Archaeology Wales

Land south of the GMF Factory, Ystalyfera, Swansea

Archaeological Evaluation

By
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Report No. 1224

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Summary

In April 2014 Archaeology Wales Ltd (AW) carried out a trenched evaluation on an area of land to the south of the former GMF factory, Ystalyfera, Swansea ('the site'). Investigation of the site was commissioned by D. S. Jones & Co on behalf of Jenard (Ystalyfera) Ltd, on the recommendation of the Glamorgan Gwent Archaeological Trust as a condition of a planning application (P2013/0737) for the construction of a residential development.

The development area lies on the site of the former Ystalyfera Iron and Tinplate Works, a very important 19th century industrial suite.

The evaluation comprised the archaeological investigation of five, machine excavated, trenches located across the site, which were designed to target potential building remains identified from historic map sources.

Trench 1 revealed evidence of a demolished brick-built structure of relatively modern origin and of limited archaeological interest. No further features of archaeological interest were noted within this trench, which was excavated to a depth of 1.3m below current ground levels, at 59.93mOD.

Trench 2 revealed partial wall remains of one building associated with the Iron & Tinplate Works at a depth of 0.1m below current ground levels (59.96mOD); no internal features were identified. Remains of a tramway that may also be associated with the Works were identified at a depth of 1.0m (58.92mOD), although these may also be part of an early 20th century colliery that succeeded the Works in this area. A 20th century brick built structure of limited archaeological interest was identified at a depth of 0.94m (58.85mOD).

Trench 3 revealed the remains of a series of four tramways at depths of between 0.7m and 1.0m (59.62mOD to 59.41mOD) that may relate to the Works, although may also relate to the later colliery activity. No evidence of building remains was exposed.

Trench 4 revealed a series of dumped deposits to a depth of 1.2m (58.4mOD), but with no evidence of building remains associated with the Works.

Trench 5 revealed the shallow remains of buildings and surfaces associated with a compound of buildings located at the southern end of the site. These were revealed at a depth of just 0.05m below current ground levels. They are shown on late-19th century maps, but are unlikely to be associated with the Works and are therefore of reduced archaeological importance.

With the exception of the wall revealed in Trench 2, no structural remains associated with the Works were recorded at the depths reached by the evaluation trenches. It is possible further in situ remains survive at greater depths. A general cut and fill plan has been produced by the developer with a view to levelling the site, which takes into account flood risk, and raft foundations have been recommended as a construction technique. Based on the evaluation results, this should have a limited impact on potential features of archaeological interest, although clearly there will be an impact on some of the features identified during the evaluation. Therefore an archaeological watching brief is recommended as appropriate mitigation, to record any archaeological features revealed by groundworks associated with the planned development.

1 Introduction

1.1 This report has been prepared by Archaeology Wales Ltd (AW), in response to a request by D. S. Jones & Co, on behalf of their clients Jenard (Ystalyfera) Ltd, to provide an archaeological evaluation of the potential impacts of a proposed development on land south of the former GMF Factory in Ystalyfera, Swansea valley (Archaeology Wales Project Number 2223, site code GYS/14/EV).

1.2 The site consists of an irregularly shaped plot of scrub-covered open land some 3.38ha in size, located between the former GMF Factory and the Godre'r-Graig Workingmen's Club in Ystalyfera; NGR SN 7636 0813, see figures 1 & 2. A planning application has been submitted to develop the site for residential use (planning reference P2013/0737, Figure 3).

1.3 A previous archaeological desk-based assessment (Poucher 2012) of the development area was produced by Dyfed Archaeological Trust Archaeological Services (DATAS, formerly Dyfed Archaeological Trust Field Services). This demonstrated that the site had high archaeological potential, as it covered the southern part of the Ystalyfera Iron and Tinplate works, which was a very important industrial site during the 19th century and the main reason behind the development of the settlement of Ystalyfera.

1.4 As a result of these findings, Glamorgan Gwent Archaeological Trust Curatorial Division (GGAT-Curatorial), in its capacity as archaeological advisors to the local planning authority (Neath – Port Talbot County Borough Council), recommended that an archaeological field evaluation was undertaken in order to assess the potential for the archaeological resource at the site.

1.5 A Written Scheme of Investigation for the archaeological evaluation was produced, originally by DATAS and subsequently adapted by Archaeology Wales and approved by GGAT-Curatorial (see Appendix III). The subsequent evaluation used strategically placed trial trenches to locate and describe archaeological features present within the proposed development area. The work was designed to elucidate the presence or absence of archaeological material, its character, distribution, extent, condition and relative significance. The trenches largely focused on features relating to the Iron & Tinplate Works and the subsequent Colliery, as identified within the previous Desk-Based Assessment, i.e. they were located in areas where there was considered to be the greatest potential for archaeological activity.

1.6 The excavations took place between the 7th April and the 16th April 2014. The work was managed by Phil Poucher and carried out under the supervision of Andrew Shobbrook.

1.7 All work conformed to the IFA's Standards and Guidance for Archaeological Field Evaluation (IfA 1994, revised 2008 with updates Nov 2013) and was undertaken by suitably qualified staff to the highest professional standards.

2 Site description

2.1 The proposed residential development site lies to the southwest of the town of Ystalyfera in the Swansea (Tawe) valley. It consists of an irregularly shaped plot of land some 3.38 ha in area (Figures 1 & 2). It is bordered by the former GMF Motor Factory buildings to the northeast, the A4087 to the southeast, the grounds of Godre'r-Graig Workingmen's Club to the southwest, and the footpath beside the Swansea Canal to the west. The river Tawe lies a short distance to the east.

2.2 The site is located within the anthracite coalfield, the geology of which comprises the Lower Coal Measures of the Carboniferous period. The soils around the development area are well-drained and consist of fine loamy soils, subject to slight seasonal water-logging, and river alluvium.

3 Historical Background

3.1 The historical background of the area was discussed within the previous desk-based assessment (Poucher 2012), and is summarised below. Within the area of the site, the most noteworthy aspects are those that relate to industrial development that occurred from the later 18th century onwards.

3.2 Between 1794 and 1798 the 16 mile long Swansea canal (GGAT HER Reference PRN 1046w) was constructed. It ran through Ystalyfera, and its surviving remains form much of the north-western boundary of the proposed development site. Despite the presence of the canal, Ystalyfera itself remained an agricultural landscape of dispersed farms, small fields and wooded hill slopes until the late 1830s, as shown on the Tithe map of the area of 1838. Much of the development area was wooded at that time, although had already been bought by the Ystalyfera Company in readiness for the construction of an Iron Works.

3.3 The development of the Ystalyfera Iron Works started in 1838, in the area north of the proposed residential site. The Iron Works site expanded throughout the 19th century, especially once it was bought and managed by James Palmer Budd. The site contained six blast furnace by 1848 and twelve by 1858, set up in front of the impressive charging bank wall that can still be seen immediately north of the former GMF factory building. Palmer Budd also diversified into tinplate manufacture, one of the first such sites to combine ironworking and tinplate manufacture at the same site. By 1848 this had grown to include twelve rolling mills (Ince 1993; 162-3). The tinplate buildings were set out immediately to the south of the ironworks, and are likely to have extended into the area of proposed development.

3.4 By 1872 the tinworks included sixteen rolling mills, housed mainly in a large central building which extended into the north-western part of the development area. A second large building is also indicated within the centre of the proposed residential development site, as indicated on a map of Swansea canal created in around 1870 (Figure 4). The function of this building is not entirely clear. Part of the extensive network of tram or railroads that extended throughout the site is also shown. These tram or rail roads also connected to a walled compound housing several buildings located at the southern end of the site. However, this is

likely to have been separate to the main iron and tinworks site, as annotations on the map indicate it formerly belonged to the Midland Railway Co., and therefore previously to the Swansea canal. It appears to correspond to a maintenance facility, a builder's yard, or a structure of similar use (R. Protheroe Jones, Pers.com.)

3.5 The iron and tinplate works employed a huge number of people, said to be around four thousand by the mid-1860s. This was not only in the factory itself but also in its associated coal mines. This clearly drew large numbers of people to this part of the Swansea valley. New houses were built and streets laid out, and the town of Ystalyfera was created.

3.6 From the mid-1870s there was a gradual decline in the fortunes of the Ystalyfera Iron Company, as steel manufacture began to take prominence and competition increased from other industrial areas. The 1st edition Ordnance Survey map (Figure 4) shows the site at this time (1877/8). The main tinworks building has been altered, although the southern end, within the area of proposed development, remains unchanged from that visible on the previous canal-properties map. The other large building within the area also appears little-altered. To the west, against the canal embankment, a large, long rectangular shed appears to have been built alongside the tram/rail roads. Another unusual rectangular building has also been added to the east, with a distinctive line of square features to its north and another linear feature to its south. The functions of these long thin structures to the west and to the east of the tinplate works are enigmatic and potentially unique to this works, and thus of potentially high archaeological significance.

3.7 The ironworks finally closed in 1886, however the tinplate works continued in production until the mid-20th century. The tinplate industry of Wales had mixed fortunes and the size of the site was reduced towards the end of the 19th century and a number of the ancillary buildings were removed by the early-20th century.

3.8 The continued reduction in tinplate manufacturing appears eventually to have led to abandonment of the southern end of the tinplate works, effectively the site covered by the area of proposed residential development. The majority of the buildings appear to have been cleared, prior to the establishment of a small colliery in 1906/7 (Figure 4). Although not labelled on any map, this appears to have been the Ystalyfera Colliery, known locally as 'Next Week'. A coal drift was sunk under the canal, with a tram/rail road line crossing the canal to the south. The colliery may have kept working until at least 1913.

3.9 By the start of the 2nd World War, the Ystalyfera tinplate works was down to just four mills, employing around 300 workers. In 1946, due to the high cost of materials and the increasingly out-of-date equipment, the tinplate works was eventually closed down. Much of the site was cleared in the 1960s, which was followed by the establishment of light industrial units across the area. The area of proposed development appears to have remained largely undeveloped since its clearance. Mid to late 20th century maps show an area consisting largely of scrubland, with occasional small structures located within its limits. The disused mine level is still marked on maps as late as the early 1990s.

4 Previous investigation

4.1 Archaeological works have been undertaken at the Ystalyfera Iron and Tinplate Works previously. A desk-based assessment of the area was completed by GGAT in 2005 (Jones & Roberts), an evaluation of part of the site to the north completed by DAT in 2006 (Jamieson), and excavations of the Ironworks by DAT in 2011 (Poucher forthcoming). The evaluation and excavation located to the north, recorded *in situ* remains of the iron and tinplate works at varying levels below the ground surface, and in varying conditions. Substantial masonry walls up to 2.5m in height associated with mid-19th century ironworking, which were subsequently covered and preserved by coal-mining waste material, were revealed by the excavations. Whereas the remains of walls and floors associated with the main tinplate works building, some located immediately below the topsoil, were recorded during the evaluation.

4.2 Geotechnical studies have been carried out across the proposed residential development area (Figure 5). These were originally done for a larger area, which incorporated the new ASDA superstore to the north as well as the site of the former GMF Motor Factory. The associated reports: 'Interpretative Geo-Environmental Report' and 'Mining Assessment Report' were prepared by White Young Green (Hughes 2007a and 2007b).

4.3 The mining assessment confirmed the presence of former mine working entrances within the proposed residential development area (Figure 5). Two of these lie within the area of the 'Next Week' colliery and lie on the western edge of the site. They comprise two adits leading beneath the canal into mine workings beneath the adjacent hill. Remains of the entrances to the up-cast or down-cast adits were revealed within three test trenches located in this area.

4.4 The geo-technical report included the excavation of a number of boreholes (BH1 – BH4) and test-pits within the proposed residential development area (TP1 – TP14). The results of the ground investigations confirmed the presence of made-ground across the majority of the development area; one test pit (TP3) encountering topsoil overlying the natural geology. The character of the made-ground is mostly recorded as containing brick, ash, sandstone cobbles etc, but some information indicating structures or *in situ* remains were also present within TP2, TP9, TP10, TP 13 and TP14 at varying depths between 1.2m and 2.9m below current ground levels.

4.5 The depth of made ground varies across the proposed residential development area. The Trial Pits indicate made ground (excluding TP3) varying in depth between 1.1m and 4m, with between 0.20m – 0.3m of topsoil above that. The character of the made ground is not clear. It is possible that remains of structures could be present within this deposit or, alternatively, that when the Ystalyfera Iron and Tinworks was closed and demolished the entire area was covered with a substantial depth of waste material. The boreholes suggest that made ground is present at depths of between 6.9m and 7.7m in an area located just north of the centre of the development site.

4.6 The geo-technical information has enabled a cut and fill plan to be designed across the site, to aim of which is to achieve a roughly level area, lowering some of

the higher parts and using the resulting material to fill in some of the lower parts. This would remove any major flood risks within the development site. The rough outline of the cut and fill proposals are shown on Figure 5. The report also suggests that, taking account of the ground conditions, raft foundations may be the most suitable construction method.

5 Methodology

5.1 Prior to the evaluation taking place, a Written Scheme of Investigation was produced detailing the methodology for the archaeological evaluation. This was agreed by GGAT-Curatorial and a copy is included in Appendix III.

5.2 Five machine excavated evaluation trenches were cut across the site, targeting the seven sites of archaeological interest that were been identified from the historic maps of the area (Figure 5).

5.3 Trench 1 was 20m long and 2m wide, orientated east – west and located towards the northern end of the site. Its position was designed to investigate the southern extent of the former rolling mills building, crossing the line of an exterior wall and investigating internal deposits. It became clear that a recent trackway had been cut through the area, where the eastern part of the trench was due to be excavated, with a significant amount of dumped material to the east of the track. As a result, the western end of the trench was extended, although the eastern end could not be investigated.

5.4 Trench 2 was located a short distance to the south, orientated WNW - ESE and measured 44.8m long by 1.7m wide. Its position was designed to target the second large tinplate works building to the southwest of the main rolling mills structure, as well as buildings associated with the later 'Next Week' Colliery. Its position was located using existing topographical features. However, it became apparent that these did not correspond to the surveyed features and, as a result, the final position of the trench was to the north and west of the original planned position. Nonetheless, this position still incorporated the site of the main rolling mills structure, the subsequent colliery structures and the site of an additional structure associated with the tinplate works. After on-site consultation with GGAT-Curatorial, this trench was extended 18m to the NNE to investigate a wall.

5.5 Trench 3 was also located towards the western edge of the site. The trench was orientated SE-NW and measured 1.7m wide by 40m. Its position was designed to investigate a long, somewhat enigmatic, structure on the western side of the tinwork complex as well as one of the main tinplate works buildings. The presence of an existing fence-line and dense undergrowth crossing the line of the trench resulted in the position of the trench being shifted to the northeast, although it still incorporated the two structures it was designed to investigate.

5.6 Trench 4 was located towards the eastern side of the site. It measured 41.2m long by 1.7m wide and was orientated SE – NW. Its position was designed to investigate one of the tinplate works buildings on the eastern side of the complex, as well as associated rail and tram lines.

5.7 Trench 5 was located towards the southern end of the site. It measured 42m long by 2m wide and was orientated east – west. Its position was designed to investigate an area of smaller buildings, thought to be possible ancillary working buildings, such as a blacksmiths shop. The orientated of this trench was adjusted slightly to take account of a public footpath running across the edge of the site.

5.10 The trenches were all excavated by a mechanical excavator equipped with a toothless ditching bucket. The trenches were excavated to either the top of identified archaeological deposits or to a safe working depth.

5.11 All areas were hand cleaned to prove the presence or absence of archaeological features and to determine their significance. Sample excavation was undertaken on all identified archaeological features. Recording was carried out using Archaeology Wales recording systems (pro-forma context sheets etc), using a continuous number sequence for all contexts.

5.12 Written, drawn and photographic records of an appropriate level of detail were maintained throughout the course of the project. Digital photographs were taken using cameras with resolutions of 5 mega pixels or above.

5.13 Plans and sections were drawn to a scale of 1:50, 1:20 and 1:10 as required, see Figures 6 – 16.

5.14 A project archive will be prepared in accordance with the National Monuments Record (Wales) agreed structure, as laid out in the WSI (Appendix III). Contact has been made with the National Waterfront Museum, Swansea, for the deposition of the finds and the project archive. When the final location of the finds and the project archive is established this information will be relayed to the HER.

5.15 No deposits were deemed worthy of sampling.

5.16 The fieldwork took place between 7th April and the 16th April 2014.

5.17 A site monitoring visit was undertaken by a representative of GGAT-Curatorial on 10th April 2014, prior to any backfilling activity.

6 Results

6.1 *Trench 1 (Figures 6 & 7, Photos 1 – 4)*

6.1.1 Trench 1 was 20m long and 2m wide, orientated east – west and located towards the northern end of the site. Its position was designed to investigate the southern extent of the former rolling mills building, crossing the line of an exterior wall and covering part of the associated internal area.

6.1.2 The eastern end of the planned trench location was truncated by the presence of a recently constructed trackway, which cut through surrounding deposits to a depth of 1m to 1.5m and was *c.*5m wide. This trackway formed the main access to the site from the north and was, therefore, left undisturbed. To the east of this, the ground appeared to have been built up with rubble, above which was a covering of scrub and small trees.

6.1.3 This trench contained a vegetation-capped topsoil deposit of relatively thin (0.1m thick) mid to dark-grey clayey-silt (1001). This overlay another, similar, clayey-silt deposit (1002), which was 0.1m in thickness.

6.1.4 Underlying these topsoil deposits, at the eastern end of the trench adjacent to the modern trackway, was a 1.3m thick deposit consisting largely of brick rubble (1003). The bricks appeared to be mid to late-20th century in date, with large sections still bonded together with cement mortar. A section of roughly level concrete floor was revealed (1005) underlying the brick rubble, which although badly damaged still appeared to be largely *in situ*, at 58.93m OD. This section of floor was 1.4m long, and spread across the width of the trench. Together, the concrete floor and brick rubble appear to represent the remains of a brick-built structure that had been partly demolished and largely pushed over from the east, as indicated by the tip lines in the brick rubble, and then covered in topsoil. The structure appears to have been relatively basic, with a concrete floor and a two-brick thick wall. The bricks and mortar suggest that it dates to the mid-20th century or later. No finds were recovered in association with the structure. The concrete floor was set on a layer of moderately compacted dark-grey gravel (1006) with coal, brick and stone inclusions.

6.1.5 To the west, the bricks overlay a very thick deposit of dark grey-brown clayey-silt (1004). This deposit was excavated to a depth of 1.2m below current ground levels, but the base of the deposit was not reached. It contained fragments of 20th century concrete, brick and metal fittings and the remains of tree saplings. This deposit clearly carried on westwards beyond the trench limits. The presence of the brick rubble and tree saplings indicates that this deposit was spread across this area in an east to west direction, possibly as the result of bulldozing. As the tree saplings appeared relatively un-decayed, this appears to have occurred relatively recently.

6.1.6 Previous ground investigation works included the excavation of a test pit to the east of this trench (TP14) within the built-up ground beyond the modern trackway, close to the original planned line of the trench. This pit recorded 0.3m of topsoil, below which was made-ground to a depth of 2.4m, which included stone, coal fragments, brick, wire mesh, piping, timber and slag. This appears to represent mixed demolition rubble. A hollow iron girder, 0.1m in diameter and at least 1.5m long, was recorded at a depth of 1.2m (59.22mOD), and many whole bricks were also recorded

from a depth of 1.6m (58.82mOD), it is possible these features represent *in situ* structural remains.

6.1.7 The relatively modern appearance of the former brick structure within the trench suggests that it post-dates the operational life of the tinplate works, and is therefore of limited archaeological value. No finds, features or deposits of archaeological interest or of any association with the tinworks were recorded. The revealed deposits indicate that the tinworks lies in an area that is now modern disturbed ground, at a depth of at least 1.2m below current ground levels.

6.2 ***Trench 2 (Figures 8 & 9, Photos 5 – 16)***

6.2.1 Trench 2 was located a short distance to the south, orientated WNW - ESE and measured 44.8m long by 1.7m wide. After consultation with GGAT-Curatorial, an additional 18m of trenching was added to the north-eastern edge, orientated SSW – NNE. As mentioned in the methodology, the position of this trench was altered from its original planned location, but the new position still targeted the second large tinplate works building to the southwest of the main rolling mills structure, as well as buildings associated with the subsequent 'Next Week' Colliery and another structure associated with the tinplate works.

6.2.2 The trench was covered by a dark brown silty-clay topsoil (2000) of varying thickness, but generally averaging 0.1m thick. Towards the western end of the trench the topsoil overlay the remains of a stone and brick built wall (2009), encountered at a shallow depth of 0.1m below current ground levels (59.96m OD). This wall was 1.5m wide, when initially encountered, and built of roughly squared large stone blocks bonded in a lime mortar. The wall was orientated southwest – northeast. The northwest face of the wall was roughly vertical, only three courses deep (0.4m), with a rough face and mortar covering some of the stone work. This was sat on top of a compacted foundation comprising angular stones and mortar. In contrast, the south-eastern face was more solidly constructed, and to a depth of at least 1m below current ground levels; the foundations on this side were not exposed. This face of the wall also contained a vertical rectangular recess, 0.09m wide and 0.2m high, possibly representing the recess for a floor beam, which indicates the interior of the building was to the southeast. The trench was subsequently extended to investigate this wall. The wall terminus to the northeast was recorded and a stretch of wall, 19.5m in length, exposed. The wall continued beyond the south-western edge of the trench. The entirely stone-built section of the wall extended for 10.1m (ending 9.4m from the terminus), beyond which the rough stonework continued only along the north-western edge of the wall, for a thickness of 0.95m, with the south-eastern edge largely rebuilt in brick. The stonework consisted of an outer face of mortared stone, largely surviving only one or two courses high above the rough mortared stone foundations. Behind the face was an internal core of smaller unworked stone and the occasional brick fragments set in a compact lime mortar. The brickwork consisted of unmarked bricks, set in a lime mortar, comprising of a solid wall 0.65m thick. The depth of the brickwork on this side of the wall was not exposed. The wall terminus appears to have been demolished down to foundation level, revealing only a rough, slightly rounded, mortared rubble end to the wall. The length and alignment of this wall would appear to match relatively closely to

part of a rectangular structure located immediately to the south of the main tinplate works rolling mills building, as is depicted on a canal ownership map dating to about the early 1870s and an Ordnance Survey map dated 1877/8 (Figure 4).

