WEMYSS METAL MINE, CEREDIGION: ARCHAEOLOGICAL WATCHING BRIEF

DAT Archaeological Services

Prepared by Dyfed Archaeological Trust
For: Tetra Tech

REGISTERED ORGANISATION CIfA

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WEMYSS METAL MINE, CEREDIGION: ARCHAEOLOGICAL WATCHING BRIEF

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WEMYSS METAL MINE, CEREDIGION
ARCHAEOLOGICAL WATCHING BRIEF

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WEMYSS METAL MINE, CEREDIGION: ARCHAEOLOGICAL WATCHING BRIEF

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EXECUTIVE SUMMARY

DAT Archaeological Services were commissioned to undertake a watching brief in January 2021 during groundworks associated with geotechnical investigational works at Wemyss Metal Mine, Ceredigion (NGR SN 71579 74089).

Overall the watching brief demonstrated that the majority of the geotechnical investigations carried out during the watching brief did not encounter any built structures associated with the mine, apart from one substantial wall not shown on historic mapping.

CRYNODEB GWEITHREDOL

Comisiynwyd Gwasanaethau Archeolegol YAD i ymgymryd â brîff gwylio ym mis *Ionawr 2021 yn ystod gwaith daear sy'n gysylltiedig â gwaith ymchwilio geodechnegol ar Wemyss Metal Mine, Ceredigion (NGR SN 71579 74089).*

Yn gyffredinol, dangosodd y brîff gwylio nad oedd mwyafrif yr ymchwiliadau geodechnegol a gynhaliwyd yn ystod y brîff gwylio wedi dod ar draws unrhyw strwythurau adeiledig sy'n gysylltiedig â cloddfa, ar wahân i un wal sylweddol na ddangoswyd ar fapio hanesyddol.

1.1 INTRODUCTION

1.1 Project Commission

1.1.1 DAT Archaeological Services were commissioned by Tetra Tech to undertake an archaeological watching brief during geotechnical investigations at Wemyss Mine, a former 19th century lead and zinc mine (PRN 23230) approximately 14.6km southeast of Aberystwyth in Ceredigion (Figures 1 and 2).

1.1.2 The proposed geotechnical investigations were required to provide information to assess the geotechnical, geo-environmental, geological and or hydrogeological ground conditions in order to inform the outline design of remedial engineering interventions.

1.1.3 Following discussions with the archaeological curator Dyfed Archaeological Trust-Development Management (DAT-DM) it was recommended that an archaeological watching brief was carried out during the geotechnical investigations, as several of the proposed trial trenches and hand dug inspection pits were situated within an archaeologically sensitive area of the mine.

1.1.4 The area of Wemyss Mine was the subject of a Historic Environment Desk-Based Assessment by DAT Archaeological Services in 2016 (Bell et al 2016). This desk-based assessment was updated in 2020 to include two new areas beyond the original study area of the mine (Bell 2020). The first was a natural pond area and its connecting brook some 200m north of main mine workings. The second was a small area of mine workings and connecting infrastructure covering an area roughly 3.75ha, known as "Frongoch West" located some 400m west of Wemyss mine.

1.2 Scope of the Project

1.2.1 A Written Scheme of Investigation (WSI) for an archaeological watching brief was prepared by DAT Archaeological Services prior to the commencement of the works (Appendix I). The WSI outlined the project objectives as:

- Provision of a written scheme of investigation to outline the methodology for the watching brief which DAT Archaeological Services will undertake:
- To monitor ground works in order to identify the presence/absence of any archaeological deposits;
- To establish the state of preservation, character, extent and date range for any archaeological deposits identified;
- Production of a report and an archive of the results.

1.2.2 The aim of the watching brief is to provide information on the character and significance of any below ground archaeological remains that may be revealed within the trial trenches and inspection pits. Should any significant archaeological deposits be present, then a programme of further mitigation can be formulated and potentially implemented prior to development.

1.2.3 The archaeological works were undertaken in accordance with the Chartered Institute for Archaeologists *Standard and Guidance for Archaeological Watching Briefs* and their codes of conduct (CIfA 2014).

1.3 Report Outline

1.3.1 This report provides a summary and discussion of the archaeological watching brief and its results.

1.4 Illustrations

1.4.1 Printed map extracts are not necessarily reproduced to their original scale. On maps, north is towards the top of the page unless otherwise indicated.

1.5 Timeline

1.5.1 The following timeline (Table 1) is used within this report to give date ranges for the various archaeological periods that may be mentioned within the text.

Table 1: Archaeological and Historical Timeline for Wales.

Period	Approximate date	
Palaeolithic –	*c*.450,000 – 10,000 BC	**Prehistoric**
Mesolithic –	*c*. 10,000 – 4400 BC	
Neolithic –	*c*.4400 – 2300 BC	
Bronze Age –	*c*.2300 – 700 BC	
Iron Age –	*c*.700 BC – AD 43	
Roman (Romano-British) Period –	AD 43 – *c.* AD 410	**Historic**
Post-Roman / Early Medieval Period –	*c*. AD 410 – AD 1086	
Medieval Period –	1086 – 1536	
Post-Medieval Period[1] –	1536 – 1750	
Industrial Period –	1750 – 1899	
Modern –	20th century onwards	

[1] The post-medieval and Industrial periods are combined as the post-medieval period on the Regional Historic Environment Record as held by Dyfed Archaeological Trust

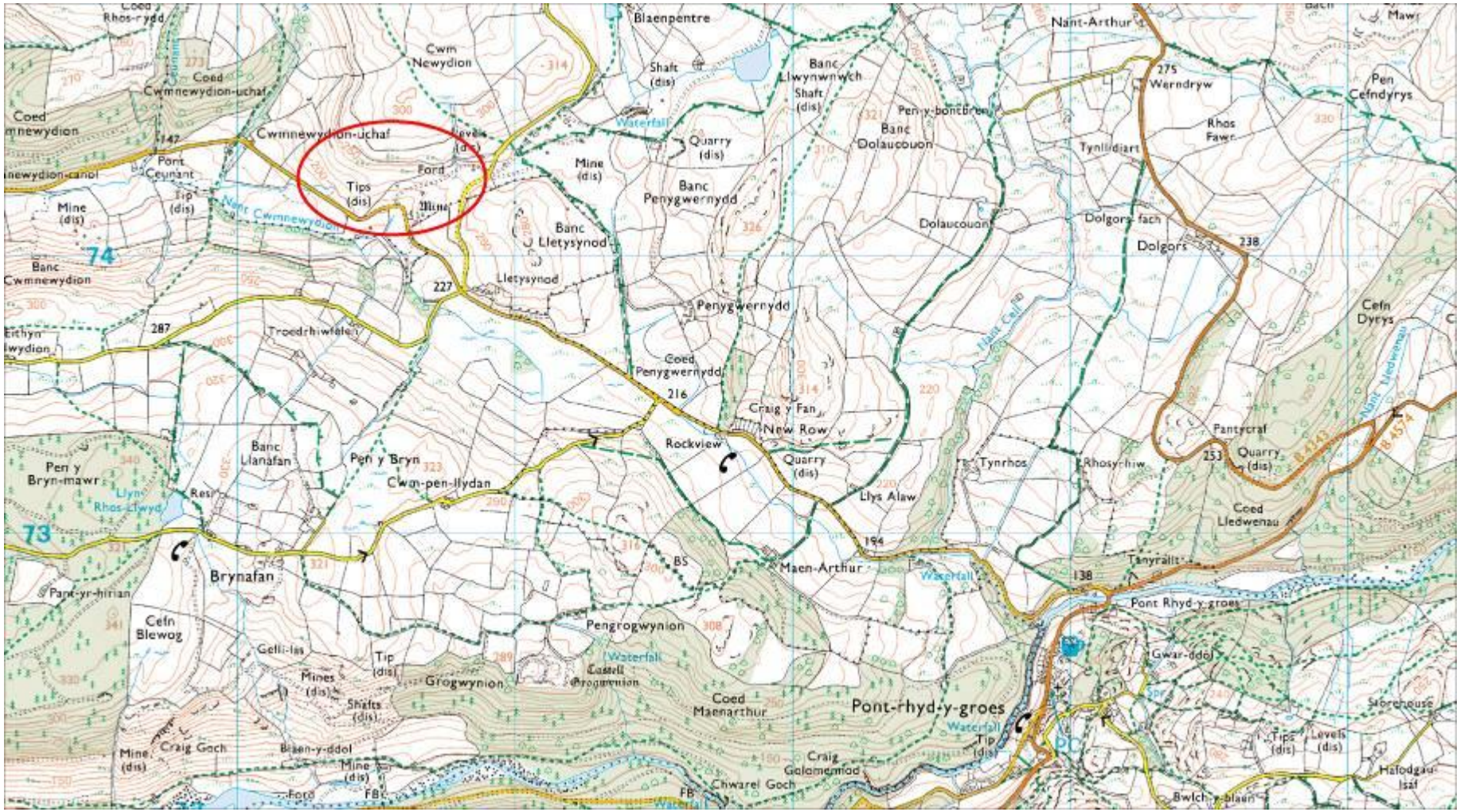

Figure 1: Location of watching brief (circled in red).

