Accuracy (% of reading)	±3.0%		±3.0%		±0.5%		±5%	±5%	±5%					

1. Date of last calibration 07/05/15

GROUND GAS MONITORING REPORT

Site name:	Esclusham Mill	Job number:	R2122	Barometric pressure at:	start:	993	mb	finish:	992	mb	
Time at:	start	9.30	Date:	08.05.15	Pressure trend	Increase from 990 to 1016mb, followed by a sharp decrease					(previous 3 days)
	finish	9.55	Staff:	SM	Instruments:	GFM436 ¹					
Record code:	G01	Weather conditions:	5/8 cloud cover / light north westerly wind					Ground conditions:	Damp / standing water in places		

Well No.	Methane %vol		Carbon dioxide %vol		Oxygen %vol		Carbon monoxide ppm	Hydrogen sulphide ppm	VOCs ppm	Gas flow l/hr		Well pressure mb	Depth to water m bgl	Notes
	Peak	steady	peak	steady	min	steady				peak	steady			
BH1	<0.1	<0.1	3.9	3.9	16.7	16.7	<1	<1	-	<0.1	<0.1	<0.01	3.44	5.83m to base
BH2	<0.1	<0.1	3.6	3.6	14.3	14.3	<1	<1	-	<0.1	<0.1	<0.01	NA	3.08m to base
BH3	<0.1	<0.1	0.8	0.8	18.9	18.9	<1	<1	-	<0.1	<0.1	<0.01	NA	5.93m to base
Limit of Detection	0.1%		0.1%		0.1%		1ppm	1ppm	0.1ppm	0.1l/hr (-60/+100)	0.1l/hr (-60/+100)	1Pa_0.01mb (-800/+1500)		
Accuracy (% of reading)	±3.0%		±3.0%		±0.5%		±5%	±5%	±5%					

1. Date of last calibration 04/02/15