6.2.3 To the southeast of this wall was a series of dumped or demolition deposits at a depth of between 0.8m and 1m below current ground levels. These deposits consist of a mid to dark yellow silty-clay (2001), averaging 0.24m thick, that would appear to represent redeposited natural. Below this was a layer of broken and crushed shale fragments (2002), averaging 0.2m thick. Underlying this was a dark, soot-rich, layer (2003) that, along with the two overlying layers, extended the full length of the trench. Towards the south-eastern end of the trench, a further underlying layer of loose shale and stone fragments (2004) was recorded. Towards the centre of the trench a layer of loose light red ash and clinker material (2005) was also noted, underlying deposit 2003, although its relationship with deposit 2004 was uncertain. This deposit, however, appears to underlie possible tramway remains 2007 (see below) and may therefore be a general levelling deposit spread across the area.

6.2.4 Two features, the remains of which survived partially *in situ,* were recorded underlying these dumped or demolition deposits. Five metres to the southeast of wall 2009 were two *in situ* level timber sleepers (2007), forming part of a tramway running almost parallel to wall 2009. The full length of the sleepers was not recorded, they extended beyond the area excavated, but each was 0.3m wide and 0.1m thick. A large iron nail survives in each sleeper, rather crudely bent over to help tie the rail in place; the rail itself was no longer *in situ*. The sleepers were bedded in a layer of compacted fine dark ash and coal fragments (2010). These sleepers were recorded at a depth of 1m below current ground levels (58.92m OD). Twenty one metres further to the southwest, a dislodged timber sleeper was visible in the trench section, within deposit 2004. Also recovered from this deposit were the remains of an iron tram wheel and partial axle, of a type used in the late 19th century, or more likely the early to mid-20th century (Protheroe Jones, pers. comm.). The date of the tram-wheel, along with the coal-rich material into which the tramline sleepers are bedded, suggests they are associated with the early-20th century colliery activity that took place in the area. However, the wall line and tramway both appear to be marked on mapping of the 1870s associated with the tinplate works.

6.2.5 Towards the south-western end of the trench were the remains of a brick-built structure (2006). The remains consisted of a right-angled corner, with the walls two-bricks in width (0.22m), orientated SE – NW, and NE – SW. The bricks themselves are stamped 'Cynghordy' and were bonded in a cement mortar. The interior contained crushed brick fragments and was not excavated further. These remains were first recorded at a depth of 0.94m below current ground levels (58.85m OD). The building is on a similar, although not exact, orientation to the wall and tramway remains to the north, and was recorded at a similar depth to the tramway sleepers. A precise date for the Cynghordy brickworks has not been established, although it is known to have been in operation in the mid-20th century.

6.2.6 Excavation of this trench ceased at the depth of the level of the tramway and brick structure.

6.3 ***Trench 3 (Figures 10 - 12, Photos 17 – 28)***

6.3.1 Trench 3 was located towards the western edge of the site, 35m to the southwest of Trench 2. The trench was orientated SE – NW and measured 1.7m wide by 40m long. Its position was designed to investigate a long, somewhat enigmatic, structure on the western side of the tinwork complex, as well as one of the main buildings of the tinplate works.

6.3.2 Once again, underlying the topsoil (3001) was a series of dumped or demolition deposits at a depth of around 0.7m to 1m below current ground levels. The uppermost (3002), consisted of a very dark brown silty-clay with large amounts of stone and brick inclusions, and appeared to comprise a weathered rubble deposit between 0.1m and 0.2m thick. Below this, towards the north-western end of the trench, was a very thick dumped deposit of stone, ash and clinker material (3003) overlying similar, but more finely sorted, dumped material (3004). These deposits extended around 6m into the trench and were excavated to a depth of 1.5m below current ground levels without being bottomed. Within the lower deposit (3004), were bricks and large fragments of concrete blocks, although none constituted *in situ* structural remains. To the southeast, this deposit gave way to a 0.7m thick dumped deposit of stone and brick rubble (3006) in a dark grey silty-clay matrix. The interface between 3004 and 3006 was indistinct, but both appear to represent a period of dumping or moving of disturbed ground. Below this deposit, at a depth of 1m below current ground levels (59.41m OD), was the first in a series of tramway sleepers (3017). Due to the presence of an existing fence-line, a baulk was left in place crossing the trench, to the southeast of which deposit 3006 appears to continue throughout the trench, although numbered separately as deposit 3008. Below this was a 0.1m to 0.15m thick deposit of dark grey to black relatively fine silty gravel (3009). This deposit overlay of two further tramlines and a concrete plinth (3015).

6.3.3 The north-westernmost of these tramlines consisted of two adjacent wooden sleepers (3017) at a depth of 1m below current ground levels (59.41mOD). They measured between 1.7m and 2m long, although both had been damaged and would have extended further; they were 0.3m wide and set 0.35m apart. Each sleeper had a pair of iron pins set 0.55m from the end. Although only two sleepers were revealed, it suggests a tramline running in a NE - SW direction. The sleepers were laid into a compact dark grey layer of fine cinder with coal fragments throughout (3005).

6.3.4 Another timber sleeper (3018) was located 1.2m to the southeast set into a similar deposit of compact, dark grey, cinder (3007) and on a similar alignment. Only one timber survives, which was 2.3m long and 0.25m wide, and at a similar depth of 1m below current ground levels (59.62m OD). The timber has a nail set centrally, 0.15m from each end, with a square boss 0.1m across with a vertical hole through it set another 0.2m further along the timber. These were presumably for holding the rails in place and would suggest tracks set *c.*1.6m apart.

6.3.5 Immediately to the southeast of sleeper 3018, a baulk 1.9m wide was left in place across the trench due to the presence of an existing fence-line. Protruding from the south-eastern side of the baulk were two further sleepers (3019) set within a dark cinder layer (3010), 0.73m below current ground levels (59.47mOD). These sleepers

were at least 2.1m long, although extended into the baulk, 0.55m wide, and set 0.65m apart. A pair of iron nails was visible in both sleepers, set 0.55m from the southeast end on the NE sleeper, and 0.4m from the end on the southwest sleeper, presumably for holding the rail in place. A nail was also visible at the northwest end of this sleeper, which if also representing the line of the track suggests rails set *c.*1.8m apart.

6.3.6 The final set of sleepers (3020) lay 10.7m to the southeast, 0.7m below current ground levels (59.46m OD). The sleepers were 2.8m long, 0.55m wide and set 0.85m apart. The north-eastern sleeper was relatively well preserved, with a pair of nails at either end to hold the rails in place, with the indentation of the rail itself remaining at the northwest end. This indicates rails 0.09m wide at the base, set 1.5m apart. Immediately to the northwest of the sleepers, surviving largely in the trench section, was a concrete plinth (3016) 1m wide and 0.5m deep. The concrete block, which had a vertical face on its SW edge, was sat on rough foundations of mortar, stone and brick. The bedding layer (3014) for the adjacent sleepers butted against the side of this plinth, which itself sat on top of a layer of loose red-brown silty gravel (3011) that appeared to act as a levelling deposit.

6.3.7 All four possible tramways (3017 - 3020) followed a very similar alignment, and are presumably therefore broadly contemporary. The association of the concrete plinth (3015) with the adjacent sleepers (3020) also suggests the features are contemporary. As with Trench 2, the date of these features is uncertain. They would appear to align relatively closely to tramway marked on maps of the 1870s, however, they also appear relatively high in the sequence of made ground across the site, as indicated by nearby geotechnical investigations (TP14 – which recorded made ground to a depth of at least 2.4m below current ground levels, 58.02mOD), and are bedded in material relatively rich in crushed coal fragments that may be more readily associated with the early-20th century colliery in the immediate vicinity.

6.3.8 Only one further feature was identified within the trench. This consisted of a rough concrete pad with a metal plate laid on top of it (3013). This pad sat within a roughly square cut (3012) 1.2m wide, protruding 0.6m into the trench, and 0.65m deep. This cut was through layer 3009, which itself overlay the sleepers and therefore clearly post-dated the use of the tramways. The remains of the pad were overlaid by layer 3008.

6.4 ***Trench 4 (Figures 13 – 15, Photos 29 – 32)***

6.4.1 Trench 4 was located towards the eastern side of the site. This trench measured 41.2m long, 1.7m wide, 1.2m deep, and was orientated southeast – northwest. It was positioned to investigate one of the tinplate works buildings on the eastern side of the complex, as well as associated rail and tram lines.

6.4.2 Beneath the 0.15m thick topsoil layer (4000) was a series of dumped deposits, which were excavated to a depth of at least 1.2m below current ground levels (deposits 4001 – 4008). The base of these deposits was not revealed within the trench. The deposits consisted largely of alternating layers of redeposited broken shale bedrock and crushed coal and ash deposits, all typical of waste material from coal-mining activity and therefore likely to have derived from the adjacent early to mid-20th century colliery that

operated on the site. Tip lines within these deposits indicate that the material was dumped from the northwest.

6.4.3 No finds, features or deposits of archaeological interest were revealed.

6.5 ***Trench 5 (Figure 16, Photos 33 – 35)***

6.5.1 Trench 5 was located towards the southern end of the site. This trench measured 42m long by 2m wide and was orientated east – west. Its position was designed to investigate a compound of smaller buildings, thought to be possible ancillary working buildings, such as a blacksmiths shop, associated with the adjacent canal.

6.5.2 This trench was covered by a relatively thin topsoil (5000), 0.12m thick, of dark brown grey clayey-silt with frequent inclusions of angular stone.

6.5.3 At the western end of the trench, the topsoil overlay a compact deposit of mid grey silty clay (5001) containing fragments of angular stone and brick. This extended for *c.*13m into the trench, the compact nature of the deposit suggesting it formed a rough surface, revealed at a depth of 0.1m below current ground levels (64.85mOD). This appears to roughly correspond to a rectangular building that formed part of the compound situated alongside the canal that was depicted on maps from the early 1870s through to 1918, at which point it is marked as an abandoned structure.

6.5.4 At its eastern end, it overlaid a layer of light brown yellow sandy clay with occasional sub-angular stone inclusions (5002). This would appear to represent a natural subsoil deposit, and is exposed beneath the topsoil throughout the central part of the trench.

6.5.5 9.1m from the eastern end of the trench, the remains of a stone and brick built wall (5006) were recorded 0.05m below the current ground level (64.75mOD), cutting into the natural subsoil (5002). The wall was linear, with an outer face on both sides of mixed full- and half-bricks and roughly squared stone, and an internal core of similar material. These stones and bricks were laid in a rough mortar. The exposed surface of the wall was level. The line of this wall roughly corresponds to a thin rectangular building in the corner of the compound, depicted on maps of the 1870s.

6.5.6 Along the eastern edge of wall 5006 was a shallow concave gully (5003) 0.6m wide, 0.1m deep and filled with a compact deposit of dark grey silty clay with frequent inclusions of sub-angular stone blocks and brick fragments (5004). This gully was cut into the underlying natural subsoil (5002), and may represent part of the construction cut for the adjacent wall remnants, indicating the shallow nature of the structural remains within the trench.

6.5.7 Running alongside the gully, on its eastern side, was a compacted layer of dark red ash and clinker (5005), 2.65m wide and running parallel to the line of the wall and gully. This may represent the remains of a metalled surface forming a track alongside the wall.

6.6 ***Artefactual and Environmental Data***

6.6.1 Very few finds were recovered from the evaluation trenches, those that were recovered are listed within Appendix II. From within Trench 2, deposit 2002

contained one complete glass bottle (Find No.1, photo 36) and a further fragment of a glass bottle (Find No.2), along with a ceramic electrical power-line insulator (Find No.3). The complete bottle is marked on the side as 'Thomas & son, Ystalyfera'; the fragment is marked on the base as 'B & Co. (?), A5137'. Neither fragment has yet been closely dated, although they both appear to be of 20th century date. The layer in which they were found has provisionally been interpreted as a dumped deposit from the mid-20th century site clearance works. Disturbed topsoil deposits from the same trench (deposit 2000) also produced an earlier, largely complete, codd-bottle (Find No. 4, photo 37), marked on one side with 'Thomas, Niagara Waters, Swansea, Neath and Llanelly' and on the reverse with '1/4d deposit charged on this bottle, J. W. Dobson Ltd, Maker, Barnsley'. This bottle has not been closely dated, but it is believed that Dobson of Barnsley was manufacturing codd-bottles under that name at the end of the 19th century. The bottle, however, was clearly found out of context.

6.6.2 Also within Trench 2, from deposit 2004, was an iron tram-wheel with part of the axle still attached (Find No.5) and a fragment of an iron rail (Find No.6). The tram-wheel measures 0.43m in diameter and is 0.08m thick. It appears typical of tram-wheels dateable from between the late-19th century through to the mid-20th century (Protheroe Jones, pers. comm.), although this particular example is more likely to date from the early 20th century, being associated with the nearby colliery remains. The fragment of iron rail is 0.3m long, 0.075m wide at the base, and 0.035m wide along the rail itself. It presumably originated from nearby *in situ* sleepers, which may be associated with the operation of the tramway as part of the general tinworks complex. The deposit within which they were recovered, however, is provisionally interpreted as post-colliery demolition and ground clearance of early to mid-20th century date, which disturbed some of the *in situ* deposits below.

6.6.3 The only other find from the site was a complete glass milk bottle (Find No.7) from topsoil deposit (3001) within Trench 3. This clear-glass bottle is marked 'CWS' on the front and 'pasteurised milk' on the reverse. It is typical of milk bottles from the 1960s/1970s.

6.6.4 Two brick samples were retrieved. One from wall 2009 (Find No.8), which consisted of a rectangular solid frogged brick of probable late 19th or 20th century date. The other is a solid brick marked 'Cwmgors' from deposit 3002 (Find No.9). These bricks were relatively prevalent within topsoil and upper demolition deposits across the site. The 'Cwmgors' brickworks were in operation for many decades into the 20th century and therefore cannot give precise dating evidence (Protheroe-Jones, pers.comm.).

6.6.5 Consultation has been undertaken with the Curator of Heavy Industry at Swansea Waterfront Museum. The museum is not seeking to add any of these finds to their collection. Further consultation will be undertaken with the developer/landowner regarding the retention of these finds, which will in the meantime remain in storage with Archaeology Wales.

6.6.6 No deposits were revealed deemed suitable for environmental sampling.

7 Discussion and Conclusions

7.1 Trench 1 revealed demolished structural remains at a depth of 1.3m below current ground levels, at 58.93m OD. These remains, however, appear to be relatively modern in date and are of little archaeological interest. Nothing of archaeological significance was noted within the trench and the ground in the area appears to consist of at least 1.3m of disturbed material. No remains of the main tinplate works targeted by this trench, was recorded.

7.2 Trench 2 revealed the lower courses and foundations of a stone and brick built wall that appears to correspond to a later 19th century wall associated with the tinplate works. A deeper wall face and a possible floor timber support suggest that the interior lay to the southeast. The remains of a tramway found within this area may indicate that the building functioned as a wagon shed. Alternatively, the tramways may be associated with later colliery workings, due to the presence of an early-20th century tram-wheel in disturbed overlying deposits. The presence of a later brick structure at a similar level to the tramway suggests that they belong to a later period of activity, and one that truncated and removed internal features associated with the building. Although remains of one of the tinplate works buildings were recorded within the trench, no remains of the larger building or later colliery buildings targeted by the trench were revealed. The wall was recorded at a depth of 0.1m below current ground levels, at 59.96m OD. The tramway was recorded at a depth of 1m below current ground levels at 58.92m OD, and the brick-built structure at 0.94m below current ground levels, at 58.85m OD.

7.3 Trench 3 revealed an upper 0.7m to 1.0m of disturbed ground. Below this, a series of four tramways were recorded. From west to east they were recorded at depths of 1.0m below current ground levels (59.41m OD), 1.0m below ground levels (59.62mOD), 0.73m below current ground levels (59.47m OD) and 0.7m below current ground levels (59.46m OD). This last tramway was also found in association with a concrete plinth. These tramways appear to be broadly contemporary. They are marked on maps of the 1870s, although it is possible that in their final use they related to the early 20th colliery. One later concrete pad was also recorded, believed to be later 20th century in date. No remains of the large tinplate works building or an enigmatic long rectangular building, targeted by this trench, were revealed.

7.4 Trench 4 revealed dumped deposits, seemingly derived from nearby coal mining activity, to a depth of at least 1.2m below current ground levels, 58.4m OD. Nothing of archaeological interest was noted within this trench. No evidence of the former tinplate works building, targeted by the trench, was revealed.

7.5 Trench 5 revealed shallow structural and surface remains associated with a compound visible on mapping from the 1870s to the early 20th century. These remains appeared just below the surface at a depth of around 0.05m (64.75mOD). They correspond to a compound believed to house a maintenance facility associated with the adjacent canal; this was not connected to the tinplate works.

7.6 The evaluation has demonstrated that there are some *in situ* 19th century structural remains surviving at the southern and western end of the site, in areas where the ground level is likely to be reduced. Such work is likely to damage or destroy these remains. These structures in these areas, however, are of relatively minor

archaeological interest compared with the main tinplate works structures visible on historic map sources, although still worthy of recording.

7.7 Remains of tramways are also recorded within the site, some of which may similarly be affected by potential ground reduction works, although they appear to lie in areas where the ground level of the proposed development will be raised. These remains are also of limited archaeological interest, although still worthy of recording.

7.8 Evidence of the main tinplate works buildings were not revealed within the evaluation trenches. It is unlikely that typical late-19th and early-20th century demolition and clearance works on the site would have completely removed these structures, and the possibility remains that *in situ* evidence of the tinplate works survives at depths below that reached by the evaluation. All such remains are potentially of significant archaeological importance. Some elements of the main tinplate works buildings lie in areas of planned ground reduction, although generally the ground level covering the site of the main buildings will be built up. It is considered unlikely that groundwork associated with the development will reveal significant areas of the main tinplate works buildings.

7.9 If, however, groundworks associated with the planned development involve the removal of significant depths of material across the site of the main tinplate works complex, then further remains may be revealed requiring more detailed archaeological excavation and recording. If the planned works involve ground level changes (as illustrated on Figure 5), and raft foundations as recommended in the geotechnical reports, then it is recommended that an archaeological watching brief be undertaken during such groundworks. Sufficient time should be allowed within the construction programme for adequate recording of archaeological features to take place, should they be revealed by these works.