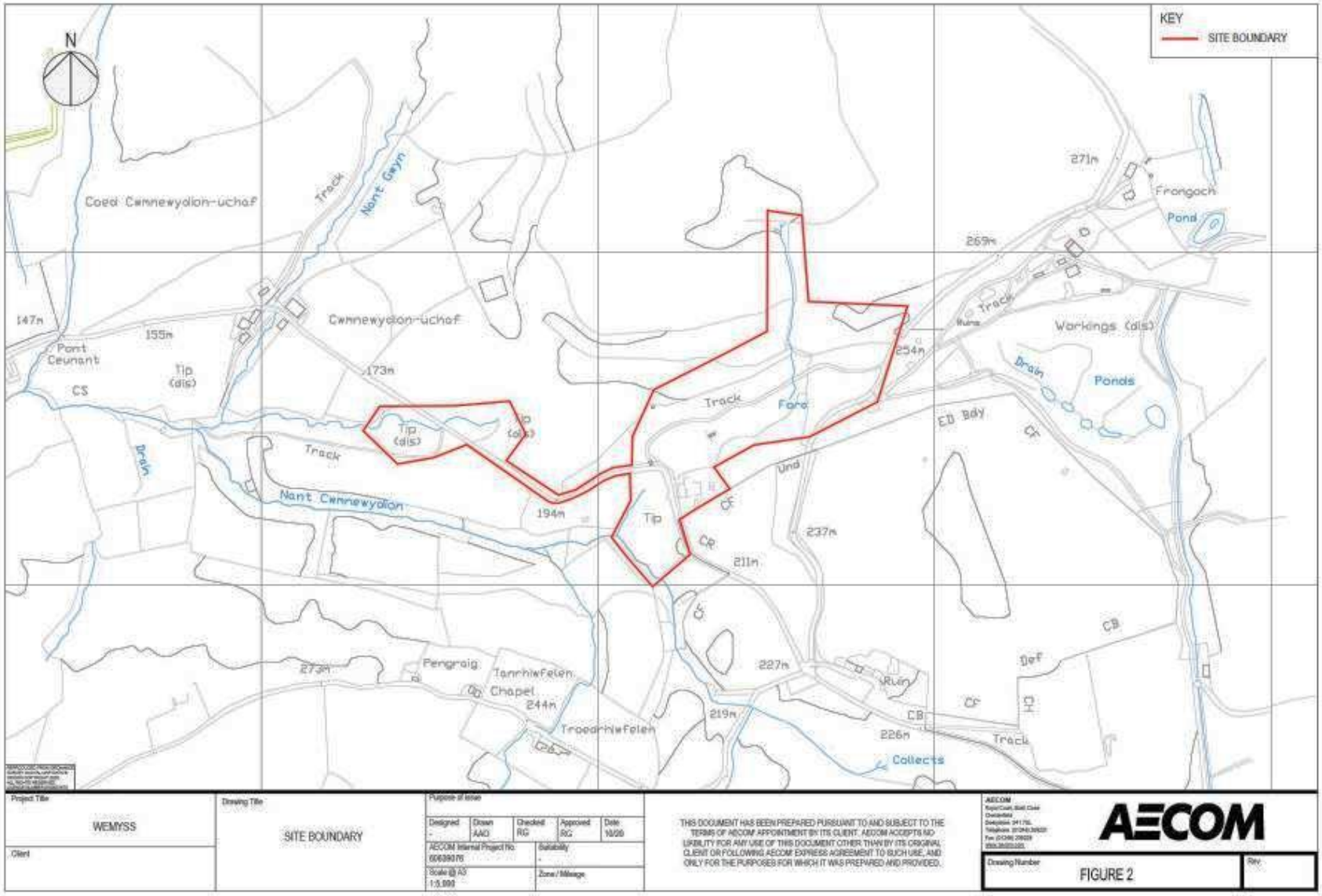

Figure 2: Plan of site boundary.

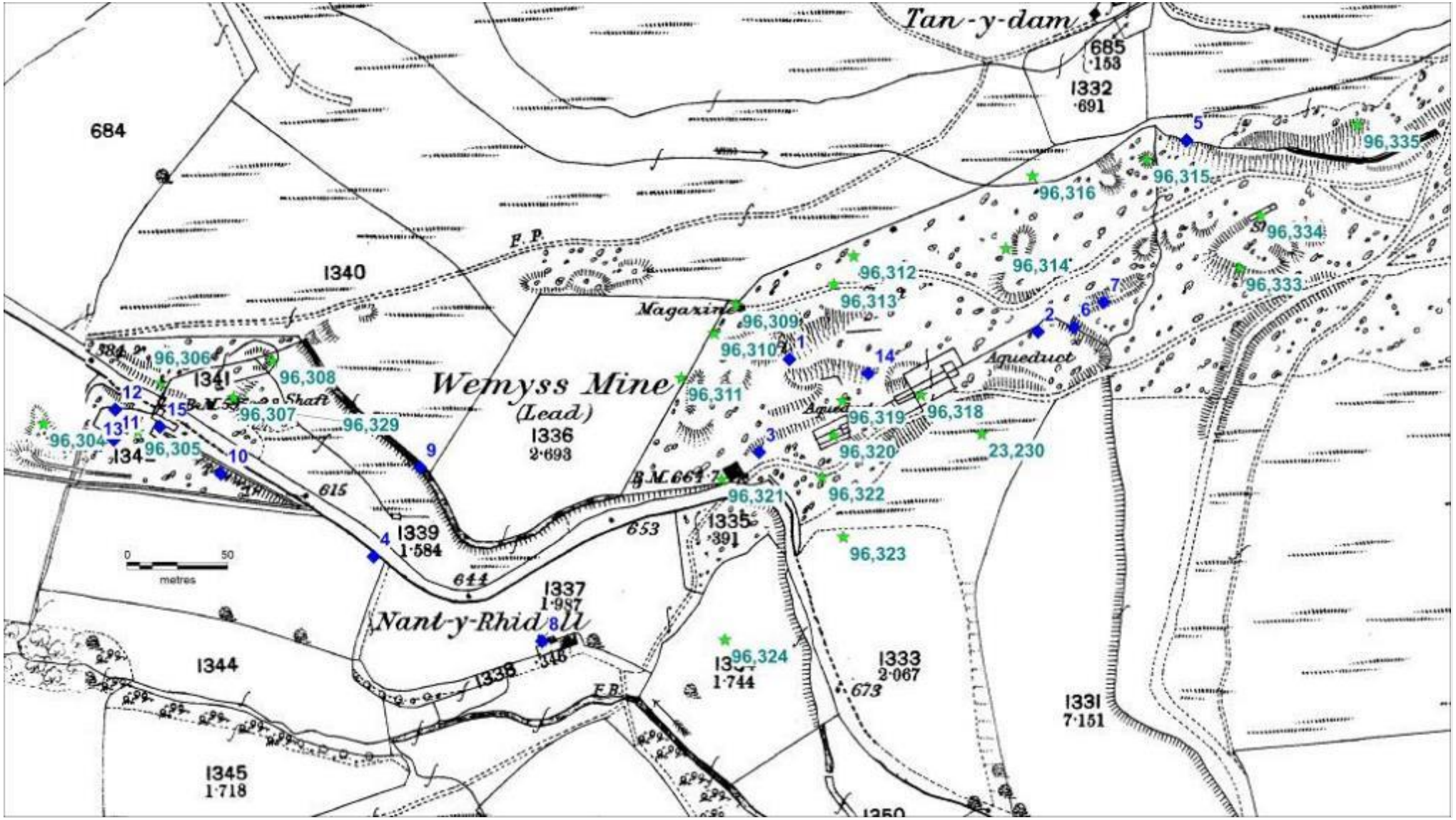

Figure 3: Extract of the OS 1st edition 1:2500 map published in 1905 showing the archaeological sites recorded on the HER within the area of Weymss mine (green stars), as well as additional sites recorded during the 2016 walkover (blue diamonds). Sites listed in Tables 2 and 3.

Table 2: Archaeological assets within the area of Wemyss mine (shown in Figure 3).
Comments in italics are updates to the HER record created following the site walkover in 2016 (Bell et al 2016).

PRN	NPRN	Name	Summary	NGR
23230	33907	Zinc Mine,Lead Mine	The Wemyss mine was a lead and zinc mine which operated in conjunction with Frongoch Mine intermittently from 1861 to 1899. In 1899 a dressing mill was built on the site to process ore from Frongoch Mine. Modernised and provided with electric power from the Pont Ceunant generator house at the end of the 19th century.	SN717742
96303		Wheel Pit	Virtually no trace of waterwheel apart from a brick quoined masonry tailrace culvert just to south at base of vegetated tips (Protheroe-Jones 1993, mine 159, no.3). *Only visible on 1905 2nd edition, 1:2500 OS map (MB Feb, 2016)*	SN7115374272
96304		Spoil heap	Fines dumps (Protheroe-Jones 1993, mine 159, no.4). *Visible on 1st edition 1888. 1:2500 OS map, spoil tips cover a larger area on 2nd edition, 1905 OS map. (MB Feb 2016).*	SN7123374215
96305		Dressing Floor	No remains at all of dressing floor (Protheroe-Jones 1993, mine 159, no.5). *Possible buddles and slime pits/settling tanks shown on 1st edition 1888. 1:2500 and 2nd edition, 1905 OS maps. These may be the site of the new dressing floors built in 1864 (MB Feb 2016).*	SN71287421
96306		Balance Pit	Bobpit; fairly good condition; no other trace of route of flat rods (Protheroe-Jones 1993, mine 159, no. 6). *This is not shown on either the 1st edition 1888. 1:2500 or 2nd edition 1905 OS maps. (MB Feb 2016).*	SN7129274234
96307		Spoil heap	Coarse tips with much vein stuff (Protheroe-Jones 1993, mine 159, no.7). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016).*	SN7132874226
96308		Level	Deep Adit level: rock cut; open; very wet; fairly large (Protheroe-Jones 1993, mine 159, no.8). *This is likely to be the hollow shown on the 1847 tithe map and may be the "original" Wemyss adit. Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016).*	SN7134874244
96309		Magazine	Substantially intact magazine (Protheroe-Jones 1992, mine 159, no.10). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016).*	SN7157974267
96310		Shaft	Irregular rock cut shaft or stope come to surface; open (Protheroe-Jones 1993, mine 159, no.11).	SN7156874253

			Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016).	
96311		Gulley	Gulley- probable site of a level (Protheroe-Jones 1993, mine 159, no.15). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016).*	SN7155174231
96312		Mine Building	Minimal ruins of building (Protheroe-Jones 1993, mine 159, no.12). *Only visible on 2nd edition 1905 OS map. (MB Feb 2016)*	SN7163874290
96313		Shaft	Ball's Shaft: cratered and run in. Development rock tips to west, possible site of ore bins to south (Protheroe-Jones 1993, mine 159, no.14). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. Annotated as "Ball's shaft on 1896 Crosswood plan of Wemyss (MB Feb 2016).*	SN7162874276
96314		Level	Gulley- probable site of level (Protheroe-Jones 1993, mine 159, no.15). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. Annotated as "adit" on 1896 Crosswood plan of Wemyss (MB Feb 2016).*	SN7171474292
96315		Shaft	Glanville's Shaft: run in crater; vegetated tip to south (Protheroe-Jones 1993, mine 159, no.16). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. Annotated as "Glanville's Shaft" on 1896 Crosswood plan of Wemyss (MB Feb 2016).*	SN7178574335
96316		Leat	Well-defined leats (Protheroe-Jones 1993, mine 159, no.17). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016).*	SN7172874328
96318		Wheel Pit	Large, well-built waterwheel pit; east part much filled by stream washing gravel in. Minimal remains of balance bob pit to east; no trace of structure to west (Protheroe-Jones 1993, mine 159, no.20). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. This is also shown on the 1896 Crosswood plan. It is most likely that this is Kitto's 56ft wheel pit (MB Feb 2016).*	SN71677422
96319		Level	Masonry arched entrance, fairly small, to a level. Open (Protheroe-Jones 1993, mine 159, no.21). *Not marked on historic OS mapping (MB Feb 2016)*	SN7163174218
96320		Wheel Pit	Slight remains of water wheel pit although virtually entirely washed away by stream (Protheroe-Jones 1993, mine 159, no.22). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. This is also shown on the 1896 Crosswood plan. Secondary wheel to PRN 96318 (MB Feb 2016).*	SN7162674201
96321		Building	Ruined building (Protheroe-Jones 1993, mine 159, no.23).	SN71577418

			Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. This is also on the 1896 Crosswood plan and is annotated as a "Smithy" (MB Feb 2016).	
96322		Spoil heap	Mixed coarse and crushed tips (Protheroe-Jones 1993, mine 159, no.24). *Only visible on 2nd edition 1905 OS map (MB Feb 2016)*	SN71627418
96323		Dressing Mill	Well-preserved ruins of dressing mill on 5 levels, great deal of loadings etc. (Protheroe-Jones 1993, mine 159, no.25). *Only visible on 2nd edition 1905 OS maps. These were built in 1899 under the Belgian company Société Anonyme Minière (MB Feb 2016)*	SN71637415
96324		Spoil heap	Fine dumps - large (Protheroe-Jones 1993, mine 159, no.26) *Only visible on 2nd edition 1905 OS maps (MB Feb 2016).*	SN71577410
96328		Tramway	Only trace of route of tramway from West Frongoch (160) mine is hedge bank alignment (Protheroe-Jones 1993, mine 159, no.30). *Visible on 1st edition 1888 1:2500 OS map, not shown to be extant on 2nd edition 1905 1:2500 OS map (MB Feb 2016)*	SN7115774201
96329		Shaft	Cratered, run in shaft (Protheroe-Jones 1993, mine 159, no.31). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. The 2nd edition also appears to show it. (MB Feb 2016)*	SN71347422
96333		Spoil heap	Development tips protruding from grassy hummocky area (Protheroe-Jones 1993, mine 158, no.6). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016)*	SN7183074280
96334	33846	Shaft	Boundary shaft: stonewalled collar; blocked with refuse; well preserved balance bob pit to south west with set of steps entering from north (to aid greasing of bearings) (Protheroe-Jones 1993, mine 158, no.7). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016)*	SN7184174306
96335		Spoil heap	Slight trench above grassy tips (Protheroe-Jones 1993, mine 158, no.8). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016)*	SN71897435

Table 3: Additional archaeological sites within the area of Wemyss mine recorded during the 2016 site walkover (Bell et al 2016) (Figure 3).

Wemyss Site Number	Type	Summary	Evidence	NGR
1	Building	Ruined Stone building emerging from eroding spoil tips in the northern area of the site and is level with a trackway runs parallel to its front.	Ruined Building	SN7160574239
2	Launder	RPJ 1993 Site No. 19 Wemyss (Mine 159): "Stone footing on site of launder"	Documentary	SN7172974256
3	Office and Workshop	Site of "Office & Workshop" depicted on 1896 Crosswood plan of Wemyss mine; not shown on any other mapping. No visible trace on ground.	Documentary	SN7158974193
4	Lime Kiln	"Old Lime kiln" identified on 1905 OS map, Structure visible on modern AP. Site not visited	Documentary	SN71396274145
5	Leat	Leat northeast of "Glanville's Shaft" running east-west, not recorded in HER	Earthwork	SN71805274344
6	Aqueduct	Remains of "Aqueduct" feeding wheel pit PRN 96319 as depicted on historic OS maps, not recorded in HER. Earthwork remains still visible	Earthwork	SN71747274252
7	Gully?	Possible remains of old trench or shaft. Not recorded in HER, shown on historic OS maps but not annotated as such.	Earthwork	SN71762 274264
8	House	Remains of Nant-y-Rhidyll farm house as shown on the 1888 1st edition OS map. Structural remains visible on modern AP	Ruined Building	SN71479274101
9	Leat?	Curvilinear feature shown on 1888 1st edition OS map, 1896 Crosswood plan and 2nd edition 1905 OS map. Also visible as earthwork with bank on southern side with flat bottomed channel. Starts at Adit (PRN 96308) and ends at the Smithy building (PRN 96321).	Earthwork and Documentary	SN71420274189
10	Tramway	Narrow gauge tramway shown on 1888 1st edition OS map at Western end of Wemyss site. Disused by 1905 2nd edition OS map	Documentary	SN7132174188
11	Buddles?	One possible buddle shown on 1st edition 1888 OS map. Three then shown on 1905 2nd edition OS map. On 1st edition OS, buddle appears to be fed by launder/leat	Documentary	SN7126874206
12	Leat/launder?	Possible leat or launder shown on 1st edition 1888 OS map feeding possible buddle (Site 11)	Documentary	SN7126974221
13	Slime pits?	Two rectangular structures shown on 1st edition 1888 OS map	Documentary	SN7125974203

14	Adit	Small "adit" marked on 1896 working plan map	Documentary	SN7164474231
15	Wheelpit?	Possible wheel pit shown on southern side of road on both 1888 and 1905 1:2500 OS maps. Possible leats and launders connected to it. As part of PRN 96306	Documentary	SN71291274212

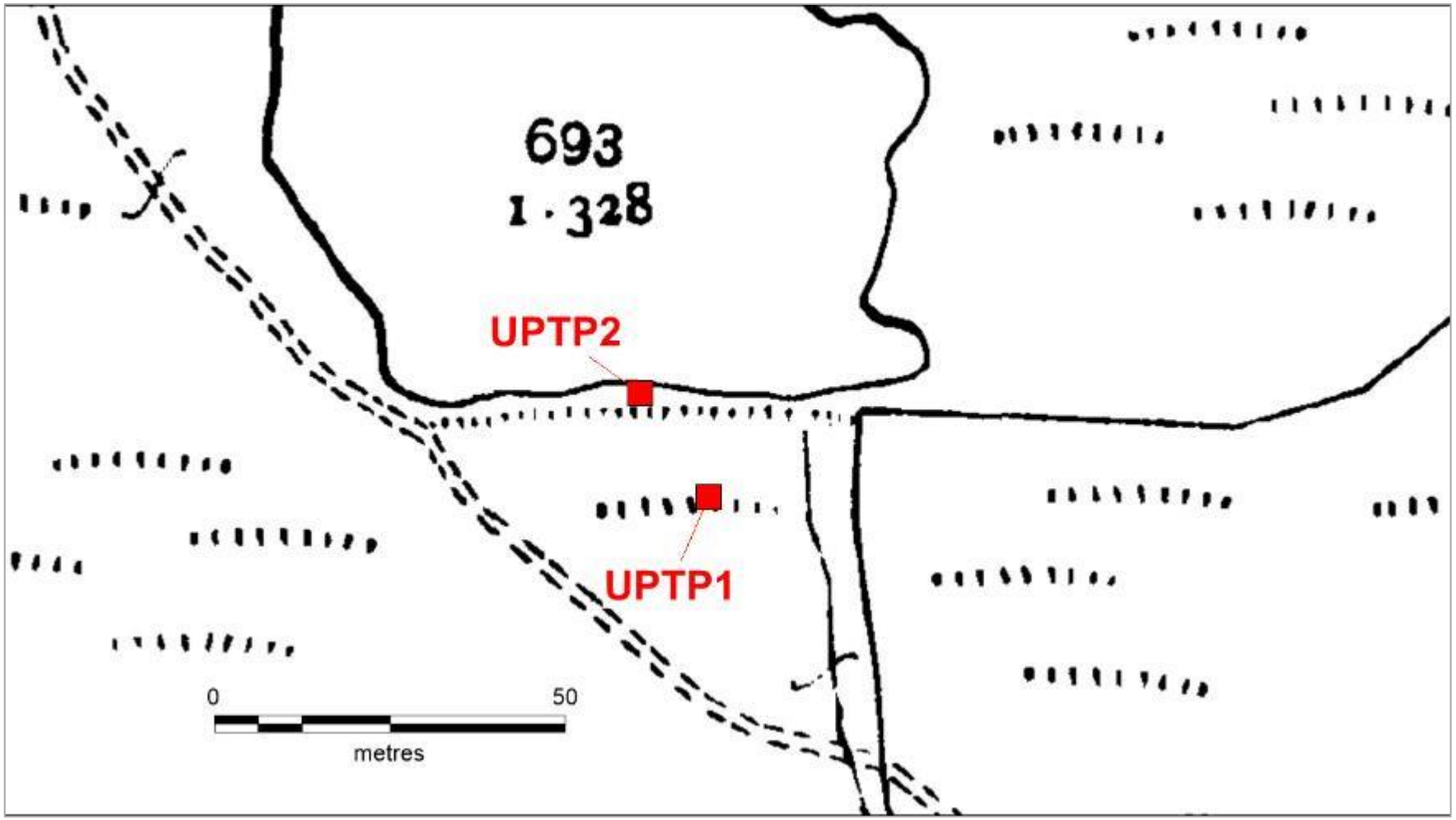

Figure 4: Extract of OS 2nd edition (1905) showing approximate locations of trenches close to former reservoir NW of Wemyss Mine.

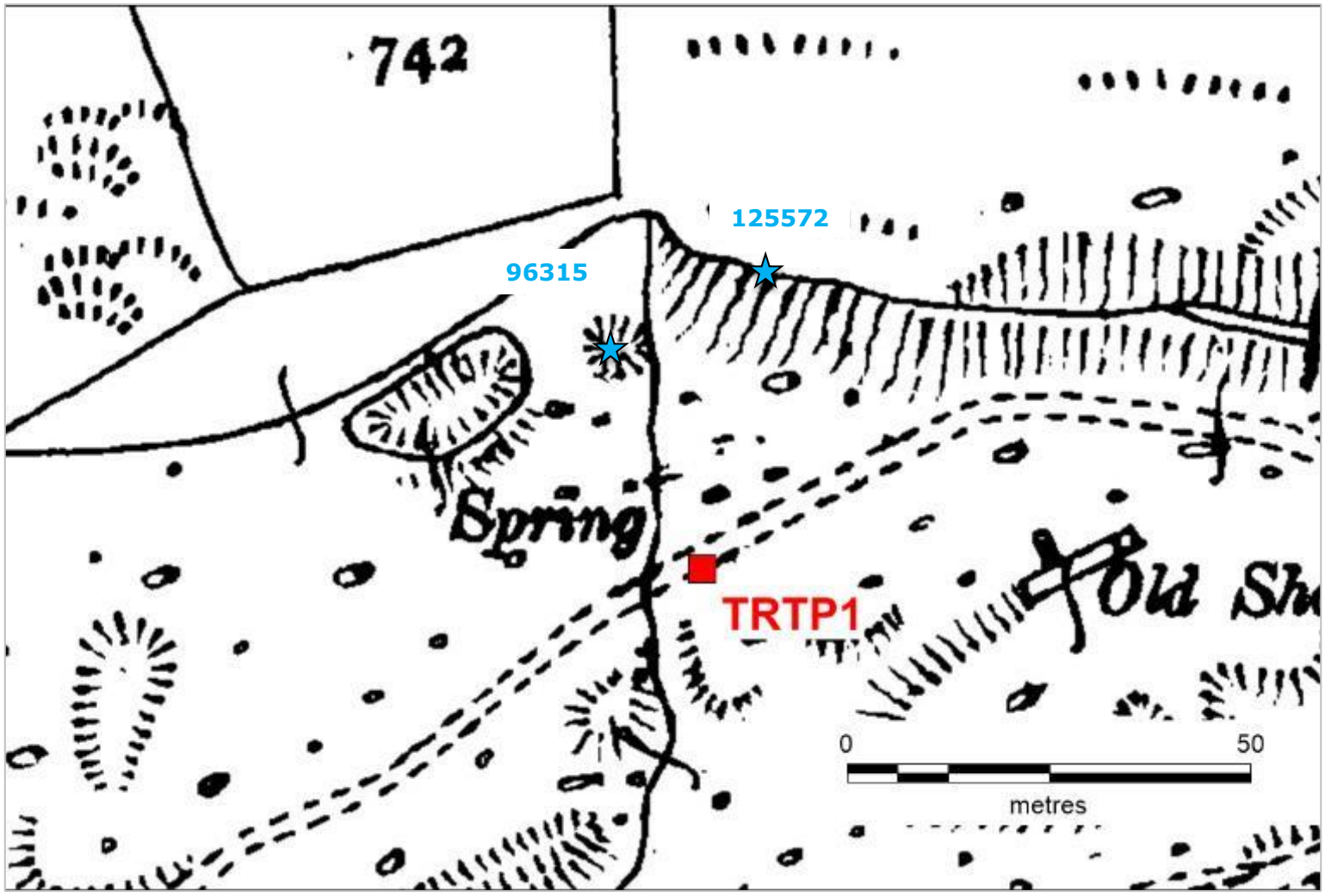

Figure 5: Extract of OS 2nd edition (1905) showing approximate location of trench on trackway above Wemyss Mine