8 Bibliography

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Cartographic

Anon 1838 *Llangiwg Parish Tithe map and apportionments*

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Geological Survey of England and Wales 1948 *Glamorgan geological map 6 inch to 1 mile 9NW*

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Ordnance Survey 1899 *2nd Edition 1;2500 Glamorganshire III.13 & IX.1*

Ordnance Survey 1918 3rd *Edition 1;2500 Glamorganshire III.13 & IX.1*

Ordnance Survey 1921 *1;10,560 Glamorganshire IX.NW*

Ordnance Survey 1965 *1;10,560 Glamorganshire IX.NW*

Ordnance Survey 1984-1991 *1;10,000 Glamorganshire IX.NW*

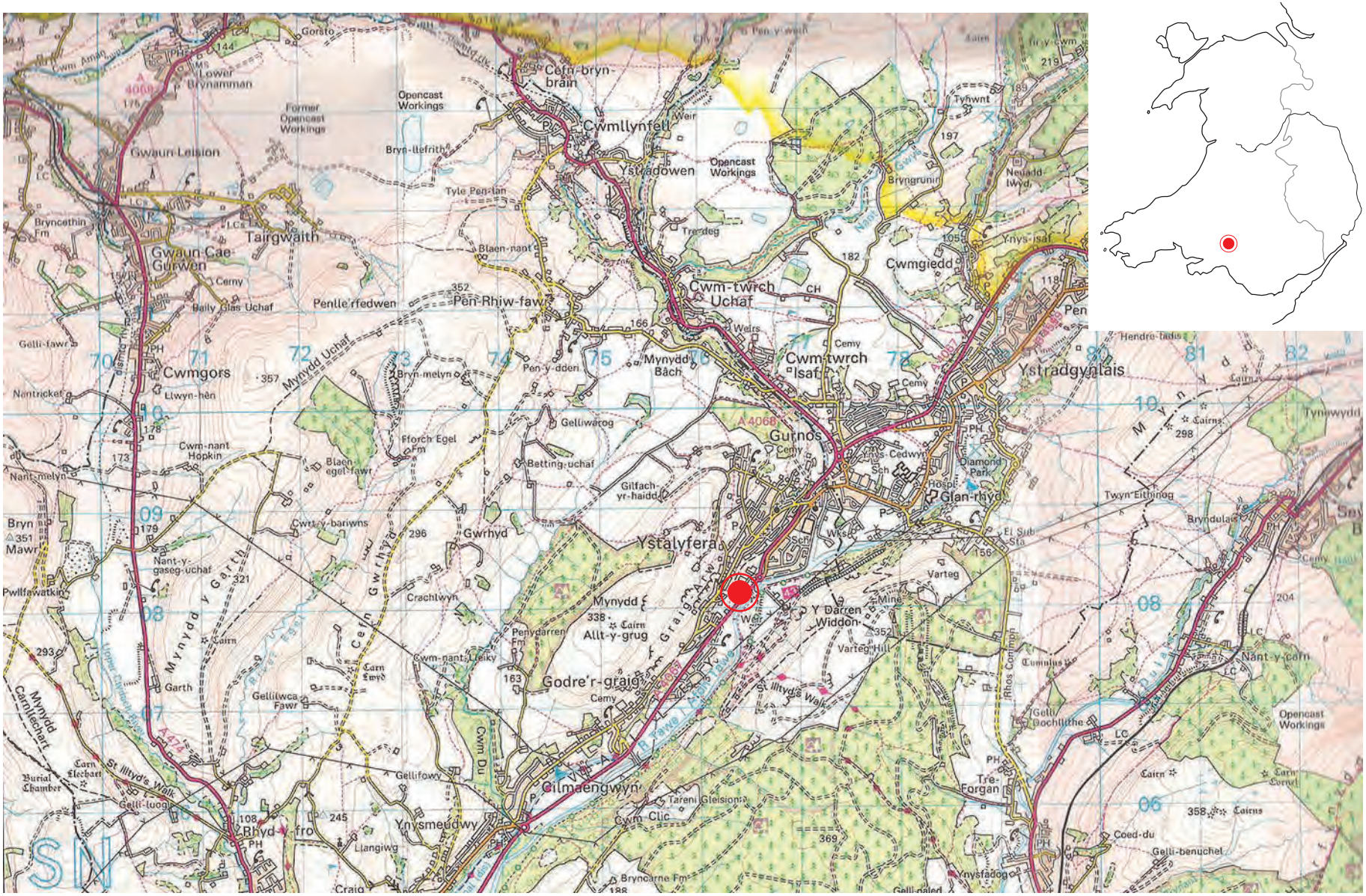

Fig.1: Location map, based on the Ordnance Survey 1;50,000.

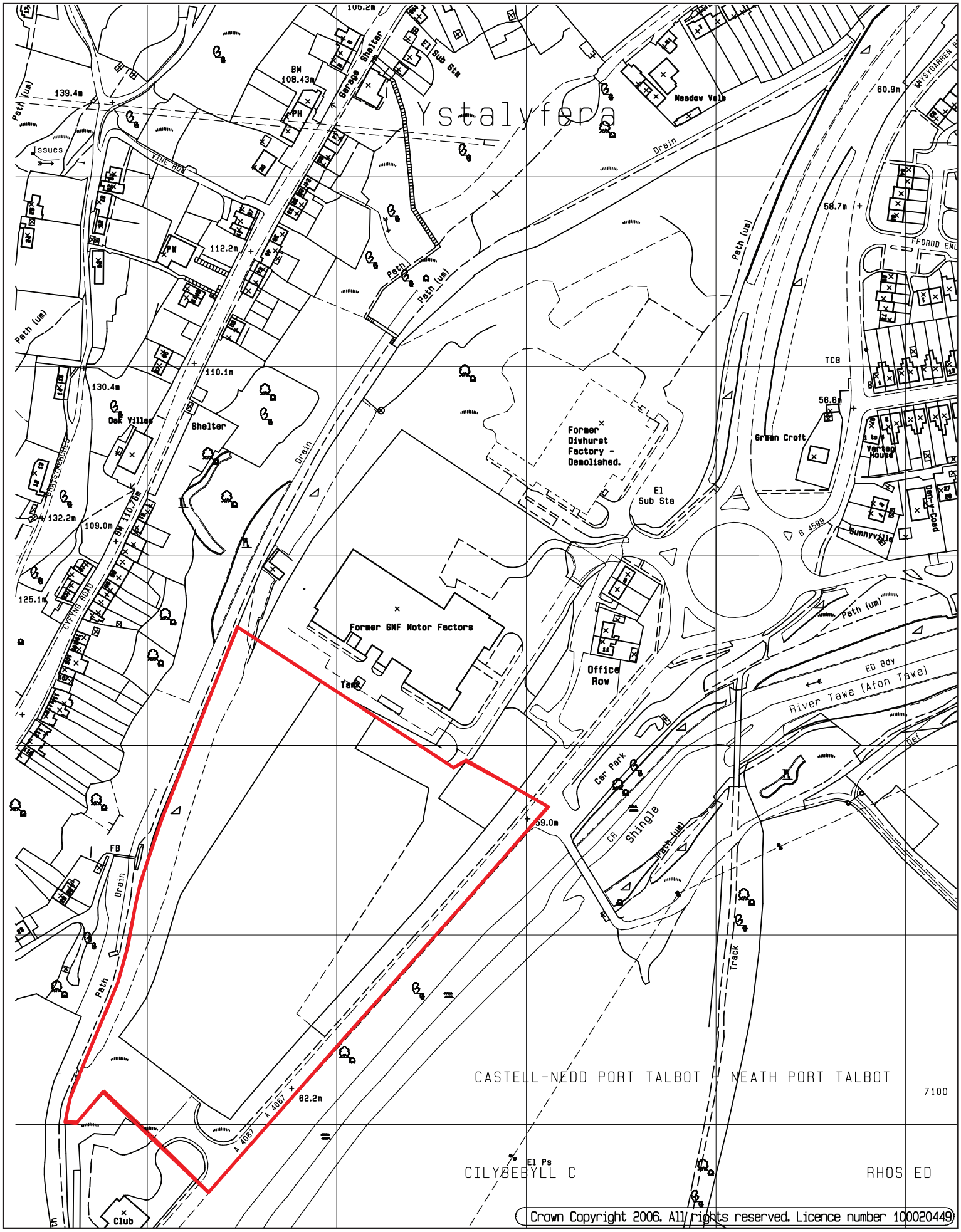

Fig. 2: Site location map in detail. Original plan provided by Hawkesbury Properties Ltd, Drawing No.2191.05.dsg

Scale 1:2500 @ A3

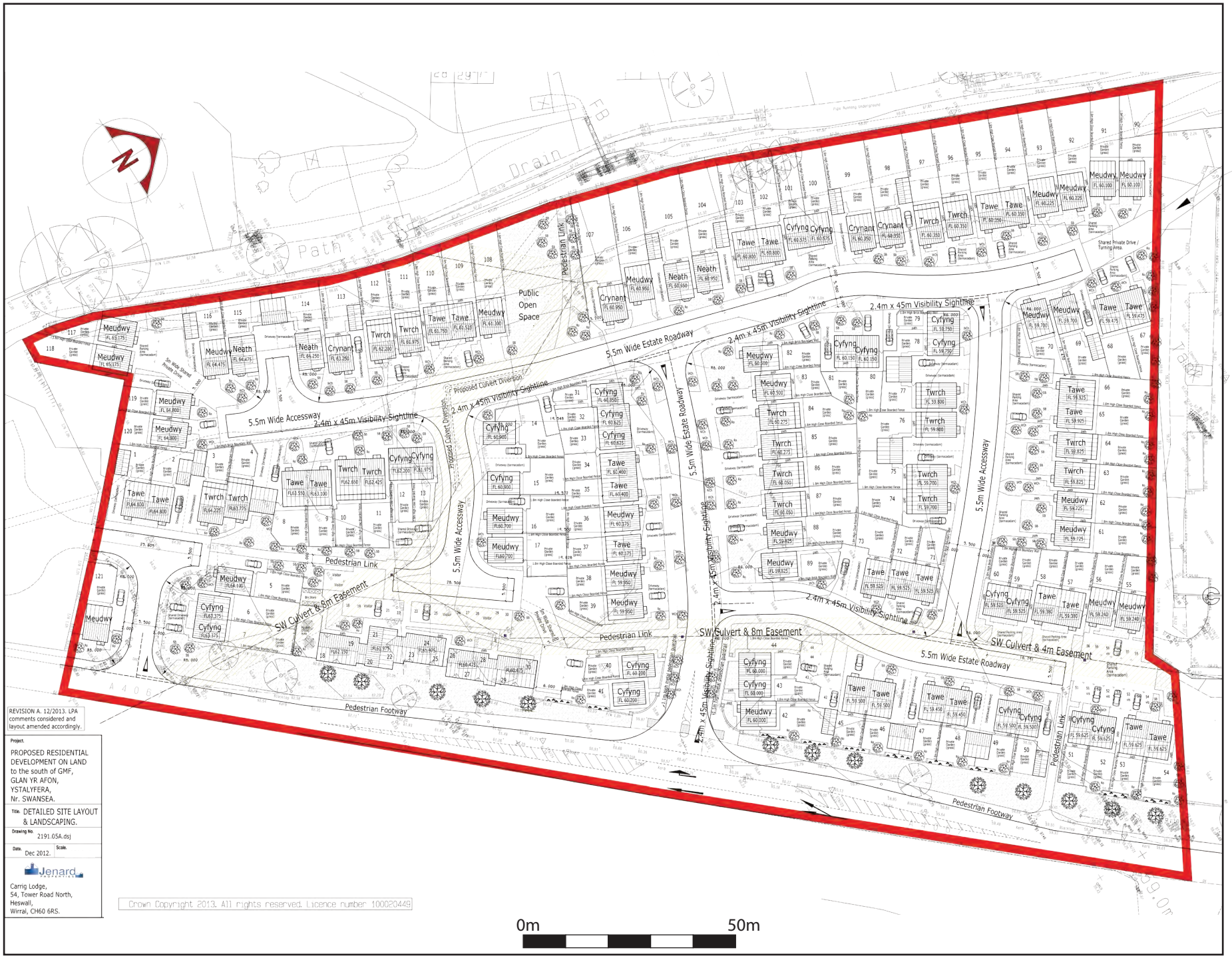

Fig. 3: Proposed development layout. Original plan provided by Jenard (Ystalyfera) Ltd

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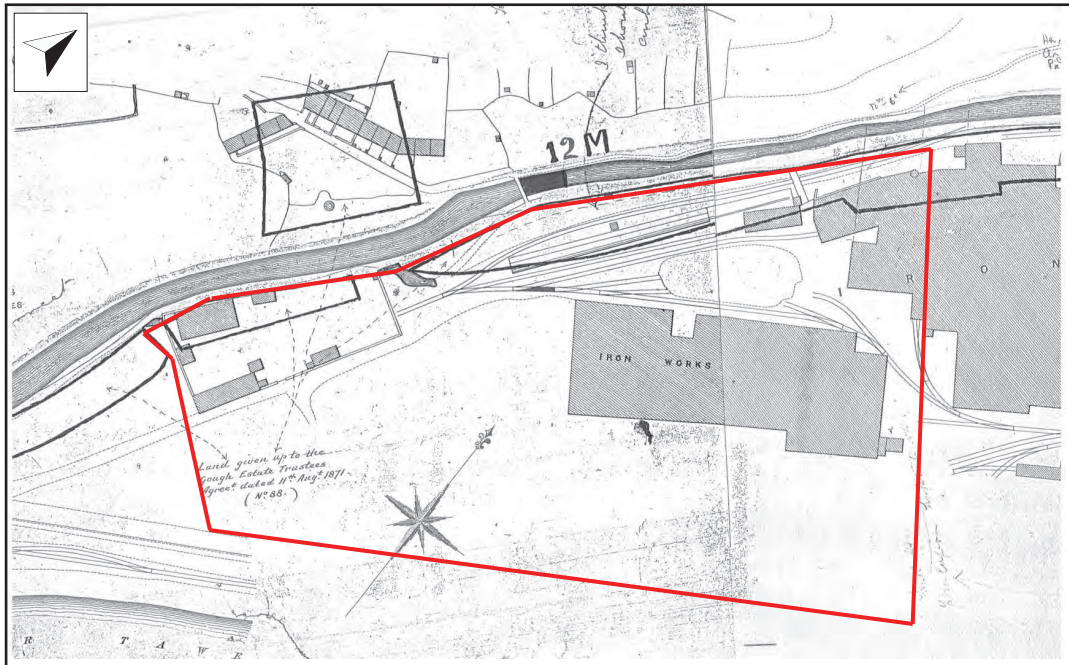

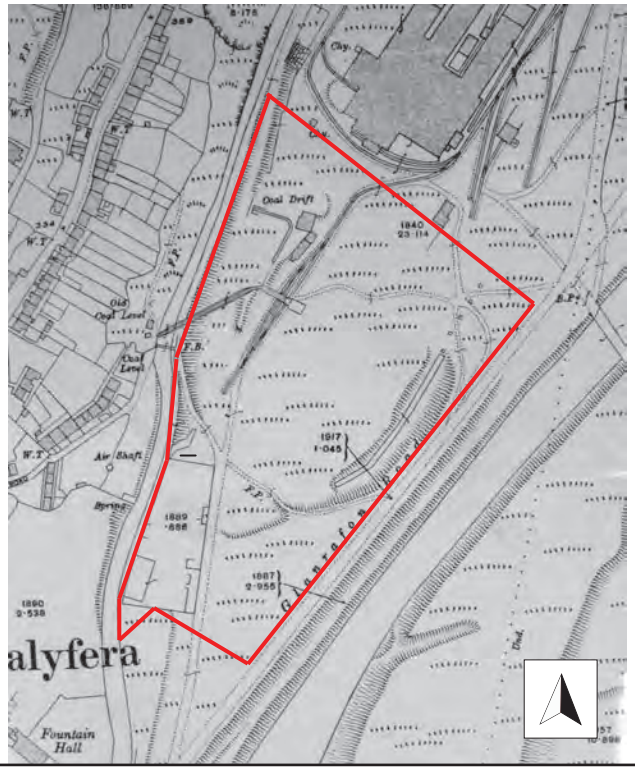

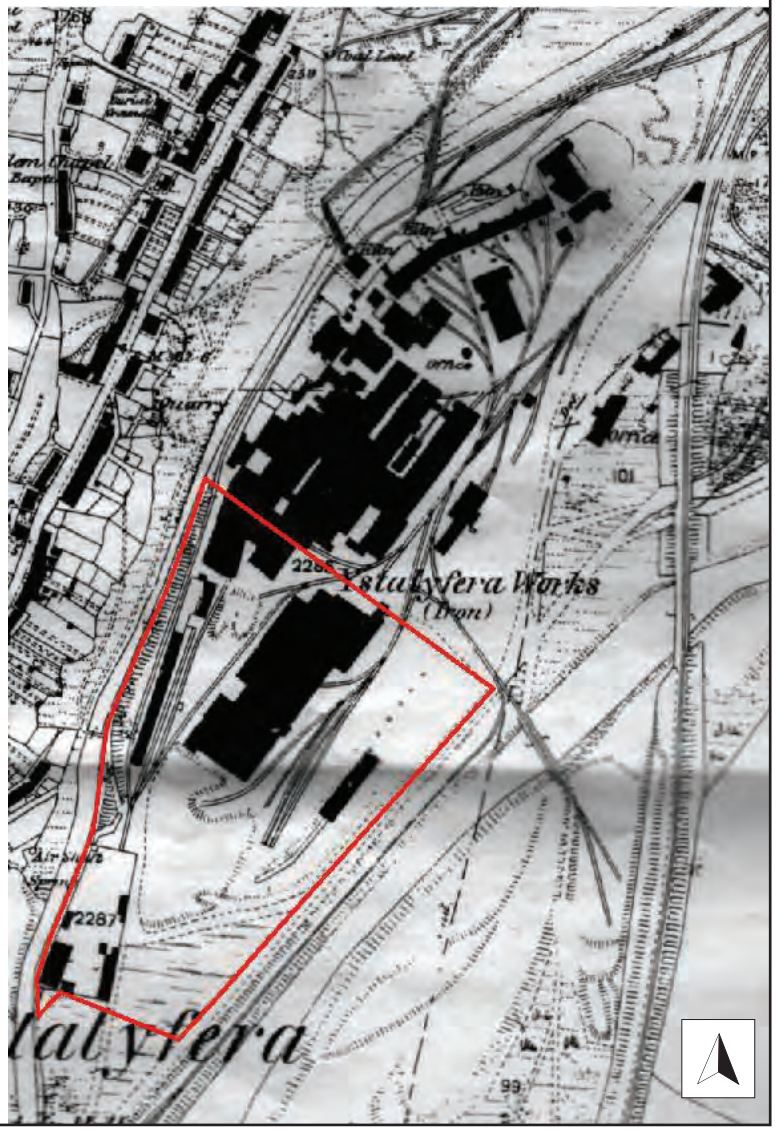

Fig. 4: Extracts from historic mapping. Top left is a canal ownership map presumed to be from the early 1870s. On the right is the Ordnance Survey map from 1877/8 showing the full extent of the Works. Bottom left is the Ordnance Survey map from 1918 showing the later Colliery buildings.

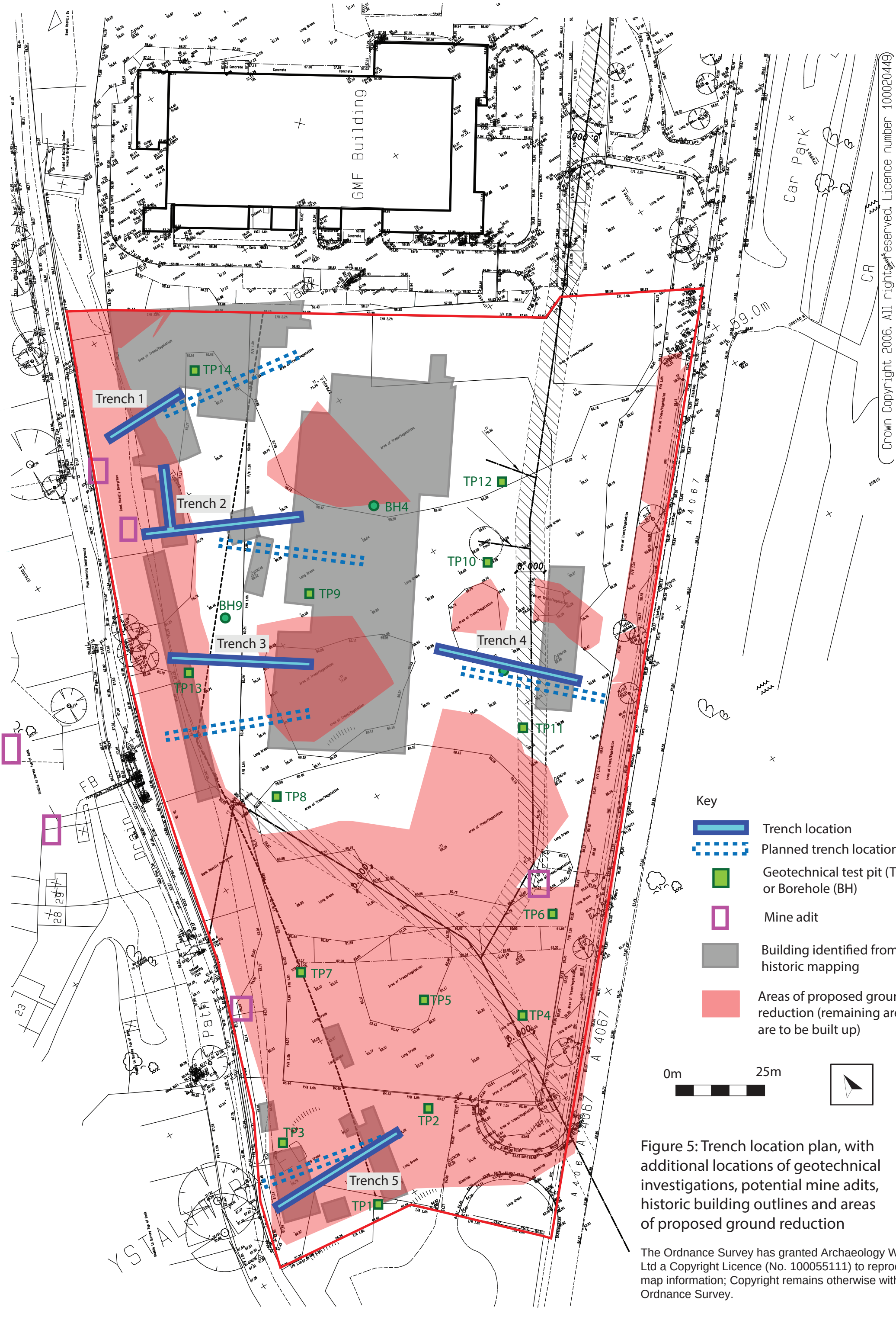

Figure 5: Trench location plan, with additional locations of geotechnical investigations, potential mine adits, historic building outlines and areas of proposed ground reduction