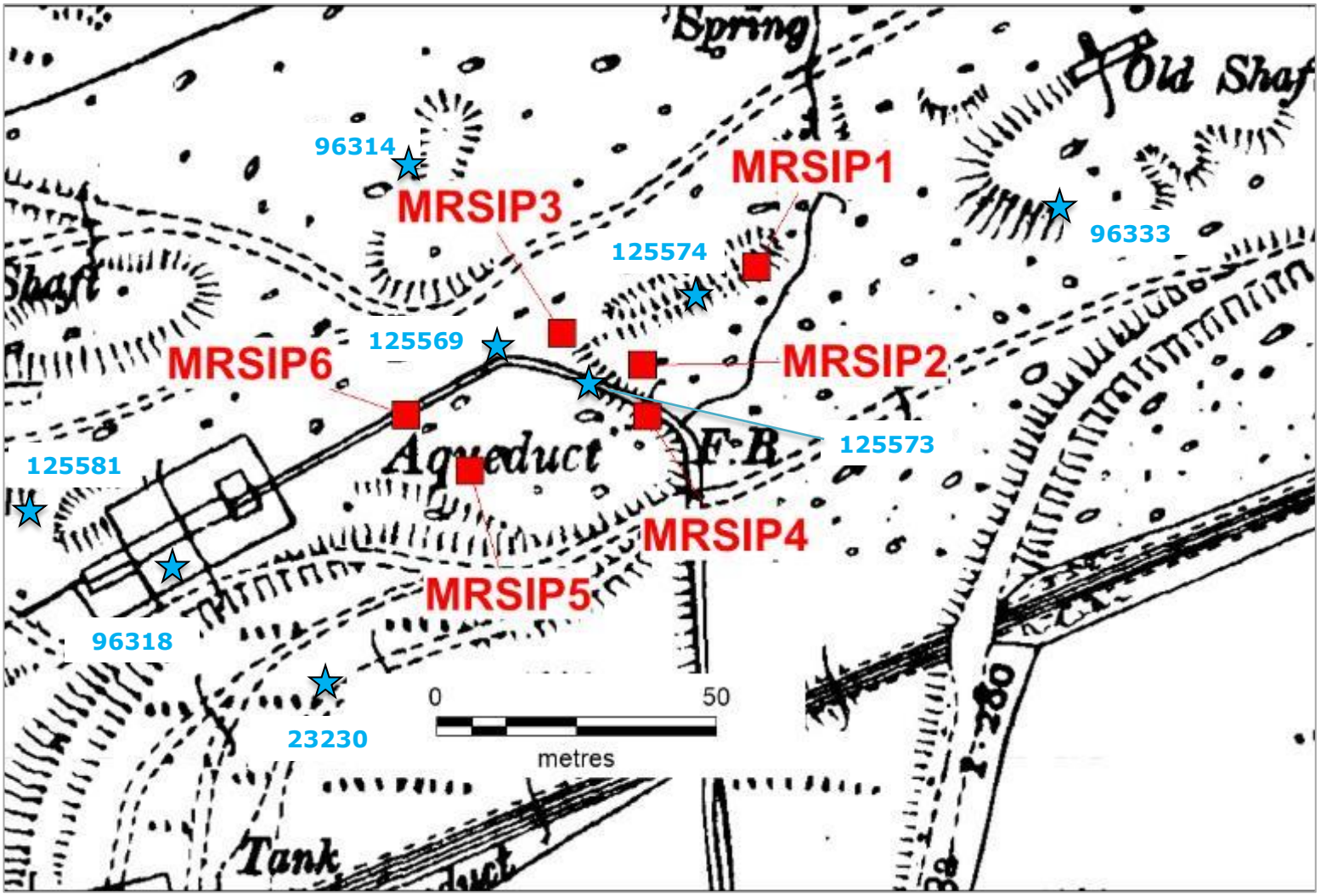

Figure 6: Extract of the OS 2nd edition (1905) showing approximate locations of hand-dug test pits NE of wheel-pit (PRN 96318)

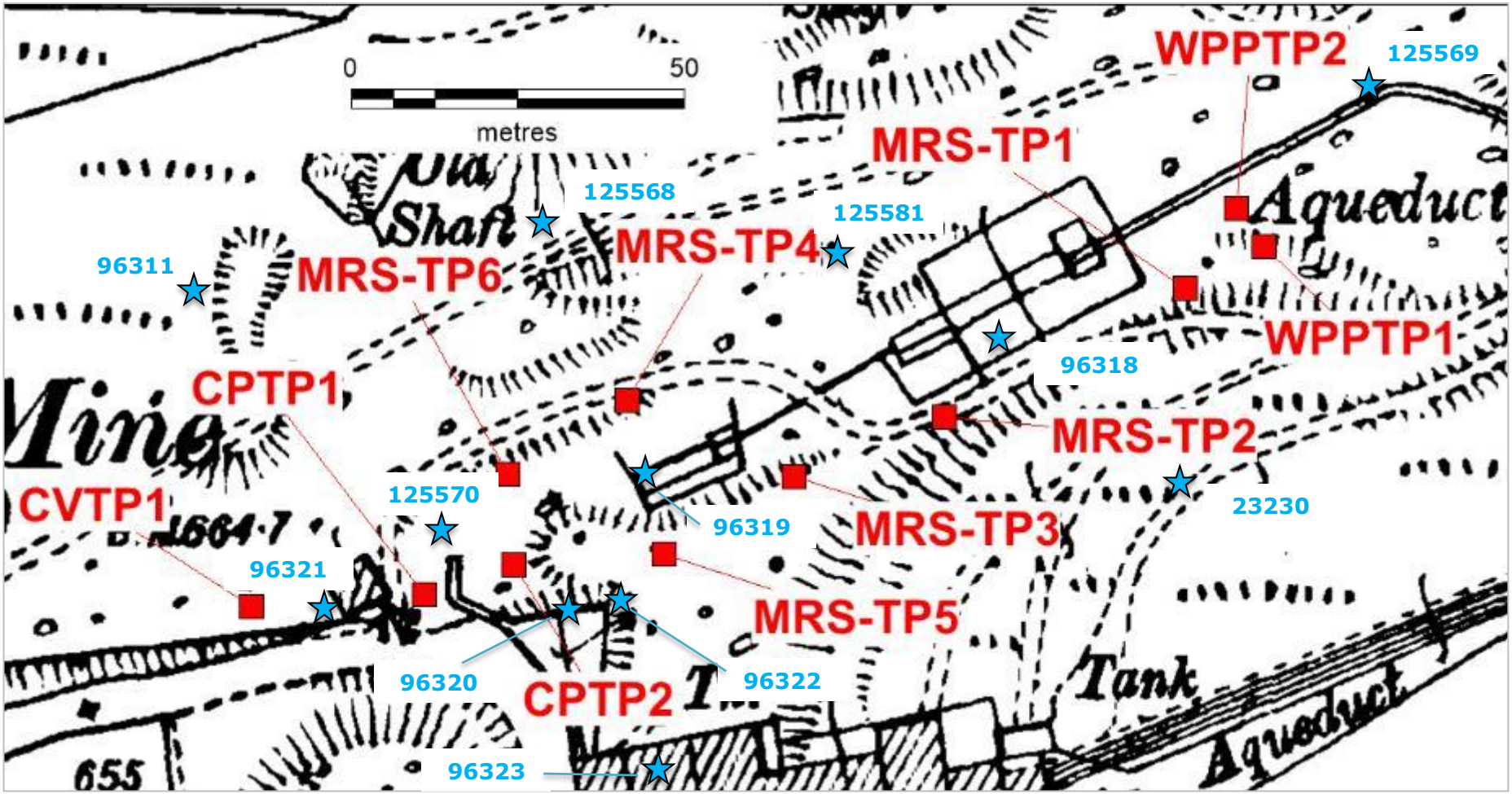

Figure 7: Extract of OS 2nd edition (1905) showing approximate locations of trenches in the region between the former dressing-mill (PRN 96323) and wheel-pit (PRN 96318)

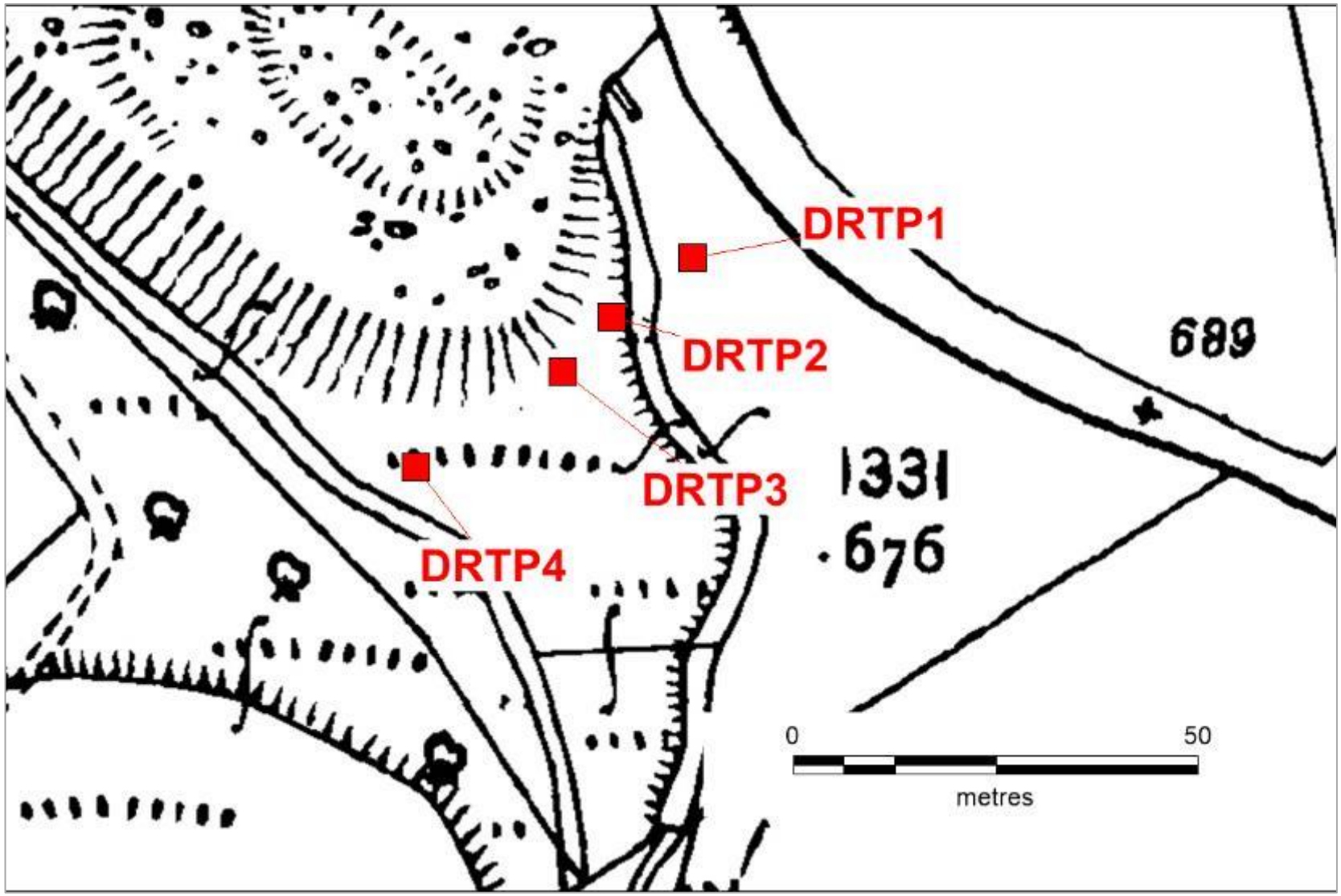

Figure 8: Extract of OS 2nd edition (1905) showing approximate locations of trenches east of Wemyss main spoil tip.

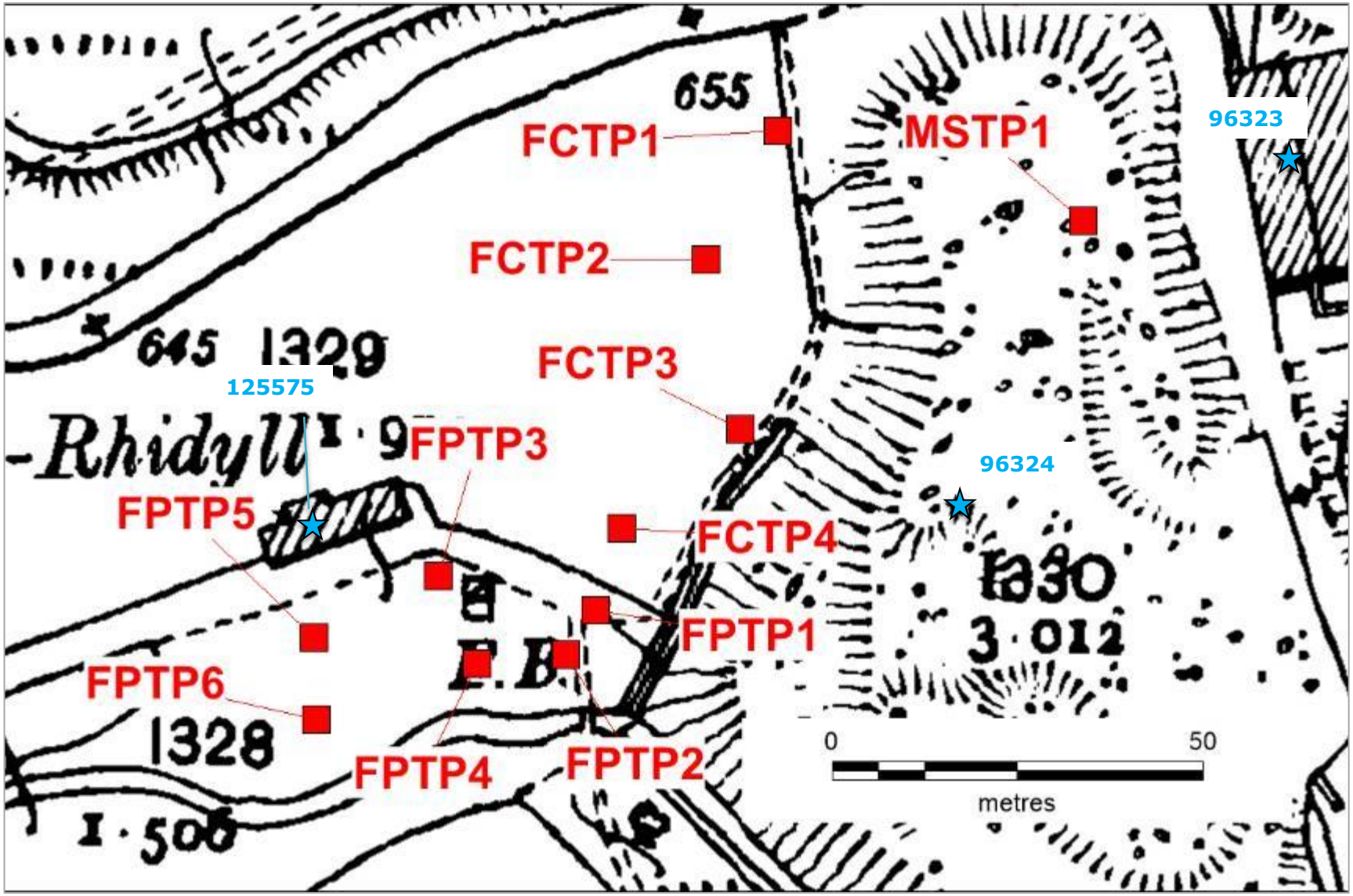

Figure 9: Extract of OS 2nd edition (1905) showing approximate locations of trenches west of Wemyss main spoil tip (PRN 96324).

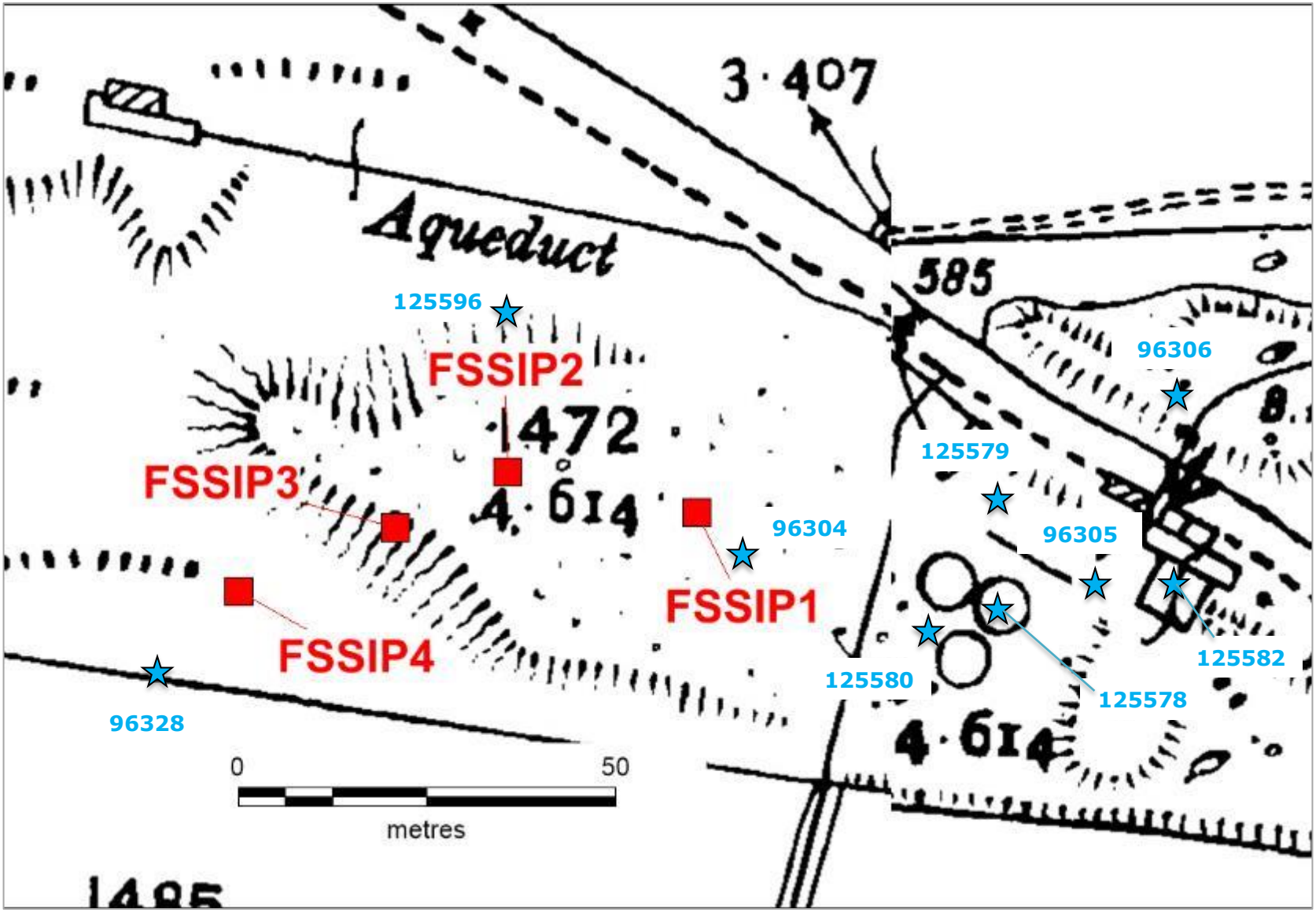

Figure 10: Extract of the OS 2nd edition (1905) showing approximate locations of test-pits on summit and base of spoil tip (PRN 96304) at Frongoch West.

2. THE SITE

2.1 Location and Topography

2.1.1 Wemyss former lead and zinc mine occupies the southwest facing slopes of Cwm Newidion valley with a maximum elevation of 295m at its northern extreme and a minimum elevation of 185m beside the banks of Nant Cwm Newidion. The town of Aberystwyth lies 14.6km to the northwest and the village of Pontrhydfendigaid approximately 2.5km to the southeast.

2.1.2 The mine workings are bisected by a minor road that runs from Pontrhydygroes to Abermagwr; to the north of the road are the upstanding remains structures associated with the mine, whilst to the south a large tip of processed waste slopes down to the stream Nant Cwm Newidion (Photo 1).

2.1.3 The underlying solid geology of the site comprises Devil's Bridge Formation; interbedded mudstone and sandstone (British Geological Survey 2020).

Photograph 1: Wemyss Mine spoil tips and former dressing mill.

2.2 Historical Development of Wemyss Mine (after Bell 2020).

2.2.1 Wemyss lead and zinc mine (PRN 23230) is immediately southwest of Frongoch mine (PRN 9151) and is located around 3.5km southwest of Devil's Bridge, Ceredigion. The Frongoch mineral lode ran through both Frongoch and Wemyss mines and was worked independently until 1846 when Wemyss was purchased by John Taylor & Sons Company; owners of Frongoch mine. Thereafter, Wemyss was operated in conjunction with Frongoch until the closure and sale of both mines in 1903.

2.2.2 Shortly after its procurement by John Taylor the Wemyss adit was extended eastwards to serve the Frongoch workings. By 1848 the Wemyss adit had holed through to the Frongoch adit at the 24 fathom level, subsequently becoming the deep ("Frongoch") adit that purportedly

extended for 3 miles (Bick, 1986). The *"adit began on the main lode near the road* [northern side presumably]*, but after about 150 fathoms turned northeast for about 25 fathoms before continuing eastwards on a north lode which outcrops on surface about 20 fathoms north of Boundary Shaft* [at Frongoch]" *(Bick, ibid:14).*

2.2.3 During this period in the mid-nineteenth century the mines were both profitable and productive while the operations continued to exploit deeper levels. In 1863 new dressing floors were constructed at Wemyss to process the ore from Frongoch. Sometime during the 1870s Ball's Shaft, the first of two principal shafts at Wemyss was cut into the lode at 76 fathoms (Bick, *ibid*).