Fig. 6 Trench 1 Plan

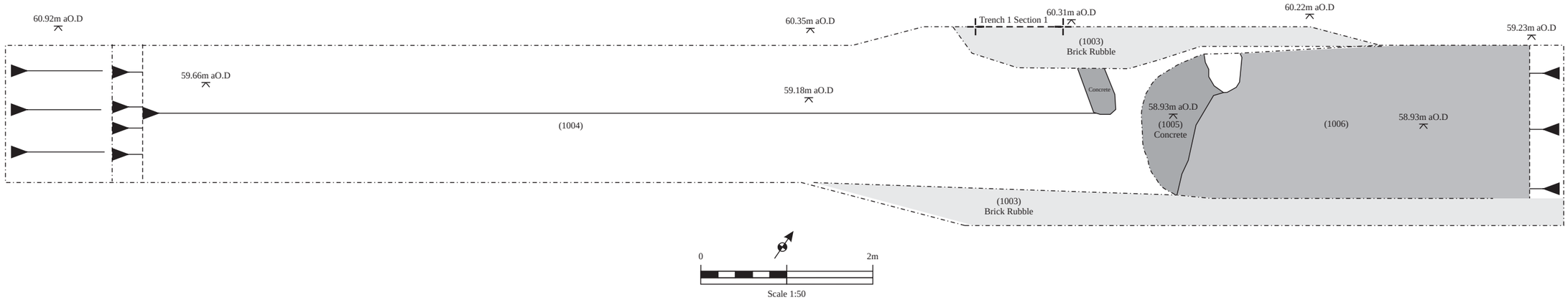

Fig. 7 South Facing Section in Trench 1
Brick Rubble Deposit (1003)

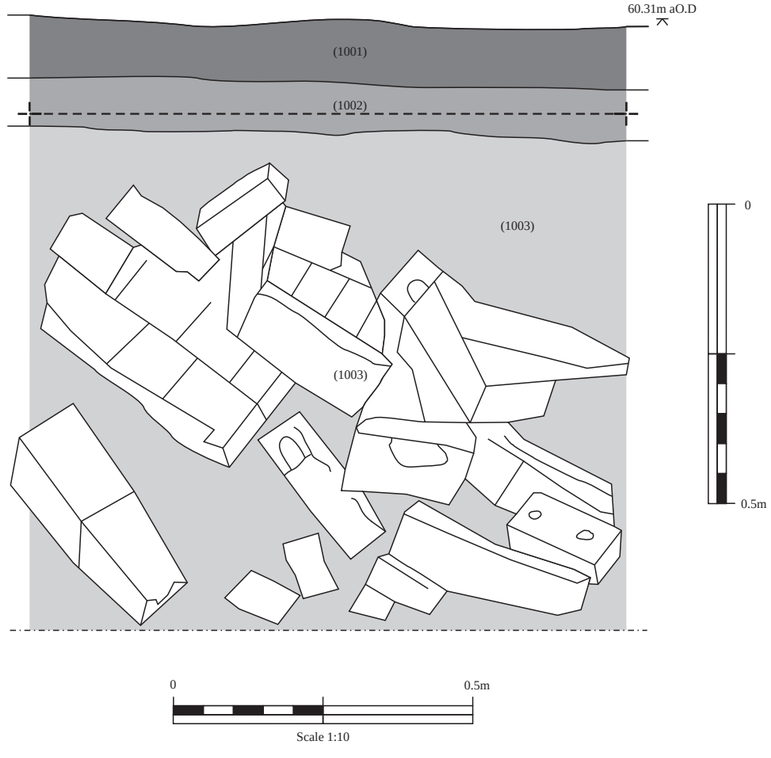

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Fig.6 & 7
Trench 1 Plan and Profile

Scale: Plan 1:50
Section 1:10

Fig. 8 Trench 2 Plan

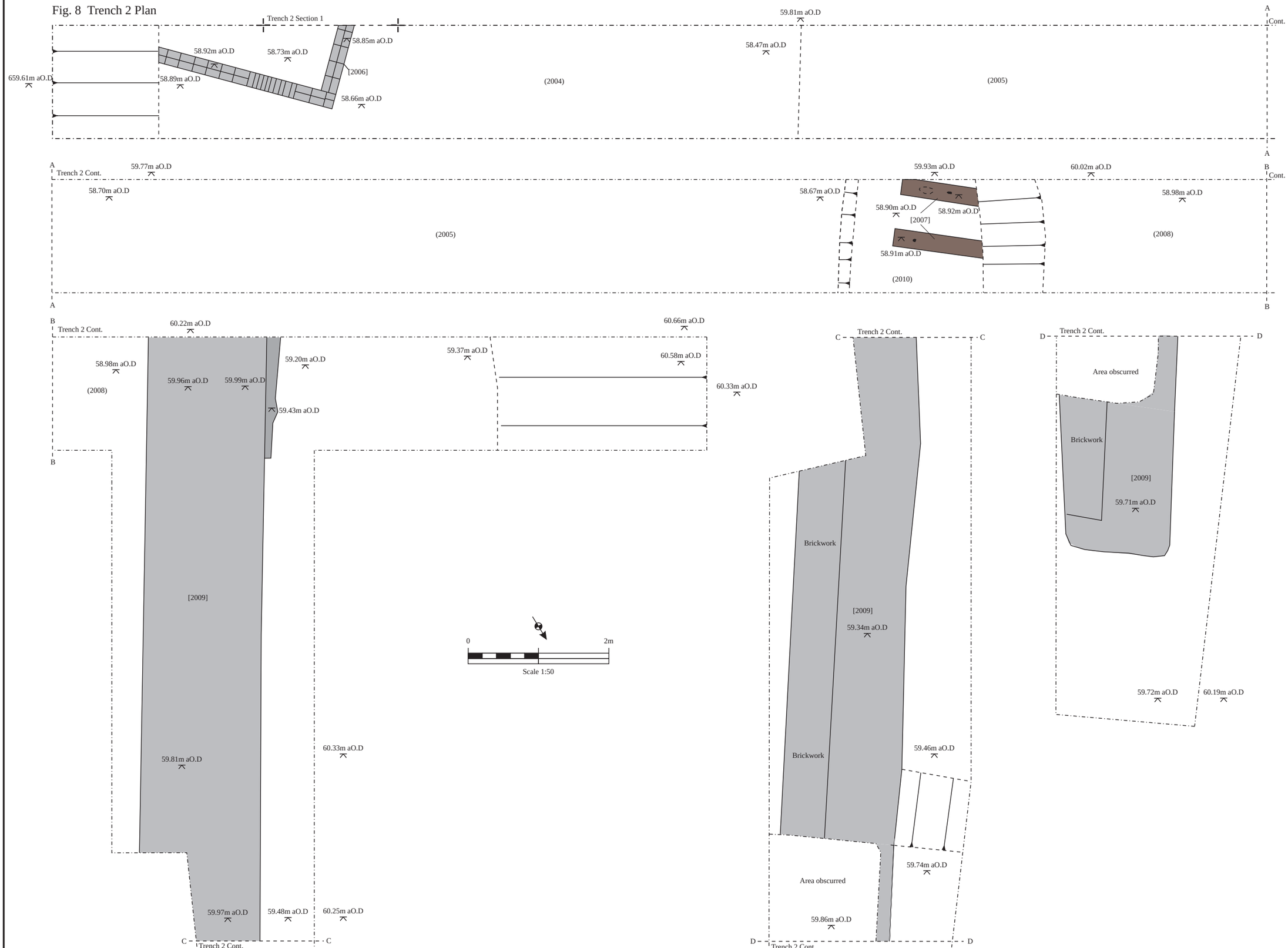

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Fig. 8 Trench 2 Plan

Scale: Plan 1: 50

Fig. 9 North Facing Section in Trench 2 Building [2006]

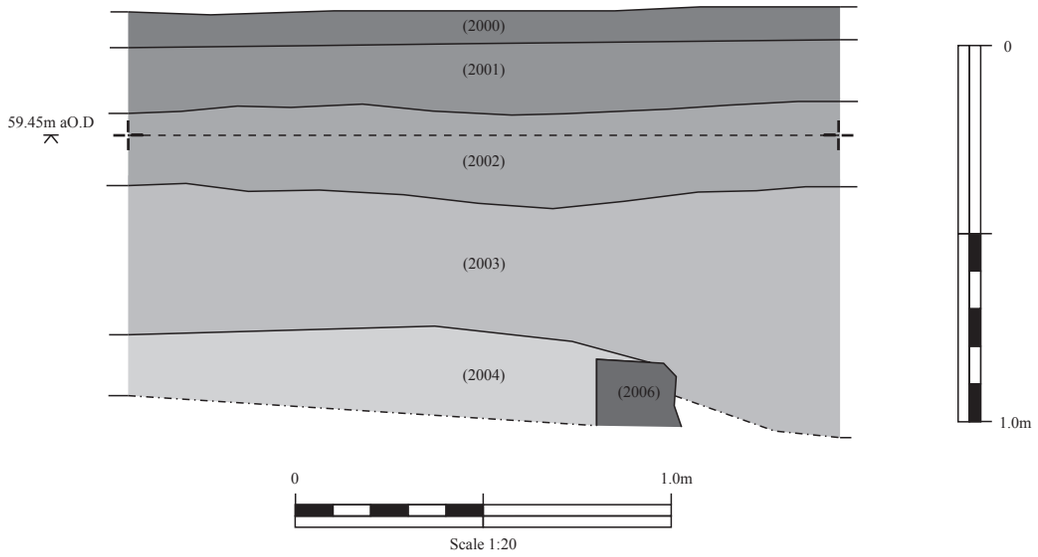

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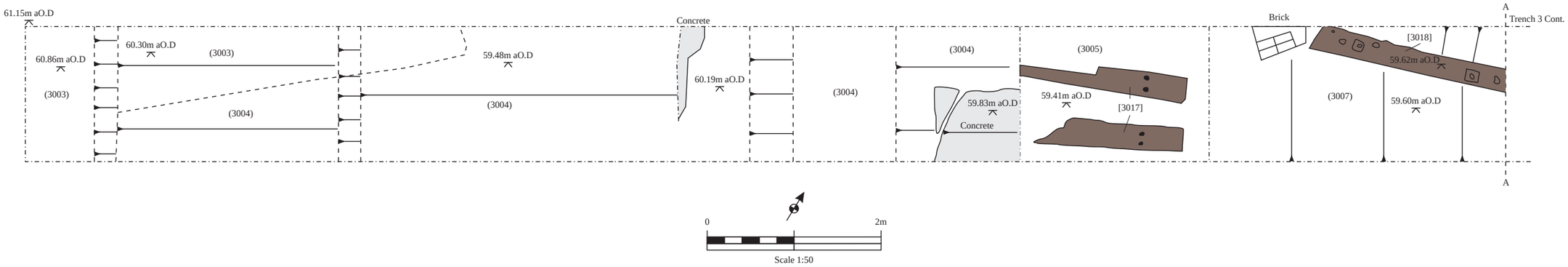
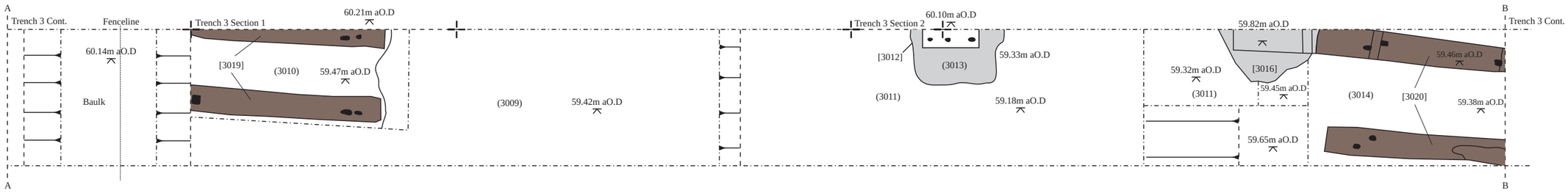
Fig. 9 Trench 2 Profile

Scale: Section 1: 20

Fig. 10: Trench 3 Plan





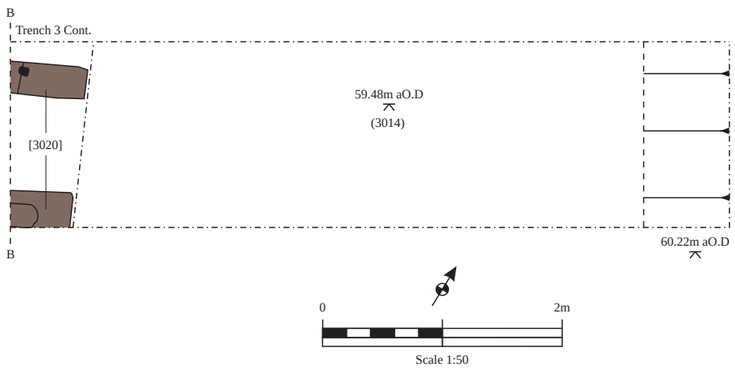


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Fig. 10 Trench 3 Plan

Scale: 1: 50

Fig.11 South Facing Section inTrench 3
Sleeper (3010) Section 1

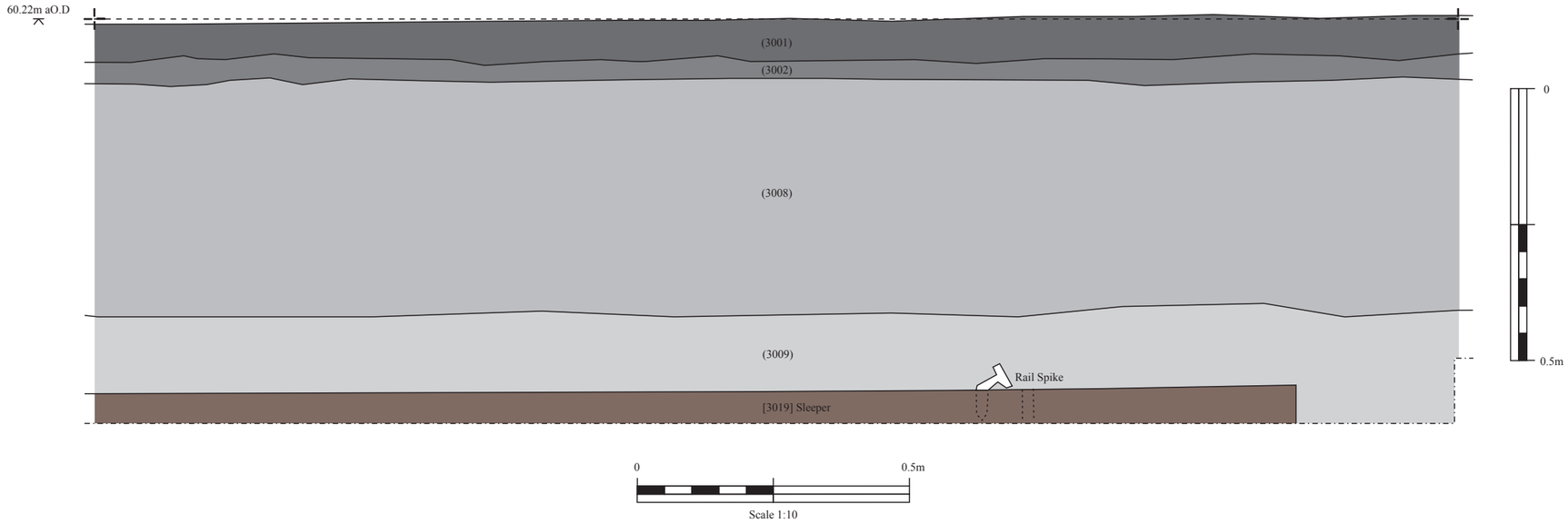

Fig. 12 South Facing Section in Trench 3
Features [3012] and [3013] Section 2

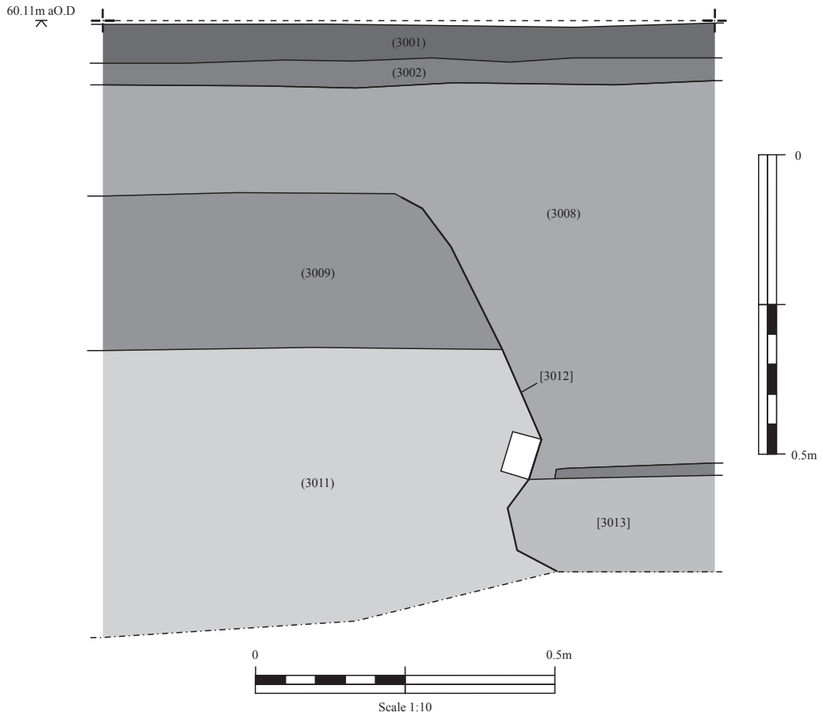

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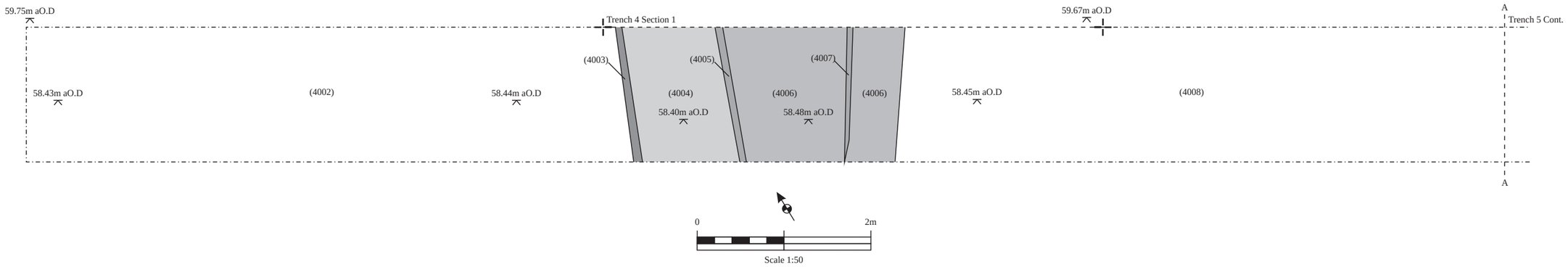
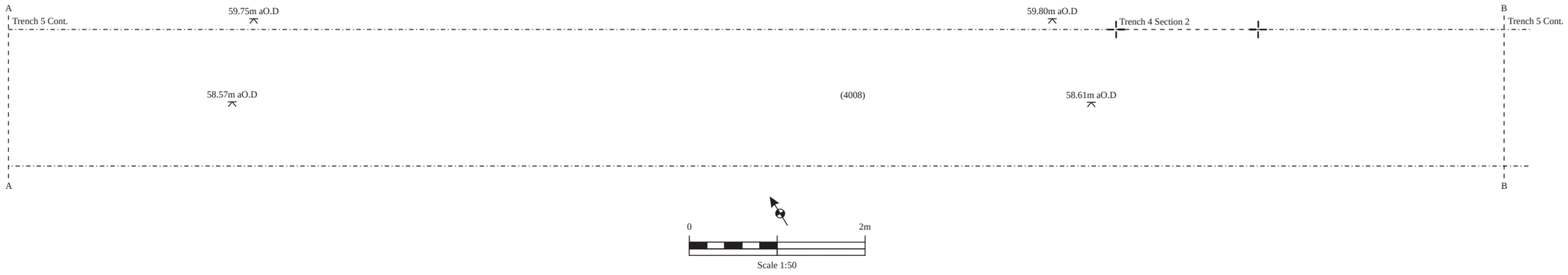
Fig. 11 & 12
Trench 3 Profiles