2.2.4 However, by the latter half of the nineteenth century the mines began to struggle as the productivity of the lode began to dwindle. Meanwhile the prices of metal fluctuated against ever increasing working costs. In 1878, the mines made their first loss and the Taylor Company sold their lease of both mines.

2.2.5 In the same year of 1878 the lease was obtained by Messrs Henry Davey and Alexander Kerby of London, and John Kitto from Llanidloes. By all accounts Kitto, a competent and successful mining engineer, was the primary agent and motivator of this venture. It was during the early years of this leasehold that Glanville's Shaft; the second of the principal shafts was cut into the lode. Unlike Ball's shaft, Glanville's Shaft was much shallower at only 16 fathoms (Bick, *ibid*). Kitto was also responsible for the construction of the pit for a 56ft waterwheel (later replaced by a 55ft wheel) at the lower levels of the site which was fed by a circuitous leat that carried water from the dressing floors (Bick, *ibid*). The later 55ft wheel turned a line of flat rods connected to the machinery at Vaughan's New Shaft at Frongoch (Bick, *ibid*).

2.2.6 In 1898 both sites were leased by the Belgian company *"Société Anonyme Minière".* The new lease holders endeavored to modernize the site by constructing a hydro-electric power station at nearby Pont Ceunant to power the machinery and mining operations. The five tiered, stone built dressing mill which now dominates the site, was built in 1899 to process the ore from Frongoch. Built on the side of the slope, each tier was occupied by a machine which was supported by a series of platforms and walls, with the dressing process becoming finer downslope. The mill was fed from material from Vaughan's New Shaft at Frongoch via a chain operated tramway which passed under the road by means of a cutting (Bick, *ibid*).

2.2.7 In spite of such optimistic investments, the venture proved to be ill fated and terminally brief. The metal markets continued to be volatile but were fleetingly favorable between 1898 and 1900. However, full production was not underway until 1902, and even then, the yields paled in comparison to what Kitto had previously achieved in spite of the absence of modern intervention (Bick, *ibid*). It would seem that during this time production at Wemyss was solely focused on processing the waste dumps from Frongoch. The new dressing mills proved to be highly efficient in this task, producing a dump of tailings and fine waste, of monumental proportions which is still visible today.

2.2.8 Full mining operations ceased at Frongoch in June 1903 although the dressing mill at Wemyss continued processing ore until August of the same year. Finally, the mines and machinery were sold at auction to Messrs R.A King & Company in November 1903 (Bick, *ibid*). Thereafter, much of the

substantial spoil tips at Frongoch were re-processed during the early twentieth century, whilst Wemyss was left to quietly decay and erode.

3. WATCHING BRIEF METHODOLOGY

3.1 Fieldwork

3.1.1 The watching brief was undertaken in accordance with the Chartered Institute of Archaeologists' (CIfA) *Standard and Guidance for an Archaeological Watching Brief* (2014).

3.1.2 A written scheme of investigation was prepared by DAT Archaeological Services detailing the proposed archaeological works, this is included in Appendix I.

3.1.3 Recording of all archaeological features or deposits conformed to best current professional practice and was carried out in accordance with the Recording Manual[2] used by DAT Archaeological Services. A written, drawn and photographic record was maintained throughout this watching brief. All contexts encountered during this watching brief were recorded.

3.2 Timetabling of Fieldwork

3.2.1 The watching brief took place between January 11th and 15th and January 18th and 21st, 2021. The weather comprised periods of heavy rain interspersed with drier conditions.

3.3 Post-Fieldwork Reporting and Archiving

3.3.1 All data recovered during the fieldwork will be collated into a site archive structured in accordance with specifications in Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation (Brown 2011), and the procedures recommended by the National Monuments Record, Aberystwyth.

3.3.2 The results of the fieldwork have been assessed in local, regional and wider contexts. The report includes a desk-based research element to ensure that the site is placed within its wider archaeological context.

3.3.3 A report fully representative of the results of the fieldwork has been prepared.

[2] *DAT Archaeological Services have adopted the Recording Manual developed by English Heritage Centre for Archaeology. A copy will be available on-site for inspection if required.*

Photograph 2: Machine excavation of trial trenches.

4. WATCHING BRIEF RESULTS

4.1 Geotechnical Investigations

4.1.1 A total of forty geotechnical investigations were monitored during the archaeological watching brief (due to severe water ingress FC TP4 was repositioned 2m further south and renamed FC TP4a). Thirty of these were machine-dug trial trenches using a small 360° mechanical excavator measuring approximately 2m long by 0.5m wide (Photo 2), and the remaining ten were hand-dug pits approximately 0.4m across.

4.1.2 Due to the presence of surface water (Photo 3) at the allotted locations for a small number of the trenches and pits it was necessary to re-locate them slightly, albeit keeping them as close as possible to their original positions.

4.1.3 Of the forty geotechnical investigations, three of them revealed archaeological features other than layers of mine-waste or natural deposits.

- UP TP1 (a 2m trench, half-sectioning a 4m wide bank) showed the bank to be constructed from peaty turves (Figure 4, Photo 4).

- CP TP2 (a 2m trench positioned 13m east along fence from main gate, then 13m north into site) revealed a substantial wall 0.7m down from the surface. The wall was aligned WNW-ESE and was 0.6m wide and at least 0.8m deep - possibly 1.2m deep. The south face had a slight batter. Water ingress prevented the full depth of the wall being seen (Figure 7, Photos 22 and 23)

- FC TP4 (a 2m trench positioned in the field west of the main spoil tip) revealed a stone-filled drain, 0.5m below the surface. It was 0.45m wide and 0.5m deep (Figure 9, Photo 33).

4.1.4 Below are the results for all 40 geotechnical pits excavated over the course of the groundworks (for individual locations please see Figures 4 to 10).

Photograph 3: Machine excavation of trial trenches.

UP TP1 (Location shown in Figure 4)

UP TP1 (2m long x 0.5m wide x 1.4m deep) Aligned NE-SW NGR SN 271753 274546		
Context Number	Description	Depth
1048	Peat layer	0.25m
1049	Light yellow clay and gravels	0.4m
1050	Stony, grey clay with quartz pieces; bedrock possibly encountered at 1.4m.	1.4m

Photograph 4: View east: UP TP1– 1m scale

UP TP2 (Location shown in Figure 4)

UP TP2 (2m long x 0.5m wide x 2m deep) Aligned N-S NGR SN 271757 274534		
Context Number	Description	Depth
1045	Peaty turves; material for construction of 4m wide, 0.6m high bank (half-sectioned on south side).	0.6m
1046	Yellow, stony clay	1.4m
1047	Weathered sedimentary bedrock.	Excavated to a depth of 2m

Photograph 5: View northeast: half section in bank showing peat turves – 0.5m scale

TR TP1 (Location shown in Figure 5)

TR TP1 (2m long x 0.5m wide x 2m deep) Aligned E-W NGR SN 271789 274307		
Context Number	Description	Depth
1051	Loose, grey clayey-sand with high percentage of angular stone; upper layer of track.	0.25m
1052	Brown, clayey-sand and frequent small angular stone - ballast for track.	0.6m
1053	Loose, very stony with clayey-sand. Whether mine-waste or degraded natural is uncertain. Possible solid bedrock at 2m.	2m

Photograph 6: View north: TR TP1 cut into trackway – 1.m scale

MRS IP1 (Location shown in Figure 6)

MRS IP1 (0.4m x 0.4m x 0.45m deep) NGR SN 271701 274226		
Context Number	Description	Depth
1037	Grey, sandy-clay and frequent small stones down to bedrock – redeposited material to create bank?	0.45m

Photograph 7: View north: MRS IP1 - 0.5m scale

MRS IP2 (Location shown in Figure 6)

MRS IP2 (0.4m x 0.4m x 0.7m deep) NGR SN 271663 274209		
Context Number	Description	Depth
1038	Orange-brown, silty-clay down to weathered bedrock.	0.7m

Photograph 8: View NNE: MRS IP2 – 0.5m scale

MRS IP3 (Location shown in Figure 6)

MRS IP3 (0.4m x 0.4m x 0.35m deep) NGR SN 271645 274204		
Context Number	Description	Depth
1039	Dark grey-brown, silty-clay	0.05
1040	Weathered bedrock	Excavated to a depth of 0.35m

Photograph 9: View northeast: MRS IP3 – 0.5m scale (Figure 5)

MRS IP4 (Location shown in Figure 6)

MRS IP4 (0.4m x 0.4m x 1.2m deep) NGR SN 271617 274209		
	Description	Depth
1041	Grey-brown, silty/sandy-clay and frequent small stones. Bedrock not encountered.	1.2m

Photograph 10: View northeast: MRS IP4 – 0.5m scale

MRS IP5 (Location shown in Figure 6)

MRS IP5 (0.4m x 0.4m x 1.2m deep) NGR SN 271629 274199		
Context Number	Description	Depth
1042	Grey-brown, silty/sandy-clay and small angular stone. Bedrock not encountered.	1.2m

Photograph 11: View east: MRS IP5 – scale 0.5m

MRS IP6 (Location shown in Figure 6)

MRS IP6 (0.4m x 0.4m x 0.75m deep) NGR SN 271597 274199		
Context Number	Description	Depth
1043	Orange-brown, sandy-clay.	0.4m
1044	Grey clay and small stones lying above weathered bedrock.	0.75m

Photograph 12: View ESE: MRS IP6 – 0.5m scale

WPP TP1 (Location shown in Figure 7)

WPP TP1 (0.4m x 0.4m x 0.5m deep) NGR SN 271713 274232		
Context Number	Description	Depth
1035	Grey-brown, sandy-clay and frequent small/medium stone above bedrock.	0.5m

Photograph 13: View southeast: WPP TP1 – 0.5m scale

WPP TP2 (Location shown in Figure 7)

WPP TP2 (0.4m x 0.4m x 1.2m deep) NGR SN 271707 274239		
Context Number	Description	Depth
1036	Orange-brown, sandy-clay and small angular stone – probably natural.	1.2m

Photograph 14: View northeast: WPP TP2 – 0.5m scale

MRS TP1 (Location shown in Figure 7)

MRS TP1 (2m long x 0.5m wide x 0.65m deep) Aligned E-W NGR SN 271701 274226		
Context Number	Description	Depth
1012	Thin layer of grey, coarse sand/fine gravels; ore-processing waste.	0.08m
1013	Orange-brown, sandy-clay with frequent small sharp stones -possibly natural.	0.25m
1014	Grey, sandy-clay – probably natural	0.12m
	Sedimentary bedrock.	Excavated to a depth of 0.6m

Photograph 15: View east: MRS TP1 - 1m scale

MRS TP2 (Location shown in Figure 7)

MRS TP2 (2m long x 0.5m wide x 0.25m deep) Aligned NE-SW NGR SN 271663 274209		
Context Number	Description	Depth
1016	Grey-brown, clayey-sand containing high percentage of small angular stone – probably ore-processing waste.	0.25m
1017	Sedimentary bedrock	

Photograph 16: View northeast: MRS TP2 - 1m scale

MRS TP3 (Location shown in Figure 7)

MRS TP3 (2m long x 0.5m wide x 2.1m deep) Aligned N-S NGR SN 271645 274204		
Context Number	Description	Depth
1018	Grey, coarse sand/fine gravels; ore-processing waste.	0.4m
1019	Loose, small/medium angular stone; some stone	0.4m
1020	Orange-brown, clayey-sands with small, angular stone probably natural.	1.7m
1021	Sedimentary bedrock.	Excavated to a depth of 2.1m

Photograph 17: View south: MRS TP3 – 1m scale

MRS TP4 (Location shown in Figure 7)

MRS TP4 (2m long x 0.5m wide x 1.1m deep) Aligned E-W NGR SN 271617 274209		
Context Number	Description	Depth
1022	Grey, coarse sand/fine gravels; ore-processing waste.	0.12m
1023	Loose, angular, medium sized stone, some with mortar attached. The mortared stone could have originated from a building further up the slope shown in the OS first edition map. Watered ingress prevented any deeper excavation.	1.1m

Photograph 18: View north: MRS TP4 – 1m scale

MRS TP5 (Location shown in Figure 7)

MRS TP5 (2m long x 0.5m wide x 2.1m deep) Aligned E-W NGR SN 271629 274199		
Context Number	Description	Depth
1024	Grey, coarse sand/fine gravels; ore-processing waste.	0.1m
1025	Loose, angular, small/medium stone	0.7m
1026	Orange-brown, clayey-sand and small angular stone – probably natural.	2.m
1027	Sedimentary bedrock	Excavated to a depth of 2.1m

Photograph 19: View east: MRS TP5 – 1m scale

MRS TP6 (Location shown in Figure 7)

MRS TP6 (2m long x 0.5m wide x 2.7m deep) Aligned ENE-WSW NGR SN 271597 274199		
Context Number	Description	Depth
1028	Grey, coarse sand/fine gravels; ore-processing waste.	0.8m
1029	Orange-brown, clayey-sand and small angular stone – probably natural	2.5m
1030	Weathered sedimentary bedrock	Excavated to a depth of 2.7m

Photograph 20: View WSW: MRS TP6 – 0.5m scale

CP TP1 (Location shown in Figure 7)

CP TP1 (2m long x 0.5m wide x 1.3m deep) Aligned NW-SE NGR SN 271603 274188		
Context Number	Description	Depth
1088	Grey, coarse sand/fine gravels; ore-processing waste.	0.35m
1089	Loose, mixed deposit of mine-waste including large stones and brick. Water ingress at 1.3m – test pit abandoned.	01.3m

Photograph 21: View west: CP TP1 – 1m scale

CP TP2 (Location shown in Figure 7)

CP TP2 (2m long x 0.5m wide x 1.9m deep) Aligned NE-SW NGR SN 271600 274184		
Context Number	Description	Depth
1090	Loose, stony deposit with modicum of clayey-sand	0.7m
1091	Stone wall 0.7m below top of test pit. Aligned WNW-ESE. Approximately 0.6m wide and at least 0.8m high - possibly 1.2m high. Slight batter on exposed south elevation? Excavation of trench abandoned at north side of wall and trench extended to the south. Water ingress prevented full exposure of south elevation. On south side of wall, below (1090), a series of coarse sand/fine gravel laminations (1092).	Top of wall 0.7m below ground surface Base of wall between 1.5m and 1.9m below ground surface.
1092	Series of orange-brown and grey laminations consisting of coarse sand/fine gravels. Water ingress obstructed view	Water ingress concealed full depth of deposit.

Photograph 22: View WNW: showing top of wall (1091) within CP TP2 – 0.5m scale

Photograph 23: View northeast: partially exposed southwest elevation of wall (1091) – 0.5m scale

CV TP1 (Location shown in Figure 7)

CV TP1 (2m long x 0.5m wide x 2.4m deep) Aligned E-W NGR SN 271545 274178		
Context Number	Description	Depth
1031	Dark, grey-brown topsoil	0.1m
1032	Light brown, sandy-clay	0.4m
1033	Grey, coarse sand/fine gravels	0.5m
1034	Orange-brown, clayey-sand and frequent small/medium angular stone	2.3m
1034	Weathered sedimentary bedrock	Excavated to a depth of 2.4m

Photograph 24: View east: CV TP1 – 1m scale

DR TP1 (Location shown in Figure 8)

DR TP1 (2m long x 0.5m wide x 1.5m deep) Aligned NNE-SSW NGR SN 271620 274036		
Context Number	Description	Depth/thickness
1000	Compact layer of grey, fine gravels/course sand or 'tailings' below turf layer; remains of ore-processing waste.	Varies between 0.25m and 0.35m
1001	Interleaving layers of course, clayey-sand and crushed shale with iron staining down to a depth of approximately 1.25m; remains of ore-processing waste.	1.25m
1002	Weathered sedimentary bedrock.	Excavated to a depth of 1.5m.

Photograph 25: View ESE: DR TP1 - 1m scale

DR TP2 (Location shown in Figure 8)

DR TP2 (2m long x 0.5m wide x 1m deep) Aligned NE-SW NGR SN 271612 274030		
Context Number	Description	Depth
1004	Grey, coarse sand/fine gravels; ore-processing waste.	0.05m.
1005	Small shale pieces within a light orange-brown, silty-clay – natural?	0.9m
1006	Weathered sedimentary bedrock.	Excavated to a depth of 1m.

Photograph 26: View ENE: interior of DR TP2 - 1m scale

DR TP3 (Location shown in Figure 8)

DR TP3 (2m long x 0.5m wide x 1.45m deep) Aligned NE-SW NGR SN 271601 274022		
Context Number	Description	Depth
1007	Grey coarse sand/fine gravels; ore-processing waste.	0.10m.
1008	Small shale pieces within a light orange-brown, silty-clay – natural?	0.9m
1009	Weathered sedimentary bedrock.	Excavated to a depth of 1.45m.

Photograph 27: View southeast: DR TP3 - 1m scale

DR TP4 (Location shown in Figure 8)

DR TP4 Hand dug (0.4m long x 0.5m wide x 1.2m deep) NGR SN 271584 274018		
Context Number	Description	Depth
1010	Grey, coarse sand/fine gravels; ore-processing waste; water ingress at 0.5m.	1.2m

Photograph 28: View northeast: DR TP4 – 0.5m scale

MS TP1 (Location shown in Figure 9)

MS TP1 (Dimensions 2m long x 0.5m wide x 1.7m deep) Aligned NNW-SSE NGR SN 271595 274131		
Context Number	Description	Depth
1011	Grey, coarse sand/fine gravels; ore-processing waste.	1.7m

Photograph 29: View west: MS TP1 - 1m scale

FC TP1 (Location shown in Figure 9)

FC TP1 (2m long x 0.5m wide x 2.9m deep) Aligned N-S NGR SN 271546 274151		
Context Number	Description	Depth
1060	Grey, coarse sand/fine gravels; ore-processing waste.	0.1m
1061	Orange-brown, silty-sandy clay with moderate small angular stone/loose, grey, silty-sandy clay with frequent small/medium sized stone – natural deposits	2.9m

Photograph 30: View east: FC TP1 – 1m scale

FC TP2 (Location shown in Figure 9)

FC TP2 (2m long x 0.5m wide x 2.7m deep) Aligned E-W NGR SN 271536 274134		
Context Number	Description	Depth
1062	Grey, coarse sand/fine gravels; ore-processing waste.	0.3m
1063	Orange-brown, silty-sandy clay with moderate small angular stone/loose, grey, silty-sandy clay with frequent small/medium sized stone – natural deposits.	2.7

Photograph 31: View east: FC TP2 – 1m scale

FC TP3 (Location shown in Figure 9)

FC TP3 (2m long x 0.5m wide x 1.7m deep) Aligned E-W NGR SN 271541 274111		
Context Number	Description	Depth
1064	Grey, coarse sand/fine gravels; ore-processing waste.	0.3m
1065	Loose, grey-brown, silty-sand.	0.6m
1066	Orange-brown, gravelly clay	0.95
1067	Grey, gravelly-clay with large stones and quartz lower down the layer. Water ingress at 1.7m. Uncertain whether (1066) and (1067) are mine-waste or natural deposits. Water ingress at 1.7m.	1.7m

Photograph 32: View southeast: FC TP3 – 1m scale

FC TP4 (Location shown in Figure 9)

FC TP4 (2m long x 0.5m wide x 1m deep) Aligned ESE-WNW NGR SN 271529 274104		
Context Number	Description	Depth
1068	Topsoil	0.1m
1069	Grey, coarse sand/fine gravels; ore-processing waste.	0.4m
1070	Stone-filled drain, approximately 0.45m wide and 0.5m deep. Below (1069) and cut into (1071).	1m
1071	Loose, sandy-gravel deposit with frequent stone and small amount of clay. Test pit abandoned due to water ingress.	1m

Photograph 33: View NNE: FC TP4; stone-filled drain (in section) beside 1m scale

FC TP4a (Location shown in Figure 9)

FC TP4a - replaces abandoned FC TP4 (2m long x 0.5m wide x 1.8m deep) Aligned N-S		
Context Number	Description	Depth
1072	Topsoil	0.1m
1073	Grey, coarse sand/fine gravels; ore-processing waste.	0.35m
1074	Loose, sandy-gravel deposit with small amount of clay, stones and quartz pieces; probably mine-waste. Bedrock visible at 1.8m.	1.8m

Photograph 34: View southeast: FC TP4a – 1m scale

FP TP1 (Location shown in Figure 9)

FP TP1 (2m long x 0.5m wide x 1.7m deep) Aligned ESE-WNW NGR SN 271525 274096		
Context Number	Description	Depth
1075	Topsoil	0.1m
1076	Grey, coarse sand/fine gravels; ore-processing waste.	0.4m
1077	Mixed deposit of clayey-sands and stone – possibly mine material. Weathered bedrock at 1.8m	1.8m

Photograph 35: View southeast: FP TP1 – 1m scale

FP TP2 (Location shown in Figure 9)

FP TP2 (2m long x 0.5m wide x 1.5m deep) Aligned N-S NGR SN 271517 274086		
Context Number	Description	Depth
1078	Grey, coarse sand/fine gravels; ore-processing waste.	0.3m
1079	Buried topsoil	0.4m
1080	Mixed deposit of clayey-sands and small/medium stone with occasional large stone – mine material? Weathered bedrock at 1.5m	1.5m

Photograph 36: View south: FP TP2 – 0.5m scale

FP TP3 (Location shown in Figure 9)

FP TP3 (2m long x 0.5m wide x 1.4m deep) Aligned NW-SE NGR SN 271500 274098		
Context Number	Description	Depth
1081	Grey, coarse sand/fine gravels; ore-processing waste.	0.1m
1082	Gravelly, grey sandy clay	0.4m
1083	Orange-brown, sandy-clay, frequent small/medium stone – natural? Bedrock v at 1.4m.	1.4m