Scale: Section 1: 10

Fig. 13: Trench 4 Plan





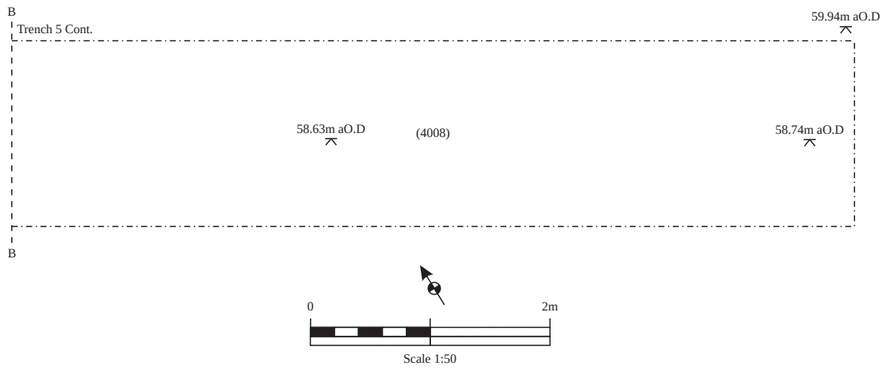


Fig.13 Trench 4 Plan

Scale: Plan 1: 50

Fig. 14: North Facing Section inTrench 4
Tiplines Section 1

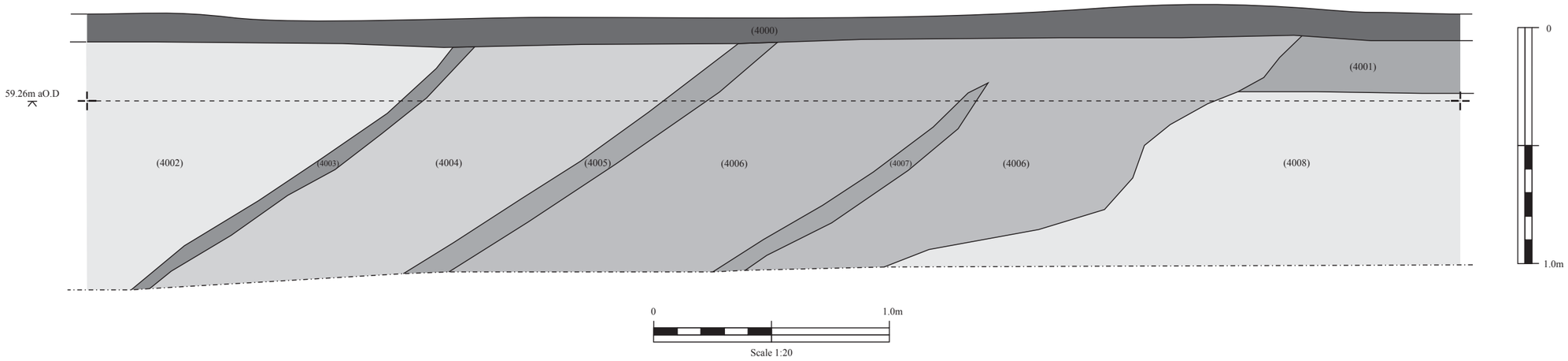


Fig. 15: North Facing Section inTrench 4
Section 2

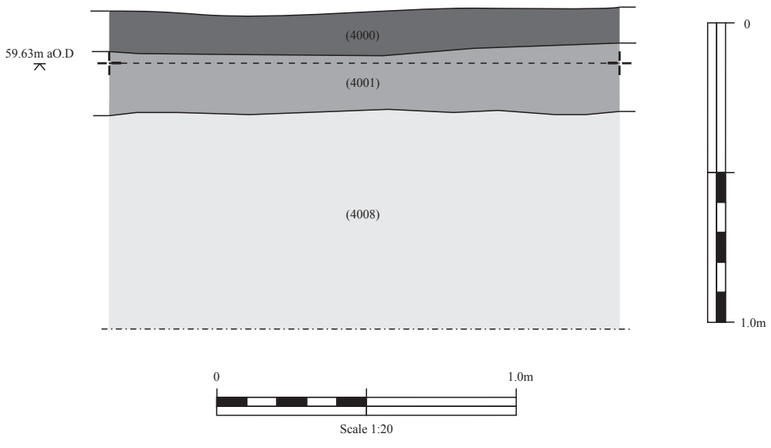


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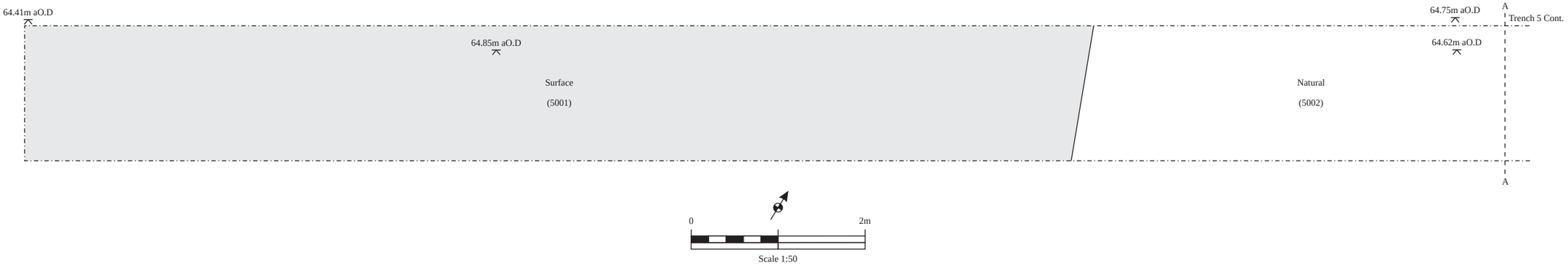
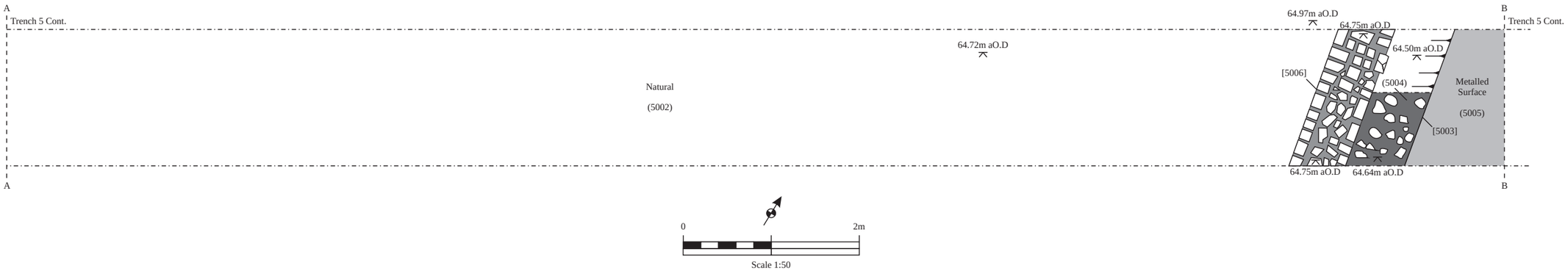
Fig. 14 & 15
Trench 4 Profiles

Scale: Section 1: 20

Fig. 16: Trench 5 Plan





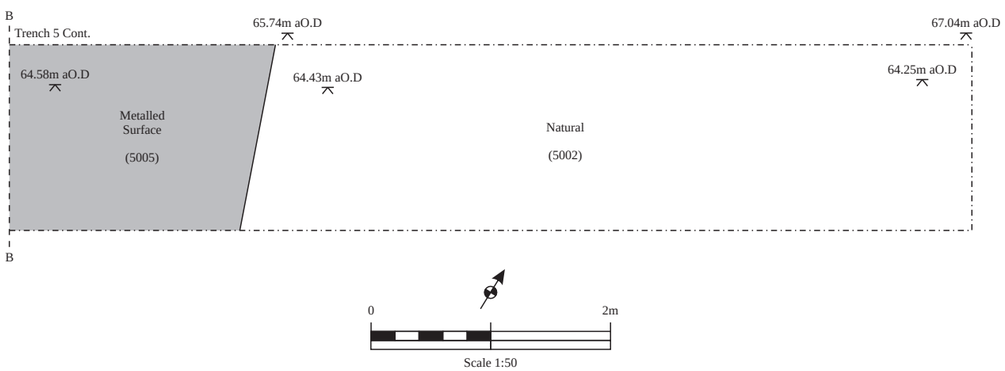


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Fig. 16 Trench 5 Plan

Scale: Plan 1: 50

Photo 1: Trench 1. West facing shot of trench during excavation, showing large quantity of brick rubble 1003.

Photo 2: Trench 1. North facing shot of the brick rubble (1003), with a section of the concrete floor 1005 visible bottom right. 1m & 2m scales.

Photo 3: Trench 1. Detail of the south facing section showing the brick rubble 1003. 1m & 2m scales.

Photo 4: Trench 1. East facing shot along the trench showing the deep soil deposit 1004. 1m & 2m scales.

Photo 5: Trench 2. WNW facing shot along the Trench. 1m & 2m scales.

Photo 6: Trench 2. ESE facing shot along the Trench, prior to its extension. 1m & 2m scales.

Photo 7: Trench 2. View SSW along wall 2009. The terminus is visible in the foreground, as is the brick rebuild along its eastern edge. 1m scales.

Photo 8: Trench 2. View SSW of the terminus of wall 2009. 1m scales.

Photo 9: Trench 2. View SSW of a section of wall 2009. 1m & 2m scales.

Photo 10: Trench 2. East (possible internal) face of wall 2009. 1m scales.

Photo 11: Trench 2. West (possible external) face of wall 2009. 1m scales.

Photo 12: Trench 2. View northeast of dumped deposits 2001 – 2005.

Photo 13: Trench 2. South facing shot of tramway sleepers 2007. 1m & 2m scales.

Photo 14: Trench 2. Tramwheel recovered from deposit 2004. 0.25m scale.

Photo 15: Trench 2. Southeast facing shot of brick structure 2006.

Photo 16: Trench 2. North facing shot of brick structure 2006 with overlying deposits. 1m & 2m scales.

Photo 17: Trench 3. View, facing northwest, along the trench. 1m & 2m scales.

Photo 18: Trench 3. View, facing southeast, along the trench during cleaning. In the foreground are the deep deposits of dumped material, with a large dislodged concrete block just above the scales. 1m & 2m scales.

Photo 19: Trench 3. Plan shot, facing northeast, of tramway sleepers 3017. 1m & 2m scales.

Photo 20: Trench 3. Northeast facing shot of dumped deposits above tramway sleepers 3017. 1m & 2m scales.

Photo 21: Trench 3. Northwest facing shot showing tramway sleeper 3018 at the bottom, and sleepers 3017 above. 1m & 2m scales.

Photo 22: Trench 3. Southwest facing section showing deposits overlying sleeper 3018. 1m & 2m scales.

Photo 23: Trench 3. Northeast facing shot of tramway sleepers 3019. 1m & 2m scales.

Photo 24: Trench 3. Southwest facing section showing deposits overlying tramway 3019. 1m & 2m scales.

Photo 25: Trench 3. Northwest facing shot of tramway sleepers 3020. 1m & 2m scales.

Photo 26: Trench 3. Southwest facing shot of tramway sleepers 3020, with overlying deposits visible. 1m & 2m scales.

Photo 27: Trench 3. Detail of rail impression and nails in tramway sleeper 3020. 1m scale.

Photo 28: Trench 3. Southwest facing section, showing general dumped deposits that overlie the various sleepers, plus the later inserted concrete pad 3012 on the left. 1m & 2m scales.

Photo 29: Trench 4. View northwest along the trench showing dumped deposits. 2m & 1m scale.

Photo 30: Trench 4. View southeast along the trench. 2m & 1m scale.

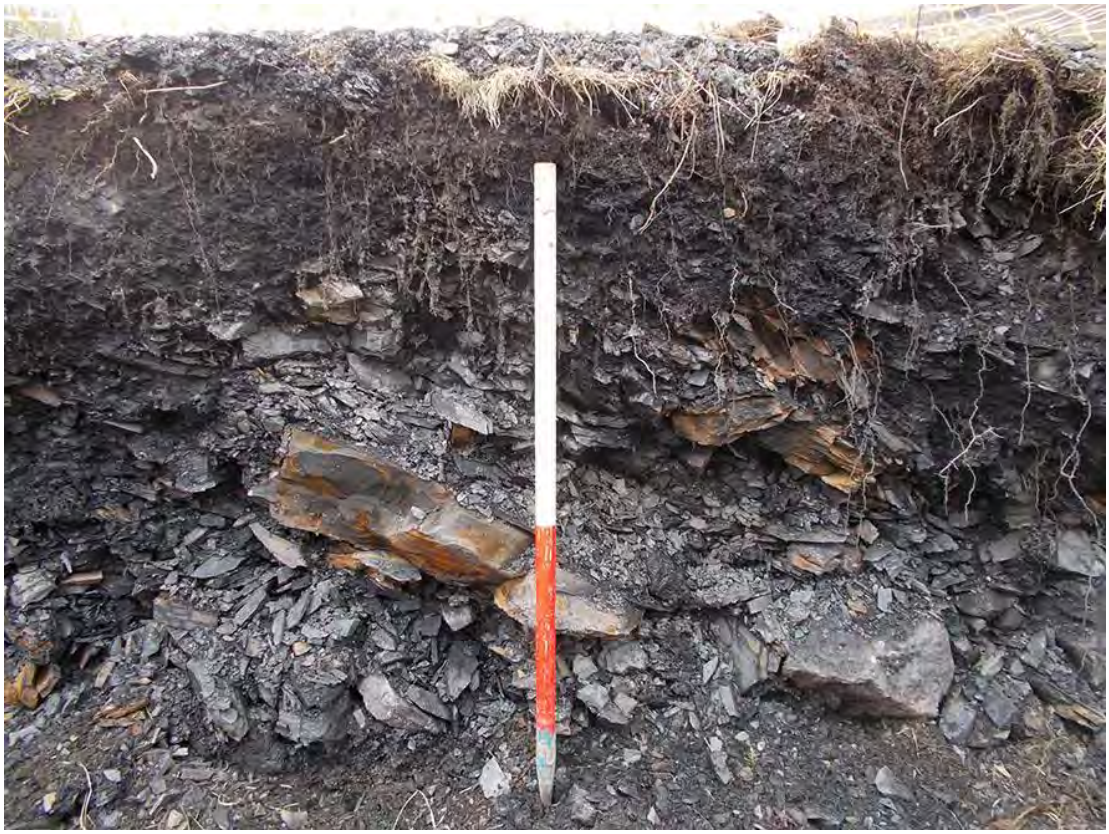

Photo 31: Trench 4. Part of the southwest facing section, showing redeposited bedrock and tip lines. 1m scale.

Photo 32: Trench 4. Part of the northeast facing section showing dumped deposits and tip lines. 2m & 1m scale.

Photo 33: Trench 5. West facing shot of the western end of the trench, showing compact deposit 5001. 2m & 1m scales.

Photo 34: Trench 5. North facing shot of wall 5003 with adjacent gully, or foundation cut fill 5005, and dark red ash bedding deposit 5006. 1m scale.

Photo 35: Trench 5. South facing shot of gully/construction cut 5004, with infill 5005. Wall 5003 lies on the right. 1m scale

Photo 36: Glass codd-bottle, late 19th century in date. Found within deposit 2000.

Photo 37: Glass bottle, marked ‘Thomas & son, Ystalyfera’, 20th century date but not dated closely. Found within deposit 2002.

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APPENDIX I:
Context descriptions

Context Descriptions

Context Number	Context Type	Description	Dimensions (Length x width x thickness)
Trench 1			
1000	-	• Context no. not used	
1001	Layer	• Topsoil • Loose, mid to dark grey clayey-silt with common medium to large brick and concrete building rubble	20m x 2m (extends beyond trench limits) x 0.10m
1002	Layer	• Dumped deposit • Moderate to loose, mid to dark grey clayey-silt with moderate medium-large sub-angular stone inclusions and concrete building rubble.	20m x 2m (extends beyond trench limits) x 0.10m
1003	Layer	• Demolished building/building rubble • Moderate, silty-gravel/cinder matrix for brick rubble • Bricks still set in concrete mortar.	5.5m x 2m (extends beyond width of trench) x 1.3m
1004	Layer	• Redeposited topsoil • Moderate, dark grey-brown clayey-silt, with common concrete and brick rubble and common vegetation and tree saplings.	10m x 2m (extends beyond trench limits) x 1.1m (full depth not established)
1005	Structure	• Floor • Compact concrete floor surface • Level, truncated on all edges, otherwise featureless	1.4m x 2m (extends beyond width of trench)
1006	Layer	• Levelling deposit for floor 1005 • Fairly Compact, very dark silty-gravel with frequent small angular brick and stone inclusions	3m x 2m (extends beyond width of trench)
Trench 2			
2000	Layer	• Topsoil • Moderate, dark brown silty-clay with common medium to large brick and concrete building rubble and sub-angular stone inclusions • Contained late 19th century glass bottle	48m x 1.7m (extends beyond trench limits) x 0.1m
2001	Layer	• Dumped deposit/redeposited natural • Fairly compact, mid-dark yellow, silty-clay with common medium-large sub-angular stone inclusions	30m x 1.7m (extends beyond width of trench) x 0.24m

2002	Layer	• Dumped deposit • Moderate, dark grey, silty-sand with very abundant medium-large angular shale fragments • Contained one complete 20th century glass bottle, fragment of 20th century glass, 20th century ceramic power insulator	22m x 1.7m (extends beyond width of trench) x 0.2m
2003	Layer	• Dumped deposit • Moderate, dark grey-black, fine sooty-gravel deposit	31m x 1.7m (extends beyond width of trench). Full depth not established
2004	Layer	• Dumped deposit • Loose, light-mid grey, silty-sand with abundant medium-large angular shale fragments • Contained late 19th/early 20th century iron tramwheel and partial axle, fragment of iron tram rail.	15m x 1.7m (extends beyond width of trench)
2005	Layer	• Dumped deposit • Loose, light red, gritty ash/foundry waste • Occasional fragments of iron slag amongst general foundry waste	12m x 1.7m (extends beyond width of trench)
2006	Structure	• Brick-built wall, corner section • Wall 2-bricks thick, firmly bonded in cement mortar, flush with vertical face • Walls orientated SE-NW and NE-SW • Bricks stamped 'Cynghordy'	2.6m x 0.22m NW-SE, 1.25m x 0.22m SW-NE
2007	Structure	• Timber tramway sleepers • Two wooden sleepers, sawn. Iron nail, bent, at end. Each sleeper aligned SE-NW, implying the tramway ran NE-SW. • Rails not in situ	Each sleeper 0.3m wide, 0.1m thick
2008	Layer	• Building rubble • Loose, mid-light grey silty sand with very abundant medium large blocks of concrete and sub angular stone, and rare fragments of ironwork	5.4m x 1.7m (extends beyond width of trench), 0.6m
2009	Structure	• Stone & brick wall • Wall, built of roughly squared and unworked grey stone facing NW side, bonded in a light grey lime mortar, 2-3 courses high above foundations. Roughly dressed stone mortared stone	19.5m, 1.5m, 0.4m deep on NW side, 1m deep on SE side (base not reached)

		faces the SE side towards the SW end of the wall, random courses to a greater depth than visible on the NW side, contains a possible beam slot. Further to the NE the SE face is rebuilt in brickwork (unmarked). • Interior consisted of unworked stone set in a firm lime mortar. • Wall orientated SW - NE	
2010	Layer	• Bedding deposit for 2007 • Fairly compact, dark grey-black, gritty ash with abundant small fragments of crushed coal	2.03m x 1.7m (extends beyond width of trench)
Trench 3			
3000	-	• Context no. not used	
3001	Layer	• Topsoil • Moderate, dark brown silty-clay with common medium to large brick and concrete building rubble and sub-angular stone inclusions • Contained complete mid/late 20th century glass bottle	40m x 1.7m (extends beyond trench limits) x 0.2m
3002	Layer	• Dumped deposit • Fairly compact, dark brown-black, silty-clay with abundant medium sub-angular stone and brick inclusions	40m x 1.7m (extends beyond trench limits) x 0.2m
3003	Layer	• Dumped deposit • Loose, dark grey clinker with abundant medium – large sub angular shale inclusions	6m x 1.7m (extends beyond trench limits) x 1.5m (base not reached)
3004	Layer	• Dumped deposit • Fairly compact, dark grey-black clayey-cinder/ash with frequent small – medium sub angular stone inclusions and lenses of orange-brown silty-gravel, and rare blocks of concrete, some very large (0.85m x 0.6m x 0.2m)	11.7m x 1.7m (extends beyond width of trench) x 1.3m (base not reached)
3005	Layer	• Bedding for tramway 3017 • Fairly compact, very dark grey-black cinder with frequent small sub-angular stone and fragmented coal inclusions	6.3m x 1.7m (extends beyond width of trench)
3006	Layer	• Dumped deposit • Fairly compact, dark grey silty-clay cinder with frequent large sub angular	6.3m x 1.7m (extends beyond limits exposed) x 0.7m

		stone inclusions and rare medium brick fragments	
3007	Layer	• Bedding for tramway 3018 • Fairly compact, very dark grey sandy silt with very frequent small fragments of crushed coal and common small – medium sun angular stone inclusions	3.4m x 1.7m (extends beyond width of trench)
3008	Layer	• Dumped deposit • Fairly compact, dark grey silty-clay cinder with frequent large sub angular stone inclusions and rare medium brick fragments	20.7m x 1.7m (extends beyond width of trench) x 0.45m
3009	Layer	• Dumped deposit/Levelling deposit • Fairly compact, dark grey – black fine silty-gravel including dark red-brown cinder lenses	Length x 1.7m (extends beyond width of trench) x 0.15m
3010	Layer	• Bedding for tramway 3019 • Fairly compact, dark grey – black fine cinder with frequent small fragments of crushed coal and rare small – medium sub-angular stone inclusions	2.1m x 1.7m (extends beyond width of trench)
3011	Layer	• Levelling deposit • Loose, mid red-brown silty-gravel with frequent small – medium sub-angular stone inclusions and rare small – medium fragments of iron slag	6m x 1.7m (extends beyond area exposed) x 0.4m (base not reached)
3012	Cut	• Cut for concrete pad 3013 • Sub-square in plan with rounded corners (although only partially exposed in trench), sides were steep, straight to slightly concave, with a moderate break of slope on to a flat, irregular base • Contained concrete pad 3013, infilled above by layer 3008	1.2m x 0.6m (full width not established) x 0.4m
3013	Structure	• Concrete pad • Roughly square concrete pad, formed by poured concrete into a roughly square cut (3012) • Flat iron plate laid into the surface	1.2m x 0.6m (full width not exposed) x 0.18m
3014	Layer	• Bedding for tramway 3020 • Fairly compact, mid grey fine cinder with frequent small fragments of crushed coal and rare small – medium sub-angular stone inclusions	2.86m x 1.7m (extends beyond width of trench)
3015	-	• Context no. not used	

3016	Structure	• Concrete plinth • In situ concrete block, partially exposed suggesting sub-rectangular in plan with rounded corners. Flat base, steep tapering east and west edges, vertical faced southern edge, onto a rounded upper surface. Bricks visible within the concrete on the eastern side	0.5m (full length not exposed) x 1m x 0.3m
3017	Structure	• Timber tramway sleepers • Two wooden sleepers, sawn. Each sleeper has two iron pins set 0.55m in from their western end. Sleeper set 0.35m apart. • Each sleeper aligned SE-NW, implying the tramway ran NE-SW. • Rails not in situ	Northernmost sleeper 2m (full length not exposed) x 0.3m Southernmost sleeper 1.7m (full length not exposed) x 0.3m
3018	Structure	• Timber tramway sleeper • One wooden sleepers, sawn. Iron nail, set centrally, 0.15m from either end. Hole set 0.3m from SE end. • Sleeper aligned SE-NW, implying the tramway ran NE-SW. • Rails not in situ	2.3m x 0.25m
3019	Structure	• Timber tramway sleepers • Two wooden sleepers, sawn. Iron nail, bent, at end. Pair of iron pins in each sleeper, 0.55m from the SE end on the northernmost sleeper, 0.4m from the SE end on the southernmost sleeper. Sleepers set 0.65m apart. • Each sleeper aligned SE-NW, implying the tramway ran NE-SW. • Rails not in situ	Each sleeper 2.1m (full length not exposed) x 0.55m
3020	Structure	• Timber tramway sleepers • Two wooden sleepers, sawn. Northernmost had pair of iron pins at either end set 0.4m to 0.5m from the end, with rail indentation visible in between. • Each sleeper aligned SE-NW, implying the tramway ran NE-SW. • Rails not in situ	Each sleeper 2.8m x 0.55m

Trench 4

4001	Layer	• Topsoil • Loose, dark brown-black, silty-clay with rare small – medium coal fragments, rare small – medium sub-angular stone inclusions and ashy deposits	41.2m x 1.7m x 0.15m
4001	Layer	• Dumped deposit • Fairly compact, dark grey-black, sandy-silt with very abundant medium to large sub-angular shale fragments	29.6m x 1.7m (extends beyond width of trench) x 0.24m
4002	Layer	• Dumped deposit • Loose, dark grey-black, sandy-silt with abundant medium sub-angular shale fragments.	6.88 x 1.7m (extends beyond width of trench x 0.7m (full depth not established)
4003	Layer	• Dumped deposit • Loose, light grey, clayey-sand with very abundant medium crushed shale fragments	1.4m x 1.7m (extends beyond width of trench x 0.1m
4004	Layer	• Dumped deposit • Loose, light brown silty-ash deposit with very abundant fragments of crushed coal	2.5m x 1.7m (extends beyond width of trench x 0.55m
4005	Layer	• Dumped deposit • Loose, light grey, sand with very abundant small to medium crushed shale fragments	1.6m x 1.7m (extends beyond width of trench x 0.1m
4006	Layer	• Dumped deposit • Loose, black fine grained crushed coal and ash	3.6m x 1.7m (extends beyond width of trench x 1.1m
4007	Layer	• Dumped deposit • Loose, dark grey-black, sandy gravel with very abundant inclusions of small – medium coal fragments	1.6m x 1.7m (extends beyond width of trench x 0.08m
4008	Layer	• Dumped deposit • Loose, dark grey-black, sandy-silt with abundant medium sub-angular shale fragments.	31.1m x 1.7m (extends beyond width of trench x 0.7m (full depth not established)

Trench 5			
5000	Layer	• Topsoil • Loose, dark brown-grey, clayey-silt with common small – medium sub-angular stone inclusions and rare small – medium brick fragments	42m x 2m (extends beyond trench) x 0.12m
5001	Layer	• Compacted surface • Compact, mid grey silty-clay with common small angular stone inclusions and fragments of brick	13m x 2m (extends beyond width of trench)
5002	Layer	• Subsoil • Fairly compact, light brown-yellow sandy-clay with rare small – medium sub-angular stone inclusions	19.6m x extends beyond width of trench)
5003	Cut	• Gully/construction cut for 5003 • Linear (orientated N-S), shallow concave SE side, with a gentle break of slope on to a concave base. NW edge not exposed	1.6m x 0.6m (from edge up to wall 5003, 1.25m including wall) x 0.1m
5004	Fill	• Fill of cut 5004 • Fairly compact, dark grey silty-clay with abundant medium – large sub-angular stone and brick fragments	1.6m x 0.6m x 0.1m
5005	Layer	• Possible metalled surface • Fairly compact, dark red ash & fine clinker with rare small angular stone inclusions	1.7m (extends beyond trench) x 2.65m
5006	Structure	• Stone & brick wall • Linear (orientated N-S), built of mixed full and half bricks and roughly squared stone set in a firm grey lime mortar. Roughly faced on both sides, exposed surface was flat	1.67m (extends beyond trench limits) x 0.63m

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APPENDIX II:
Finds Register

Finds Register

Find No.	Context	Material	Provisional Date	Description
1	2002	Glass	20th century	Glass bottle, complete, 210mm high, 60mm diameter. Cylindrical body with sloping shoulder, transparent pale blue/green glass. Marked on the side as 'Thomas & son, Ystalyfera'; on the base as 'T&S, RL4'
2	2002	Glass	20th century	Glass fragment, partial base 55mm across, partial side 60mm high. Appears cylindrical, transparent dark green glass. Marked on the base as 'B & Co. (?), A5137'
3	2002	Ceramic	20th century	Cylindrical white-glazed earthenware electrical cable insulator.
4	2000	Glass	Late 19th century	Glass 'codd' bottle, broken neck, 170mm high, 57mm diameter. Cylindrical body, pinched neck with area of marble stopper broken. Transparent, pale green glass. Marked on one side with 'Thomas, Niagara Waters, Swansea, Neath and Llanelly' and on the reverse with '1/4d deposit charged on this bottle, J. W. Dobson Ltd, Maker, Barnsley'.
5	2004	Ironwork	Early 20th century	Circular iron tramwheel, solid iron with 7 curved iron spokes. Tramwheel 430mm in diameter, 80mm thick. Partial axle attached, solid cylindrical iron bar 700mm long, 50mm diameter.
6	2004	Ironwork	Early 20th century	Solid iron rail fragment. 300mm long, 75mm wide at the base, 35mm wide at the top of the rail.
7	3001	Glass	Late 20th century	Glass 1 pint milk bottle, 215mm high, 72mm diameter. Cylindrical, clear glass. Marked 'CWS' on the front and 'pasteurised milk' on the reverse, '1 3/7' on the base.
8	2009	Brick	Late 19th/20th century	Solid light-orange brick, rectangular frog on one side. Unmarked. 228mm x 110mm, 70mm thick.
9	3002	Brick	20th century	Solid mid reddish-orange rectangular brick. Frog on one side with curved ends, marked 'Cwmgors' within the frog. Slight rectangular indentation/frog on the reverse.

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APPENDIX III:
Written Scheme of Investigation

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Written Scheme of Investigation

For an Archaeological Evaluation on land south of the former GMF Factory, Ystalyfera, Swansea

Prepared for:

Jenard (Ystalyfera) Ltd

Project No: 2223

Date: 14th March 2014

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LAND SOUTH OF FORMER GMF FACTORY, YSTALYFERA, NEATH – PORT TALBOT

WRITTEN SCHEME OF INVESTIGATION FOR ARCHAEOLOGICAL FIELD EVALUATION

NON TECHNICAL SUMMARY

This Written Scheme of Investigation (WSI) incorporates a previously submitted and approved WSI, which has been modified to incorporate the methodologies, resources and timetable of Archaeology Wales Ltd who have been contracted by Jenard (Ysatalyfera) Ltd to undertake an archaeological evaluation on land to the south of the former GMF Factory, Ystalyfera. This WSI outlines the history of and previous archaeological work undertaken on the proposed development site, and proposes a programme of intrusive archaeological trial trench evaluation designed to investigate features of potential significance. This document has been produced by Archaeology Wales Ltd for Jenard (Ystalyfera) Ltd.

1 INTRODUCTION

1.1 This written scheme of investigation (WSI) for evaluation has been prepared by Archaeology Wales Ltd (AW) in response to a request from Mr Stephen Jones of D S Jones & Co, on behalf of Jenard (Ystalyfera) Limited, for a proposed residential development site on land to the south of the former GMF Factory, Ystalyfera, Neath − Port Talbot. The results of the evaluation will be needed to inform a decision on the planning application for 'Residential Development of 121 Units: GMF Motor Factory, Ystalyfera' (Planning Application No. P2013/0737; NGR SN 7636 0813; Figure 1).

1.2 DAT Archaeological Services (formerly Dyfed Archaeological Trust Field Services) undertook an archaeological desk-based assessment of this proposed residential development site (Poucher 2012). The information was submitted with the initial planning application. The desk-based assessment demonstrated that the site area had high archaeological potential, covering the southern part of the Ystalyfera Iron and Tinplate works, a very important industrial site during the 19th century and reason behind the development of the settlement of Ystalyfera.

1.3 Following advice from Glamorgan Gwent Archaeological Trust (GGAT), acting as archaeological advisors to Neath - Port Talbot County Borough Council, a requirement has been made for an archaeological evaluation of the site area prior to a decision being made on planning permission. The results of the evaluation will be used to obtain more information on the archaeological remains identified in the desk-based assessment, and determine their presence, extent, significance, state of preservation and date. This will enable an informed archaeological decision to be made on any forthcoming planning application for the development.

1.4 This requirement follows national policy, specifically Welsh Office Circular 60/96, Section 3 which states: '*where research indicates that important archaeological remains may exist, the planning authority should request the prospective developer to arrange for an archaeological field evaluation to be carried out before any decision on the planning application is taken.*'

1.5 The proposed residential development site lies to the southwest of the town of Ystalyfera in the Swansea (Tawe) valley. It consists of an irregularly shaped plot of land some 3.38 Ha in area (Figures 1 − 3). It is bordered by the former GMF Motor Factors buildings to the northeast, the A4087 to the southeast, the grounds of Godre'r-Graig Workingmen's Club to the southwest, and the footpath beside the Swansea Canal to the west.

The river Tawe lies a short distance to the east.

1.6 The site is located within the anthracite coalfield, the geology of which comprise the Lower Coal Measures of the Carboniferous period. The soils around the development area consist of well-drained loamy soils, fine loamy soils subject to slight seasonal water logging and river alluvium.

1.7 This document provides a WSI for field evaluation. No brief was requested from GGAT and this document is to be used in lieu of such a brief. The scope of the proposed works will need to be approved by GGAT and the local planning authority prior to any agreed scheme of evaluation being implemented.

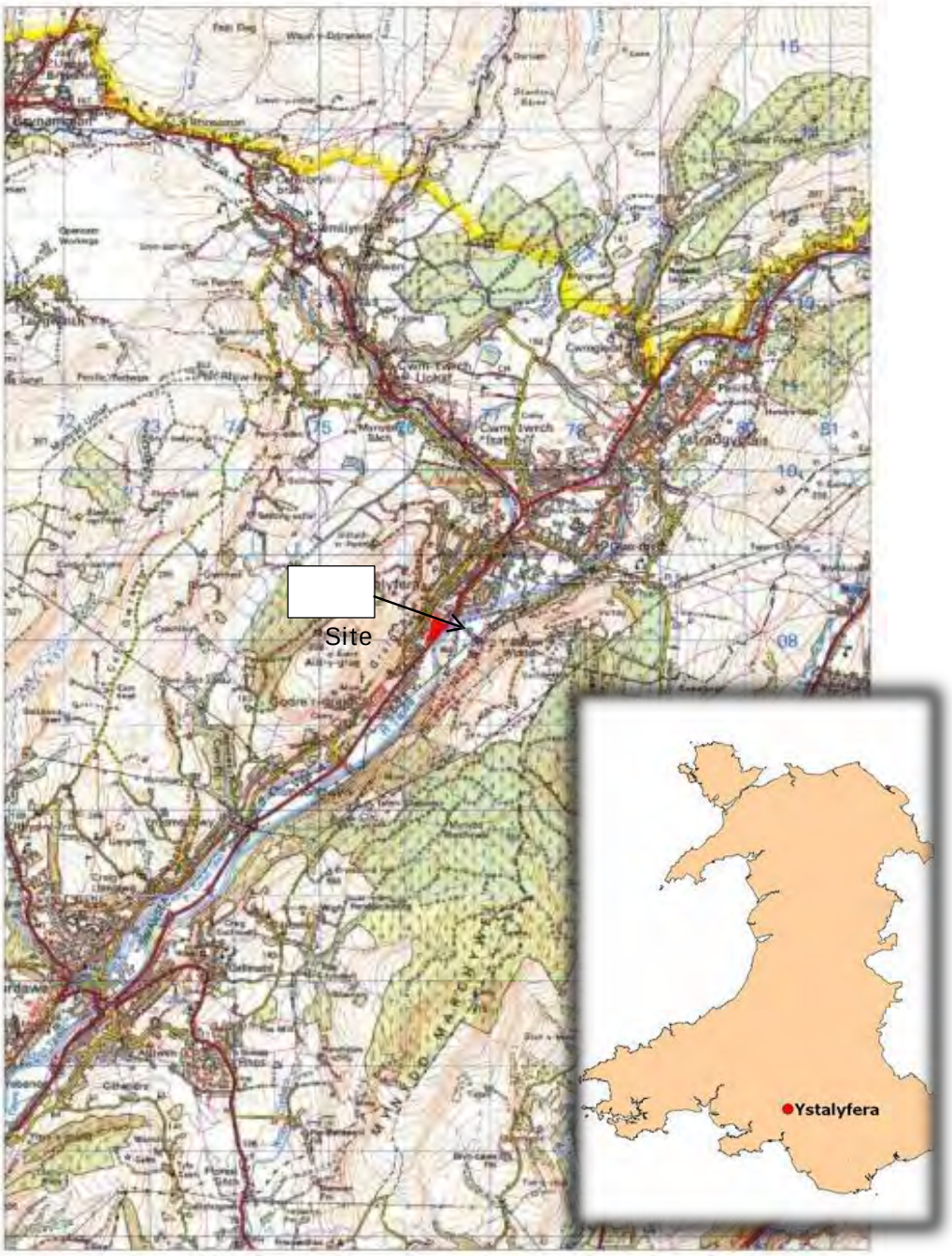

Figure 1: Location map based on the Ordnance Survey.
Reproduced from the 1987 Ordnance Survey 1:50,000 scale Landranger Map. *The Ordnance Survey has granted Archaeology Wales Ltd a Copyright Licence (No. 100055111) to reproduce map information; Copyright remains otherwise with the Ordnance Survey*.

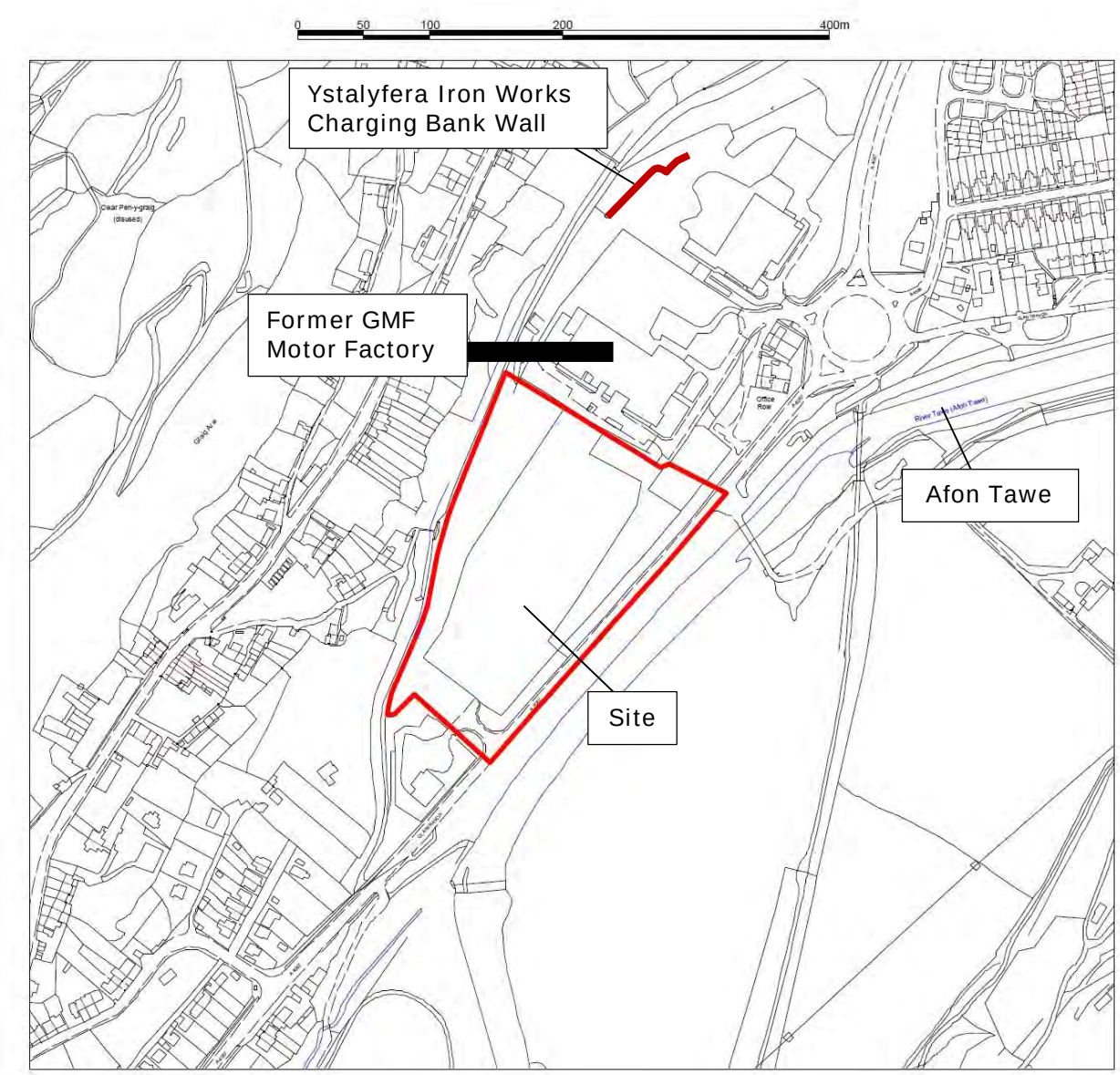

Figure 2: Proposed Residential Development Area on Ordnance Survey base map, pre-dating the construction of the new ASDA store to the north

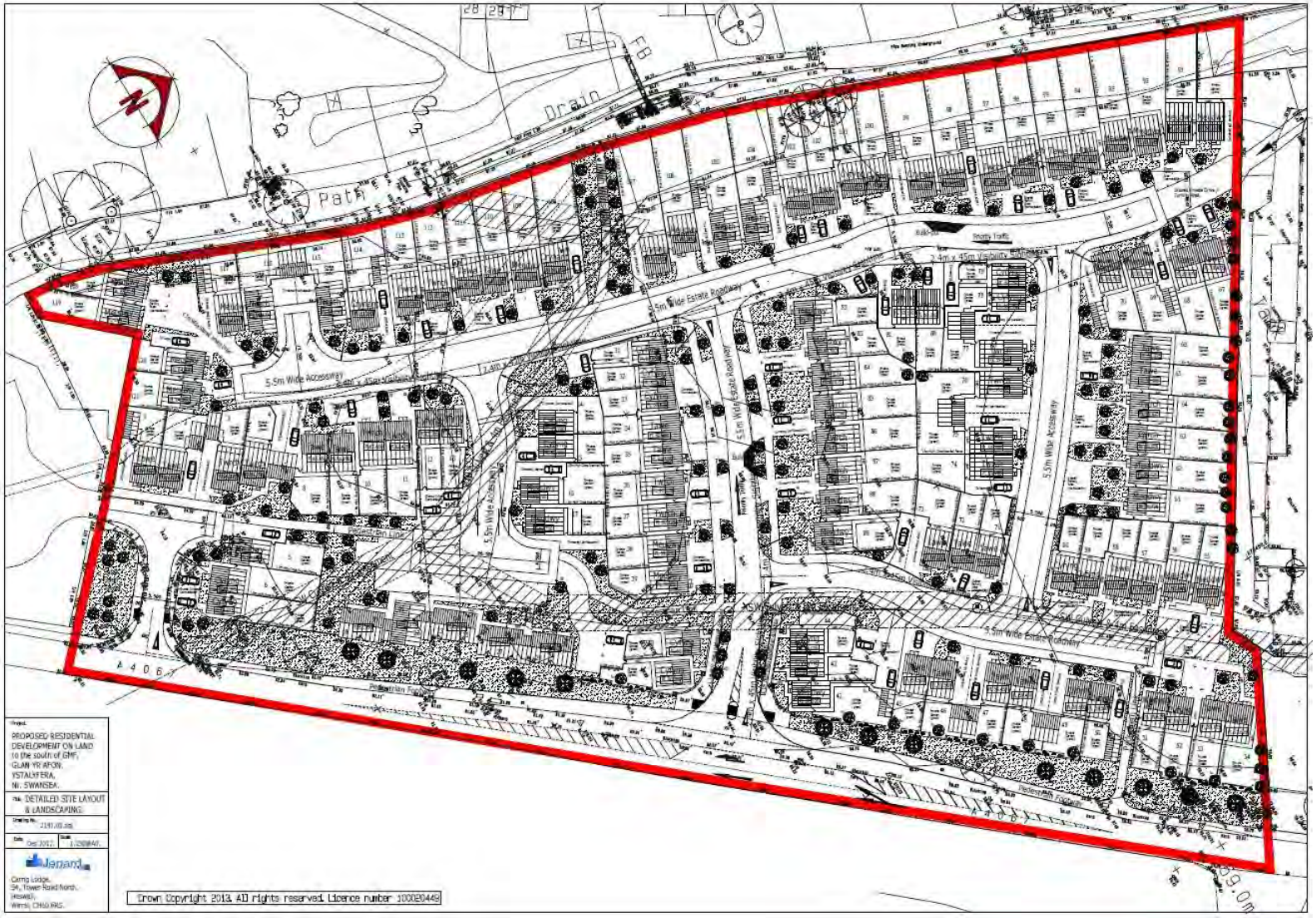

Figure 3: Detailed layout of residential development proposals (as per planning permission submission)

2. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

2.1 The following section is taken from the information included in the 'Southeast Wales Iron Industry Landscapes' (Roberts 2005) on the Ystalyfera Iron and Tinplate Works.

IW Number 029 Ystalyfera Ironworks (01207w) SN 76450 08300

General Description

The Ystalyfera Ironworks (NPRN: 34,126; PRN: 01207w), typical of a type fuelled by locally available anthracite coal, which diversified into the area of tinplate production, is a mid-19th century ironworks of some historical significance. During the 1840s and 1850s the Tinplate works with between 12 and 16 mills was considered to be the largest in the world and the works' bank of 11 blast-furnaces was second only to that at Dowlais. After the reduced number of furnaces were taken out of blast in 1885, the tinplate works continued production until 1946, when the buildings were finally demolished. Unfortunately much of the site was subsequently cleared and redeveloped and now little remains to indicate the importance and scale of the original works.

*Cartographic evidence shows continuing alteration to the ironworks site between the first, second and third editions: many of the ironworks features depicted on the first edition 1: 2500 OS map (*Figure 2*), had been cleared by the survey of the third edition. The area has today almost been entirely cleared of above ground remains; aerial photographs indicate much of the site was redeveloped by the late 1960s, after which single-storey factory units were constructed on the site. The massive stone wall of the charging bank survives west of the recent development and fragmentary remains of furnace sites also appear to survive: a blast furnace platform (PRN: 01207w) surviving adjacent to the canal at SN 764 084 noted in 1981 was noted during the field visit. Buried remains associated with the other furnace sites within the northern half of the site and within the narrow strip of land adjacent to the canal, might also survive. Thick vegetation was found to obscure much of this area during the field visit, however, and the exact condition of these features was not established. Much of the ironworks area was reclaimed from the river valley of the Tawe by the construction of impressive slag banks; these remain in situ.*

The first edition 1: 25000 OS map depicts various features including the single anthracite furnace (PRN: 01207w) of 1838 at SN 764 084, a further possible furnace site to the south at SO 76369 08297, and the extensive bank of furnaces, constructed during the 1840s and 50s at SN 76491 08413. Also depicted are three kilns adjacent to the main furnace bank at SN 76463 08408, two offices (SN 76495 08352 and SN 76570 08314), the extensive tinplate works (SN 76410 08196) in addition to an internal works railway/tramroad and an associated brickworks with adjacent shaft and old pit at the northeast end of the site (SN 76701 08638). The brickworks site is now a leisure facility of tennis courts and playgrounds.

Historical Background

The Ystalyfera Ironworks dates from 1838 when a single anthracite fired furnace was built by Benjamin Treacher and Evan James of Swansea. In the following year the works was sold to Brancker & Co., which consisted of Sir Thomas Brancker, JJ Hogan of Liverpool and Edward Budd of Swansea. The change of ownership seems to have led to additional investment at Ystalyfera, for a second furnace was under construction in

1839. It is probable that a 24in. Neath Abbey blowing engine was purchased at that time. Furnaces were periodically added to the works and in 1845 a 52½in. beam blowing engine was purchased from the Neath Abbey Iron Company.

Later by 1846, when under the ownership of James Palmer Budd the works was enlarged to contain six blast furnaces and diversified with the addition of a tinplate works. Expansion of the site to twelve mills twelve years later, the tinplate works claimed to be the largest in the world.

Budd also experimented with new iron producing techniques during the period, perfecting the use of waste gases generated in the furnaces to heat the air blast from the blowing engines. In 1848 improvements were made to the furnaces and production of each furnace at Ystalyfera increased to between 50 to 60 tons of iron each week: the six furnaces were linked by arches upon which five hot blast stoves were constructed.

Expansion of the works continued with Ystalyfera possessing ten furnaces during the 1850s although in 1854 only seven were in blast. During the 1860s the Ystalyfera Ironworks was able to keep six furnaces in production and in 1872 the concern boasted forty-two puddling furnaces and sixteen mills. The presence of puddling furnaces obviously indicates the use of bituminous coals at the works.

There was a gradual decline in the fortunes of the Ystalyfera Iron Company from the mid 1870s with only four furnaces in blast in 1877 and the men only working two weeks out of three.

Following the retirement of Budd in 1880 and withdrawal of financial support in 1883, the Ystalyfera Ironworks closed in 1885. A 16 mill tinplate works continued in production until after World War II, the buildings being demolished in 1946 (Hughes and Reynolds 1988, p 17; Ince 1993, pp 162-163).

2.2 The historical background for this specific site area was discussed within the previous desk-based assessment (Poucher 2012), and is summarised below. Of most note within the proposed residential development area is the industrial development of the site area from the later 18th century onwards.

2.3 Between 1794 and 1798 the 16 mile long Swansea canal (GGAT HER Reference PRN 1046w) was constructed, which ran through Ystalyfera, and the remains of which form much of the north-western boundary of the proposed development site. Despite the presence of the canal, Ystalyfera itself remained an agricultural landscape of dispersed farms, small fields and wooded hill slopes until the late 1830s, as shown on the Tithe map of the area from 1838. Mush of the development area was wooded at that time, although had already been bought by the Ystalyfera Company in readiness for the construction of an Iron Works.

2.4 The development of the Ystalyfera Iron Works started in 1838, in the area north of the proposed residential site. The Iron Works site expanded throughout the 19th century especially once it was bought and managed by James Palmer Budd. The site contained 6 blast furnace by 1848 and 12 by 1858, set up in front of the impressive charging bank wall that can still be seen immediately north of the former GMF factory building. He also diversified into tinplate manufacture, one of the first such sites to combine ironworking and tinplate manufacture at the same site. By 1848 this had grown to include 12 rolling mills (Ince 1993; 162-3). The tinplate

buildings were set out immediately to the south of the ironworks, and are likely to have extended into the area of proposed development.

2.5 By 1872 the tinworks included sixteen rolling mills, housed mainly in the large central building which extended into the northwestern part of the development area (Site reference Y1). A second large building (Site reference Y2) is also indicated within the centre of the proposed residential development site as indicated on a map of Swansea canal created in around 1870 (Figure 4). The function of this building is not entirely clear. Part of the extensive network of tram or railroads (Site reference Y5) which extended throughout the site is also shown. These tram or rail roads also connected to a walled compound housing several buildings at the southern end of the site (Site reference Y6), however this is likely to have been separate to the main iron and tinworks site as annotations on the map indicate it formerly belonged to the Midland Railway Co., and therefore previously the Swansea canal. It appears to correspond to a maintenance facility, builder's yard, or similar (R. Protheroe Jones, Pers.com.).

2.6 The iron and tinplate works employed a huge number of people, said to be around four thousand by the mid 1860s. This was not only in the factory itself but also in its associated coal mines. This clearly drew large numbers of people to this part of the Swansea valley, new houses were built and streets laid out and the town of Ystalyfera was created.

2.7 From the mid 1870s there was a gradual decline in the fortunes of the Ystalyfera Iron Company, as steel manufacture began to take prominence and competition increased from other industrial areas. The 1st edition Ordnance Survey map (Figure 5) shows the site at this time in 1877/8. The main tinworks building (Site reference Y1) had been altered although the southern end within the area of proposed development remains unchanged from what was visible on the previous canal-properties map. The other large building within the area (Site reference Y2) also appears little-altered. To the west, against the canal embankment a large, long rectangular shed appears to have been built alongside the tram/rail roads (Site reference Y3). Another unusual rectangular building has also been added to the east (Site reference Y4) with a distinctive line of square features to its north and another linear feature to its south. The functions of these long thin structures to the west and to the east of the tinplate works are enigmatic and potentially unique to this works, and thus of quite high archaeological significance.

2.8 The ironworks finally closed in 1886, however the tinplate works continued in production until the mid 20th century. The tinplate industry of Wales had mixed fortunes and the size of the site was reduced towards the end of the 19th century and a number of the ancillary buildings were removed by the early 20th century (Site references Y3 and Y4).

2.9 The continued reduction in tinplate manufacture appears eventually to have led to abandonment of the southern end of the tinplate works, effectively the site covered by this area of proposed residential development. The majority of the buildings appear to have been cleared, prior to the establishment of a small colliery in 1906/7 (Site reference Y7 – Figure 6). Although not labelled on any map this appears to have been the Ystalyfera Colliery, known locally as 'Next Week'. A coal drift was sunk under the canal, with a tram/rail road line crossing the canal to the south. The colliery may have kept working until at least 1913.

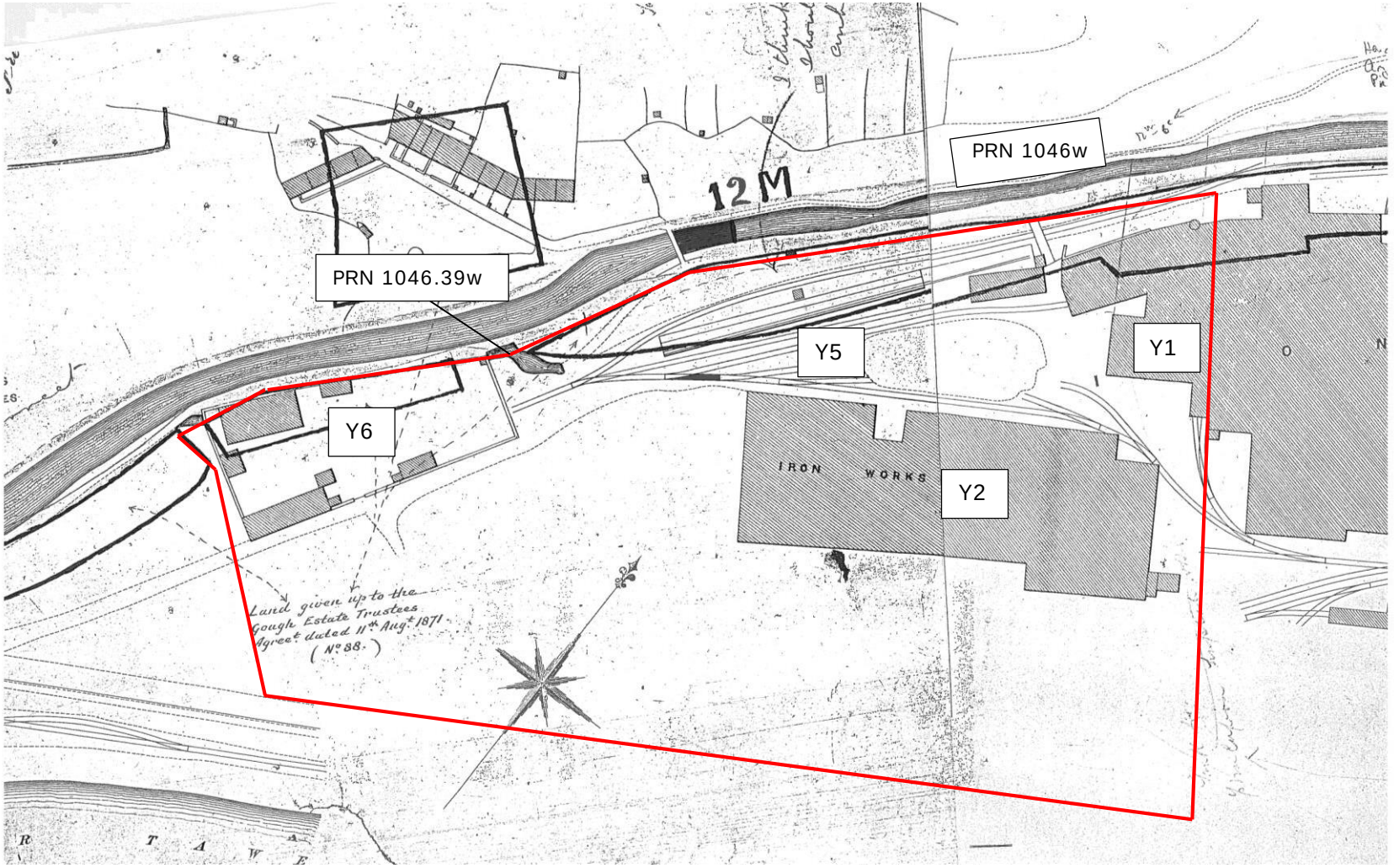

Figure 4: Extract from a map drawn up by the Midland Railway Company, presumably in the early 1870s. Area of proposed development is outlined in red, with the main archaeological sites labelled.

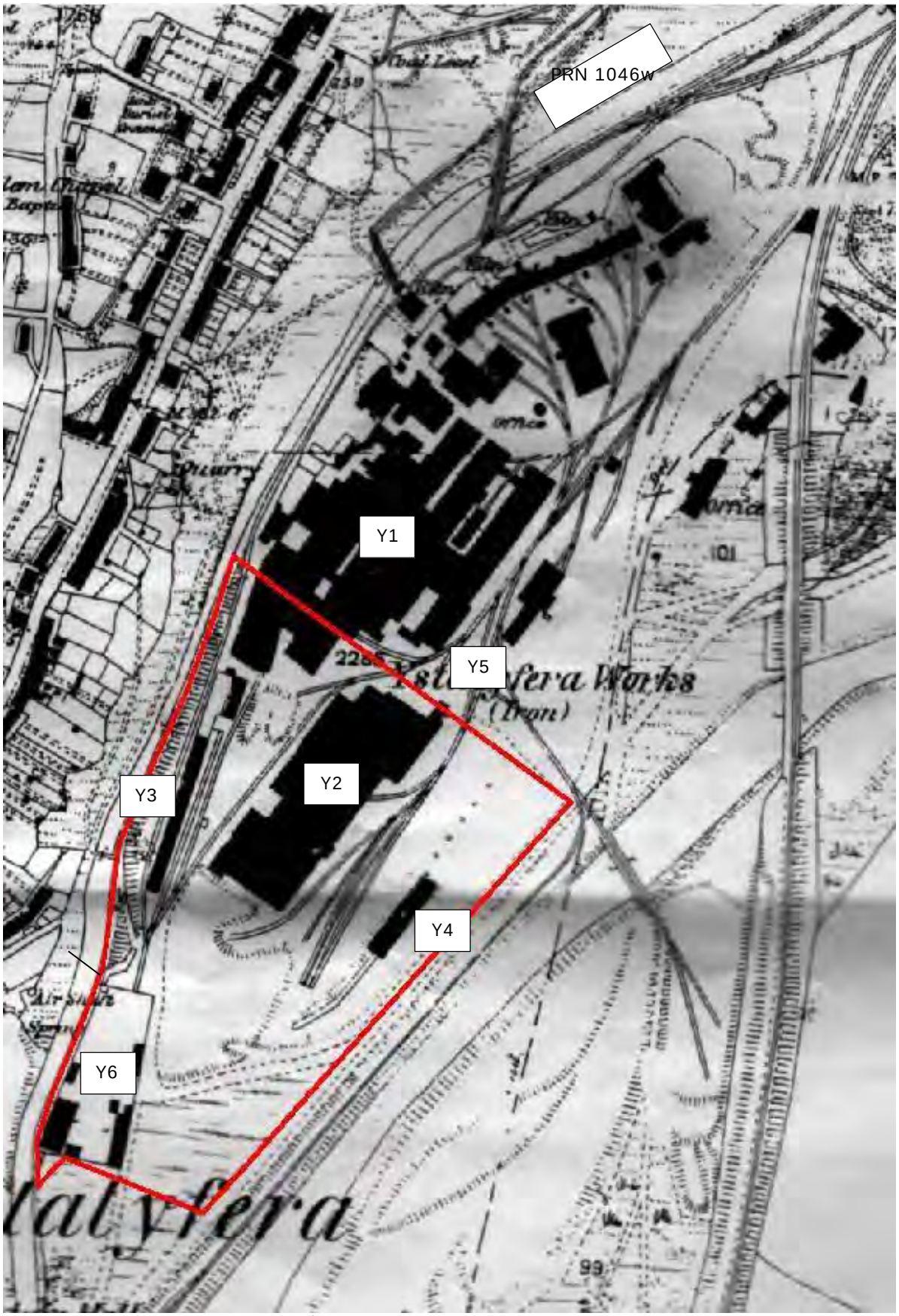

Figure 5: Extract from the 1st edition Ordnance Survey map of 1877/8. The area of proposed development is outlined in red, and sites mentioned within the text area also labelled (Site references Y1 to Y6).

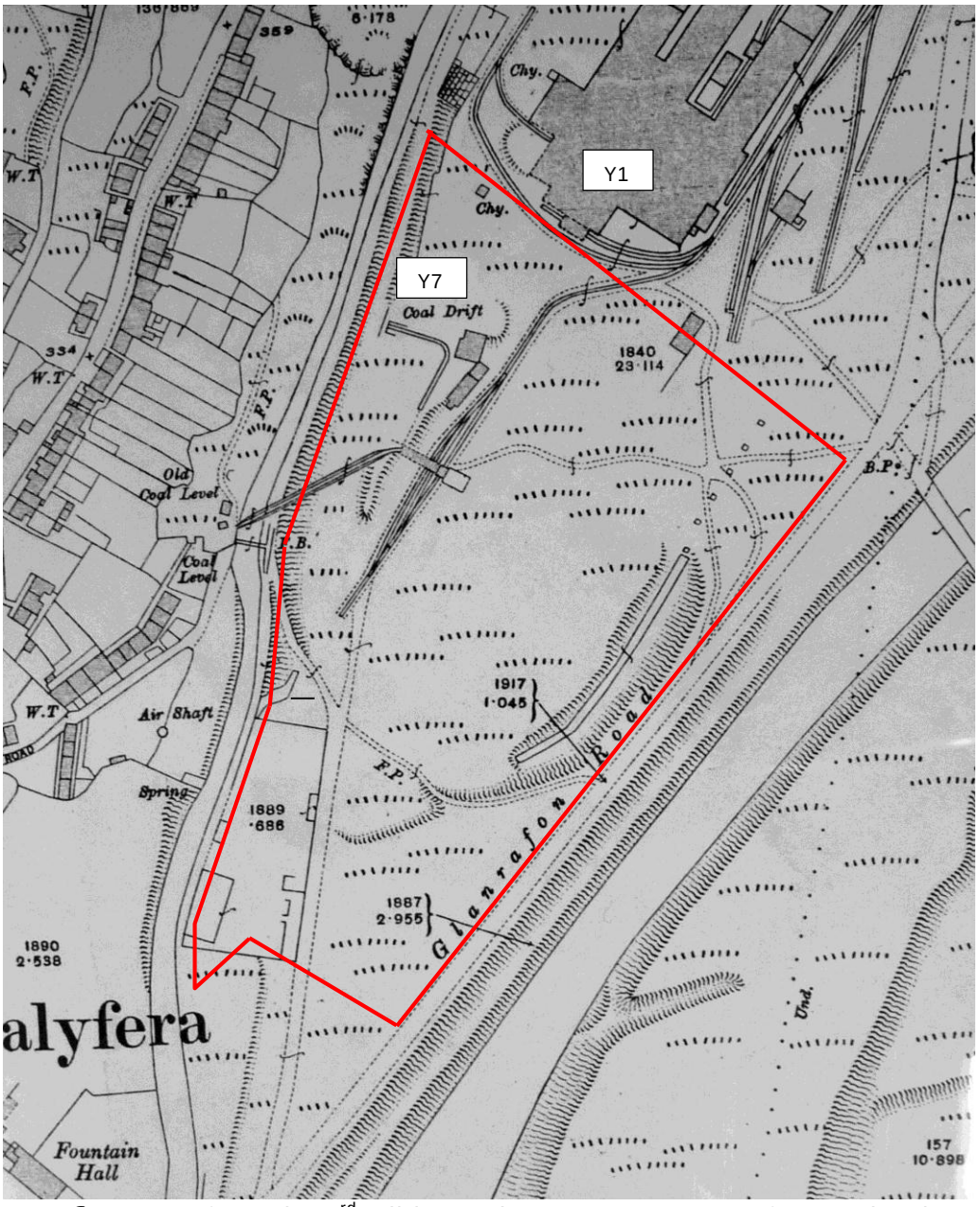

Figure 6: Extract from the 3rd edition Ordnance Survey map of 1918 showing the extent of Ystalyfera ('Next Week') Colliery (Site reference Y7). Area of proposed development is outlined in red.

2.10 By the start of the 2nd World War Ystalyfera tinplate works was down to just 4 mills, employing around 300 workers. Due to the high cost of materials and the increasingly out-of-date equipment the tinplate works was eventually closed down following the war in 1946. Much of the site was cleared in the 1960s, followed by the establishment of light industrial units across the area. The area of proposed development appears largely to have remained undeveloped since its clearance. Mid to late 20th century maps show an area consisting largely of scrubland with the occasional small structure built within its limits. The disused mine level is still marked on maps as late as the early 1990s.

2.11 Archaeological works have been undertaken at the Ystalyfera Iron and Tinplate Works previously. A desk-based assessment of the area was completed by GGAT in 2005 (Jones & Roberts); an evaluation of part of

the site to the north completed by DAT in 2006 (Jamieson); and excavations of the Ironworks by DAT in 2011 (Poucher forthcoming).

3. SITE INFORMATION

3.1 Site Visit - (as undertaken on 7th September 2012 as part of desk-based assessment)

3.1.1 The ground conditions between when the site visit for the desk-based assessment was undertaken and today is understood to be unchanged. The area remains as scrub land with stands of trees, most notably against the northern edge of the area. Wooden post and wire fences subdivide the area. The canal embankment forms the north-western edge of the area. In the northern corner this is several metres high, steep, and tree covered. The ground level rises to the south to become level with the canal at the south-western corner. A public footpath skirts this south-western corner and runs along the top of the canal embankment.

3.2.2 No standing structural remains could be discerned within the proposed development area, although dense scrub could mask some above-ground remains. Towards the eastern side of the area a patch of ground had been recently disturbed, which revealed coal mining waste but also what appeared to be in-situ stone and brick remains that suggest structural remains may survive close to the surface. This pit was presumably associated with the geotechnical surveys undertaken across the site area previously.

3.2 Geotechnical Information

3.2.1 Geotechnical studies have been carried out across the proposed residential development area. These were originally done for a larger area at Ystalyfera, incorporating the area of the new ASDA superstore to the north of the area and the former GMF Motor Factory itself. The reports an 'Interpretative Geo-Environmental Report' and a 'Mining Assessment Report' and both were prepared by White Young Green (2007a and 2007b).

3.2.2 The mining assessment confirmed the presence of former mine working entrances within the proposed residential development area. Two of these lie within the area of the 'Next Week' colliery and lie on the northern part of the western edge of the site comprising two adits leading beneath the canal into mine workings beneath the adjacent hill. Remains of the entrances to the up-cast or down-cast adits were revealed within three test trenches located in this area (TT1 – TT3).

3.2.3 A further mine entrance was located and confirmed in the centre of the western boundary, again associated with the same workings as the those above (TT4).

3.2.4 A further mine entrance was identified to have been on the eastern side of the area, though it is unclear what this was associated with in terms of the identified archaeological sites (Site references Y1 to Y7). No clear entrance was identified in the three test trenches located within this area (TT5 – TT7).

3.2.5 The depth and character of all of these mine workings is such that it is not considered that they would affect development at ground level and therefore also not cause risks in terms of undertaking a trial trench evaluation. It is not anticipated that archaeological field evaluation will be

undertaken in the areas of the possible mine entrances.

3.3.6 The geo-technical report included the excavation of a number of boreholes (BH1 – BH4) and test-pits within the proposed residential development area (TP1 – TP14). The results of the ground investigations do confirm the presence of made-ground across the majority of the development area, with only a single test pit (TP3) encountering topsoil overlying the natural geology. The character of the made-ground is mostly recorded as containing brick, ash, sandstone cobbles etc, but some information indicating structures were also present is shown in TP 11 and TP10.

3.3.7 The depth of made ground varies across the proposed residential development area. The Trial Pits indicated made ground (excluding TP3) varying in depth between 1.1m and 4m, with between 0.20m – 0.3m of topsoil above that. The character of the made ground is not made clear. It is possible that remains of structures could be present within the made ground, or alternatively that when the Ystalyfera Iron and Tinworks was closed and demolished, that the entire area was covered with a substantial depth of waste material. The boreholes suggested that made ground was present at depths of between 6.9m and 7.7m just north of the centre of the development site.

3.3.8 The geo-technical information has enabled a cut and fill plan to be designed across the site area to achieve a roughly level site area lowering some of the higher parts of the site and using this material to fill in some of the lower parts. This would remove any major flood risks within the development site. The rough outline of the cut and fill proposals are shown on Figure 7.

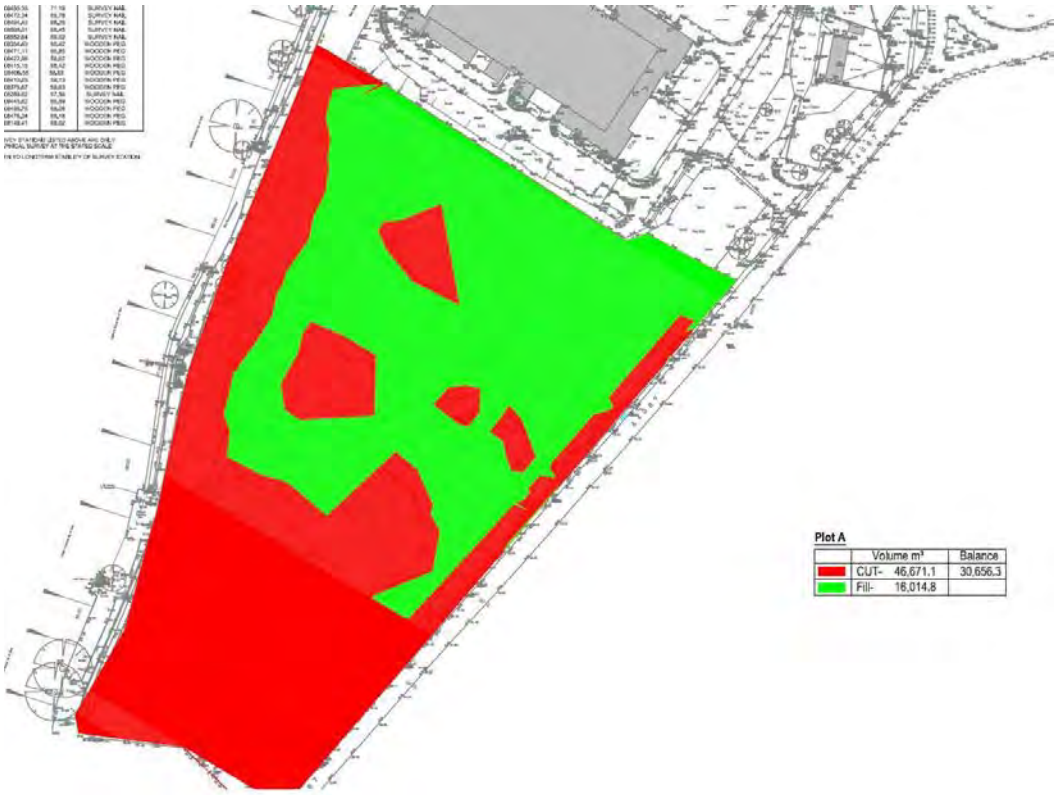

Figure 7: Schematic plan of cut (red) and fill (green) proposals for the development site.

3.3.9 It should be noted that there is a relatively high potential for contamination within the site area, including the residues of chemicals used in the tinplate rolling process and other material such as asbestos. Further information on contamination should be sought prior to undertaking the evaluation to determine any additional PPE or procedures that need to be employed during site works.

4. TRIAL TRENCH METHODOLOGY

4.1 It is proposed that a series of 5 archaeological trial trenches are opened up across the proposed residential development area. These will target the 7 sites of archaeological interest which have been identified from earlier maps of the area (Site references 1 to 7, excluding Y5). Trenches are proposed to be 2m x 40m in length.

4.2 It should be noted that although the geotechnical reports have indicated a substantial depth of made ground across the site area, the character of this made ground has not been archaeologically explored. Such material could be infilling structures, or have been used as foundation material for the industrial buildings. Should the made ground be demonstrated to be merely waste material covering industrial archaeological remains at significant depths, then it may only be possible to determine the depths of such remains at the evaluation stage. The results would inform further the cut and fill exercise and it may be possible to preserve such remains at depth below the areas that will be impacted upon from the residential development.

4.3 Trench 1 will be placed across the area of the southern extent of the former rolling mills building of the tinplate works, Site reference Y1, where it formerly crossed into the proposed development area. The trench will cross at least one of the exterior wall walls of the building to determine whether they survive standing to any height. This will also enable us to determine if the buildings have been backfilled internally.

4.4 Trench 2 will target the second large tinplate works building to the southwest of the main structure, Site reference Y2. This will again be placed to cross an exterior wall. Trench 2 will also extend to cross buildings associated with the Next Week colliery, Site reference Y7. This will not be located near to the mine entrance but will determine the survival of its associated structures that were shown to the east.

4.5 Trench 3 will be located within the area of the long structure shown on the first edition Ordnance Survey map, Site reference Y3 and cross the area into the large building associated with the Tinworks, Site reference Y2 (Figure 5). The trench will avoid the area where this could coincide with another mine entrances to the later Next Week colliery.

4.6 Trench 4 will be located on the eastern side of the site area targeting Site reference Y4. This will avoid the area of the possible mine entrance identified during the Mine Assessment (WYG 2007b). The trench will also cross part of the identified area of tram ways and rail lines, Site reference Y5.

4.7 Trench 5 will be located in the southern part of the site area where a series of smaller buildings are shown as present on the first edition Ordnance Survey map, Site reference Y6. It is thought these represent ancillary working buildings, such as a blacksmiths shop.

4.8 The proposed trench locations are shown on Figure 8, but it is possible that some variation may occur depending upon ground conditions. If the

trenches go below a depth where the trench edges can be considered safe, then wither the trench will be shortened to allow safe stepping of the edges, or a test slot will be excavated through any non-archaeologically important layers to the top of the surviving archaeological remains, the depth recorded and then the trench backfilled and made safe.

4.9 The trenches will be excavated using a mechanical excavator fitted with a flat bladed bucket, although a toothed bucket may be necessary to start if rubble is encountered. Arisings will be stored adjacent to the trench (at a safe distance). Trenches will be excavated to remove non-archaeologically significant overburden, down onto the top layer of significant archaeological levels or the underlying natural undisturbed ground surface. The depth of the excavation must conform to current safety requirements. If excavation is required below 1.2m the options of using shoring or stepped trenching will be discussed with GGAT.

4.10 Following machine excavation to the correct archaeological level, the trenches will be appropriately cleaned to prove the presence, or absence, of the archaeological features and to determine their significance. It is most likely that structures will be revealed as opposed to earth cut archaeological features, thus cleaning and recording of any such structures would be required as opposed to sample excavation.

4.11 All deposits will be recorded by archaeological context record sheet, scale drawing, photography and site notebooks. Recording will be carried out using Archaeology Wales recording systems (pro-forma context sheets etc), using a continuous number sequence for all contexts. Written, drawn and photographic records (b&w, 35mm colour slides and digital) of an appropriate level of detail will be maintained throughout the course of the project. Digital photographs will be taken using cameras with resolutions of 5 mega pixels or above. Plans and sections will be drawn to a scale of 1:50, 1:20 and 1:10 as required, and these will be related to Ordnance Survey datum and published boundaries where appropriate.

4.12 All archaeologically significant artefacts, ecofacts and samples will be retained and, where possible, related to the contexts from which they derived. Archaeological artifacts recovered during the course of the excavation will be cleaned and labelled using an accession number which will be obtained from the local museum. A single number sequence will be allocated to all finds. Sensitive material will be stored in appropriately stable conditions.

4.13 All finds and records should be removed from site each day and stored in a secure location by the appointed archaeological contractor. All finds, except those deemed to be Treasure Trove, will remain the property of the landowner, but it is assumed that permission has been given by the landowner for these to be stored as part of the archive in a suitable repository (ownership will still be with the landowner). Any finds which are considered to be in need of immediate conservation will be referred to a UKIC qualified conservator (Phil Parkes of Cardiff Conservation Services). A catalogue by context of all artefactual material found, quantified by number, weight, or both, and containing sketches of significant artefacts will be compiled. Pottery will be analysed to the standards outlined in "Guidelines for the Preparation of Pottery Archives" as prepared by the Study Group for Roman Pottery in consultation with the IFA. All other material will be analysed following the advice given in the Institute of Field Archaeologists: Guidelines for Finds Work. The requirements for the conservation of artefacts will be unpredictable until after the completion of the fieldwork. The archaeological contractor will ensure, however, that at least minimum acceptable standards are achieved (the UK Institute of Conservation's Guidelines for the Treatment of Finds from Archaeological Site should be used as guidance).

4.14 In the very unlikely event of the discovery of human remains they will, at this evaluation stage, be left *in situ*. If removal is necessary it will only take place following the granting of all permissions in writing by the relevant authorities and at a later stage of any necessary archaeological works.

4.15 All archaeologically recovered artefacts, building materials, industrial residues, environmental material, biological remains (including human remains) and decay products (collectively referred to as 'finds') will be conserved following the guidelines set out in 'Standard and Guidance for the collection, documentation, conservation and research of archaeological materials' (Institute for Archaeologists, 2008).

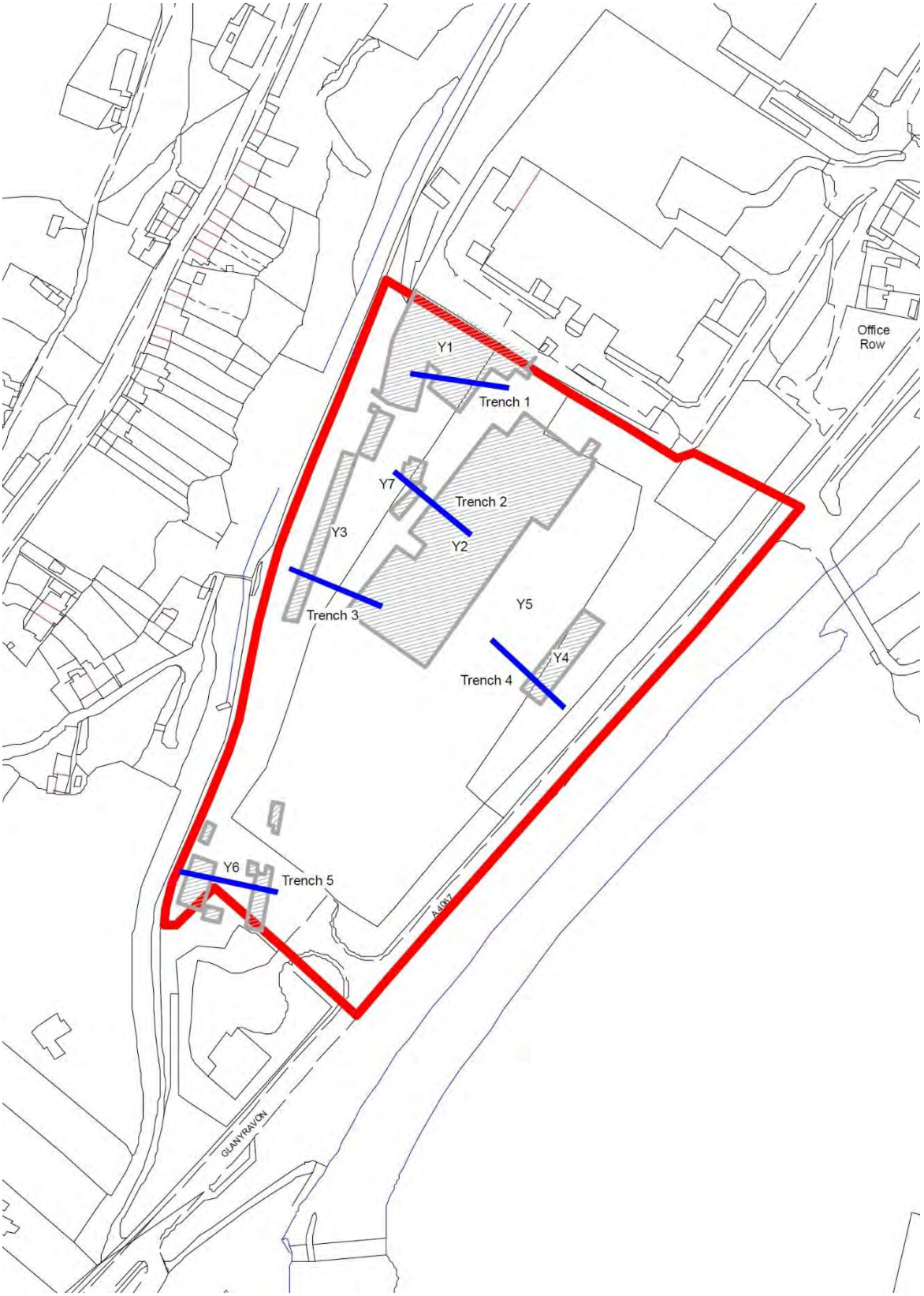

Figure 8: Proposed Trench Location Plan, with former structures indicated as hatched grey blocks, labelled as Site features Y1 to Y7
Trenches are in blue and are each 40m in length

5. POST-FIELDWORK REPORTING AND ARCHIVING

5.1 Report preparation

The report will contain the following:

- A fully representative description of the information gained from the archaeological evaluation, even if there should be negative evidence.
- A concise non-technical summary of the project results. This will be presented in Welsh to meet any Welsh language policy requirements.
- At least one plan showing the site's location in respect to the local topography, as well as the position of all excavated areas.
- Suitably selected plans and sections of significant archaeological features. All plans and sections should be related to Ordnance Datum.
- Written descriptions of all features and deposits excavated and their considered interpretation.
- A summary report on the artefactual and ecofactual assemblage and an assessment of its potential for further study, prepared by suitably qualified individuals or specialists.
- A statement of the local and regional context of the archaeological remains identified.
- An impact assessment, with mitigation proposals, of the proposed development on the archaeological resource can be considered and presented for consideration. This could include the mapped archaeological potential of the site in relation to the proposed development.

5.2 Copies of the report will be sent to Jenard (Ystalyfera) Ltd, the local planning authority, and GGAT for inclusion in the HER. Digital copies will be provided in pdf format if required.

5.3 A summary report of the work will be submitted for publication to a national journal (eg Archaeology in Wales) no later than one year after the completion of the work.

5.4 The site archive

A project archive will be prepared in accordance with the National Monuments Record (Wales) agreed structure and be deposited within an appropriate local museum on completion of site analysis and report production. It will also conform to the IfA's Standards & Guidance for the creation, compilation, transfer and deposition of archaeological archives (2009) and guidelines set out in 'Management of Archaeological Projects Two, Appendix 3' (English Heritage 1991).

5.5 Arrangements will be made with the local museum before work starts, it is anticipated the finds will be deposited at the National Waterfront Museum, Swansea. Wherever the archive is deposited, this information will be relayed to the HER.

5.6 Although there may be a period during which client confidentiality will need to be maintained, the report and the archive will be deposited not later then six months after completion of the work.

5.7 Other significant digital data generated by the survey (ie AP plots, EDM surveys, CAD drawings, GIS maps, etc) will be presented as part of the report on a CD/DVD. The format of this presented data will be agreed with the curator in advance of its preparation.

6 RESOURCES AND TIMETABLE

6.1 Standards

The field evaluation will be undertaken by AW staff using current best practice.

6.2 AW is an IFA Registered Archaeological Organisation and all work will be undertaken to the standards and guidelines of the IFA.

6.3 Staff

The project will be undertaken by suitably qualified AW staff. Overall management of the project will be undertaken by Philip Poucher (a CV is available upon request).

6.4 Equipment

The project will use existing AW equipment.

6.5 Timetable of archaeological works

The work will be undertaken at the convenience of the client. No start date has yet been agreed. It is anticipated that the fieldwork will take five days.

6.6 Insurance

AW is an affiliated member of the CBA, and holds Insurance through the CBA insurance service.

7. MONITORING

7.1 It is anticipated that the archaeological curator of GGAT will monitor the project.

8. HEALTH AND SAFETY

8.1 All on-site archaeologists should be CSCS[2] registered.

8.2 All relevant health and safety regulations must be followed.

8.3 All site inductions, H&S procedures and site rules of the site owners will be made known to the staff of the appointed archaeological contractor prior to them commencing work on-site.

8.4 Safety helmets, high visibility jackets and safety boots will be used by all site personnel as necessary. The site contractors will make all archaeological staff aware of any other PPE[3] that may be required and provide them. Archaeological staff must not enter any area where there is a considered to be a health and safety risk that has not or is not being appropriately mitigated against.

8.5 The client must ensure that all information regarding service locations and other similar constraints are made known to the archaeological contractor before any site works commence. All relevant information and mitigation measures must also be made known in relation to any contamination within the site area.

8.6 It should be noted that tinplate works have a number of processes which involved chemicals and metals that are particularly harmful. Such materials and heavy metals can remain in the ground and backfill. These can have significantly harmful effects and must be evaluated and mitigation measures in place prior to any site works commencing.

8.7 Other dangerous material such as asbestos may be present within the site area. If such material is unexpectedly exposed during site works then works in the area must cease and the client informed in order that the advice of specialist remediation consultants can be employed and mitigation

measures implemented.

8.8 Full risk assessments will be prepared before any site works commence and all members of staff will adhere to the requirements of the *Health & Safety at Work Act*, 1974, and the Health and Safety Policy Statement of AW.

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[2] Construction Skills Certification Scheme (Health and Safety Tested)

[3] Personal Protection Equipment

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