Photograph 37: View west: FP TP3 – 0.5m scale

FP TP4 (Location shown in Figure 9)

FP TP4 (2m long x 0.5m wide x 1.3m deep) Aligned E-W NGR SN 271500 274087		
Context Number	Description	Depth
1081	Grey, coarse sand/fine gravels; ore-processing waste.	0.4m
1082	Dark grey sandy clay	0.6m
1083	Stony, clayey gravels; weathered bedrock visible at 1.3m	1.3m

Photograph 38: View east: FP TP4 – 0.5m scale

FP TP5 (Location shown in Figure 9)

FP TP5 (2m long x 0.5m wide x 0.4m deep) Aligned N-S NGR SN 271483 274094		
Context Number	Description	Depth
1084	Topsoil	0.25m
1085	Yellow-brown, sandy-clay, frequent small stones. Water ingress at 0.4m – test pit abandoned.	0.4m

Photograph 39: View north: FP TP5 – 1m scale

FP TP6 (Location shown in Figure 9)

FP TP6 (2m long x 0.5m wide x 0.7m deep) Aligned E-W NGR SN 271486 274088		
Context Number	Description	Depth
1086	Topsoil	0.15m
1087	Grey coarse sand/fine gravels and clay. Water ingress at 0.7m – test pit abandoned.	0.7m

Photograph 40: View southeast: FP TP6 – 1m scale

FSS IP1 (Location shown in Figure 10)

FSS IP1 (0.4m x 0.4m x 0.9m deep) NGR SN271220 274202		
Context Number	Description	Depth
1054	Topsoil	0.1m
1055	Grey, coarse sand/fine gravels; ore-processing waste.	0.4m
1056	Light brown, silty clay with moderate amount of small stone. Bedrock encountered at 0.9m	0.9m

Photograph 41: View ESE: FSS IP1 – 0.5m scale

FSS IP2 (Location shown in Figure 10)

FSS IP2 (0.4m x 0.4m x 1.2m deep) NGR SN271230 274221		
Context Number	Description	Depth
1057	Grey, coarse sand/fine gravels; ore-processing waste.	1.2m

Photograph 42: View northeast: FSS IP2 – 0.5m scale

FSS IP3 (Location shown in Figure 10)

FSS IP3 (0.4m x 0.4m x 1.2m deep) NGR SN 271206 274224		
Context Number	Description	Depth
1058	Grey, coarse sand/fine gravels; ore-processing waste.	1.2m

Photograph 43: View northwest: FSS IP3 – 0.5m scale

FSS IP4 (Location shown in Figure 10)

FSS IP4 (0.4m x 0.4m x 1.2m deep) NGR SN 271192 274220		
Context Number	Description	Depth
1059	Grey, coarse sand/fine gravels; ore-processing waste.	1.2m

Photograph 44: View north: FSS IP4 – 0.5m scale

5. CONCLUSIONS

5.1 An archaeological watching brief was undertaken during the excavation of forty individual geotechnical pits located at sites prescribed by the 'Wemyss - Ground Investigation Specification' document.

5.2 Following discussions with the archaeological curator Dyfed Archaeological Trust-Development Management (DAT-DM) it was recommended that an archaeological watching brief was carried out during the ground investigations, as several of the proposed trial trenches and hand dug inspection pits were situated in archaeologically sensitive areas of the mine. The aim of the watching brief was to provide information on the character and significance of any below ground archaeological remains that may be revealed within the trial trenches and inspection pits.

5.3 Due to the small dimensions of the investigative trenches and pits, and the depth of deposits encountered, it was occasionally difficult to ascertain whether an exposed layer within the trench or pit was natural ground, redeposited natural or mine waste.

5.4 The grey, coarse sand/fine gravels exposed below the turf in the fields on either side of the main waste tip (Figures 7 and 8) are similar in composition to the tip deposits, which suggested that the extent of the tip is wider than that seen on the surface.

5.5 Investigative trench CP TP2 contained a substantial wall 0.7m below the ground surface. The wall ran across the width of the trench therefore only 0.5m of its length was exposed. Nevertheless, it was deemed to be 0.6m wide and at least 0.8m deep. Below this depth water ingress prevented being able to see the base of the trench, however, the machine's bucket encountered a solid barrier at approximately 1.2m. Whether this was bedrock or a surface it was impossible to determine but it is not unreasonable to suggest that the wall extended down to the level of the barrier. No wall or structure is shown on the OS 1st or 2nd edition maps at this position.

5.6 It is uncertain whether the stone-filled drain seen in FC TP4 is associated with the building to the west of it (Figure 8) or simply a field drain.

5.7 Overall the watching brief has demonstrated that the majority of the geotechnical investigations, apart from CP TP2, did not encounter any hard structures associated with the former mine.

5.8 The fact that one, possibly substantial, structure (not shown on any historical map), was uncovered during the trial trenching implies that it is possible that significant below ground archaeological remains lie within the development area, and future ground works undertaken in the area of the mine may require archaeological mitigation.

6. SOURCES

Cartographic

1888 - First edition Ordnance Survey 25-inch map of Cardiganshire.

1905 – Second edition Ordnance Survey 25-inch map of Cardiganshire

Un-Published

Bell, M, Meek, J and Murphy, F, 2016, *Metal Mine Remediation Project Part 3: Wemyss Archaeological Assessment*, DAT Unpublished Report No 2016/05 (Part 3)

Bell, M, 2020, *Wemyss Metal Mine Archaeological Desk-Based Assessment Update,* DAT Unpublished Report No 2020/55

Database

Dyfed Archaeological Trust Historic Environment Record, housed with Dyfed Archaeological Trust in The Corner House, 6 Carmarthen Street, Llandeilo, Carmarthenshire, SA19 6AE.

Websites

British Geological Survey mapping portal. Accessed on the 16/02/21

APPENDIX I:

**WEYMSS MINE – GROUND INVESTIGATIONS,
ARCHAEOLOGICAL WATCHING BRIEF 2020
WRITTEN SCHEME OF INVESTIGATION**

1 Introduction

1.1 This Written Scheme of Investigation (WSI or specification) has been prepared by DAT Archaeological Services (the contracting arm of Dyfed Archaeological Trust) to provide a methodology for an archaeological watching brief during geotechnical investigations at Weymss mine, a former 19th century lead and zinc mine (PRN 23230). The WSI has been commissioned by Natural Resources Wales.

1.2 The remains of Wemyss mine are situated some 2.5km northwest of the village of Pont-rhyd-y-groes in the county of Ceredigion, centred on NGR SN 71579 74089 (Figure 1). The minor road that runs from Pont-rhyd-y-groes to Abermagwr dissects the site; with the ruined mine buildings to the north of the road and to the south of the road the mine's spoil tips tumble down to the stream below (Photo 1).

Photo 1: Remains of the dressing mill (PRN 96323). Minor road that bisects site can be seen to right.

1.3 Approximately 500m to the northeast is the site of Frongoch metal mine (PRN 9151) with which the history and development of Wemyss mine is inextricably linked.

1.4 Wemyss mine is located at the head of the Cwmnewydion valley, a tributary of the River Magwr, which joins the River Ystwyth at Abermagwr and is a significant source of metal pollution. This is causing a chemical and ecological impact on downstream watercourses.

1.5 The proposed ground investigations are required to provide information to assess the geotechnical, geo-environmental, geological and or hydrogeological ground conditions to inform the outline design of remedial engineering interventions.

1.6 Chemical and geotechnical testing of soil samples will be undertaken and installation of monitoring wells for groundwater monitoring and sampling.

1.7 The ground investigation works are detailed in the 'Wemyss Ground Investigation Specification Engineering Interventions' prepared by AECOM. A total of 29 trial trenches and 10 hand dug inspection pits will be excavated and will require monitoring through an archaeological watching brief.

1.8 The development area has previously been subject to a historic environment desk-based assessment (DAT Archaeological Services 2016).

1.9 Following discussions with the archaeological curator Dyfed Archaeological Trust-Development Management (DAT-DM) it has been recommended that an archaeological watching brief is carried out during the ground investigations, as a number of the proposed trial trenches and hand dug inspection pits lie in the archaeologically sensitive area of the mine.

1.10 The aim of the watching brief is to provide information on the character and significance of any below ground archaeological remains that may be revealed within the trial trenches and inspection pits. Should any significant archaeological deposits be revealed, then a programme of further mitigation can be formulated and potentially implemented prior to development.

1.11 This written scheme of investigation (WSI) details the methodology of the watching brief and has been prepared in accordance with the Chartered Institute for Archaeologists (CIfA) Standard and Guidance for Archaeological Watching Briefs (CIfA 2014). A copy will be sent to the archaeological curator for their approval.

1.12 The written scheme of investigation is in accordance with the Chartered Institute for Archaeologists (CIfA) Standard and Guidance for Archaeological Field Evaluation (CIfA 2014).

1.13 The archaeological works should be undertaken by a Registered Organisation with CIfA and managed by a Member of the Chartered Institute for Archaeologists (MCIfA).

1.14 The appointed Archaeological Contractor will need to comply with this approved written scheme of investigation, and any variance from it should be discussed and approved with DAT-DM.

2 Historical Background

(After Bell at al 2016)

2.1 Wemyss lead and zinc mine (PRN 23230) is immediately southwest of Frongoch mine (PRN 9151) and is located around 3.5km southwest of Devil's Bridge, Ceredigion. The Frongoch mineral lode ran through both Frongoch and Wemyss mines and was worked independently until 1846 when Wemyss was purchased by John Taylor & Sons Company; owners of Frongoch mine. Thereafter, Wemyss was operated in conjunction with Frongoch until the closure and sale of both mines in 1903.

2.2 Shortly after its procurement by John Taylor the Wemyss adit was extended eastwards to serve the Frongoch workings. By 1848 the Wemyss adit had holed through to the Frongoch adit at the 24 fathom level, subsequently becoming the deep ("Frongoch") adit that purportedly

extended for 3 miles (Bick, 1986). The *"adit began on the main lode near the road* [northern side presumably]*, but after about 150 fathoms turned northeast for about 25 fathoms before continuing eastwards on a north lode which outcrops on surface about 20 fathoms north of Boundary Shaft* [at Frongoch]" *(Bick, ibid:14).*

2.3 During this period in the mid-nineteenth century the mines were both profitable and productive while the operations continued to exploit deeper levels. In 1863 new dressing floors were constructed at Wemyss to process the ore from Frongoch. Sometime during the 1870s Ball's Shaft, the first of two principal shafts at Wemyss was cut into the lode at 76 fathoms (Bick, *ibid*).

2.4 However, by the latter half of the nineteenth-century the mines began to struggle as the productivity of the lode began to dwindle. Meanwhile the prices of metal fluctuated against ever increasing working costs. In 1878, the mines made their first loss and the Taylor Company sold their lease of both mines.

2.5 In the same year of 1878 the lease was obtained by Messrs Henry Davey and Alexander Kerby of London, and John Kitto from Llanidloes. By all accounts Kitto, a competent and successful mining engineer, was the primary agent and motivator of this venture. It was during the early years of this leasehold that Glanville's Shaft; the second of the principal shafts was cut into the lode. Unlike Ball's shaft, Glanville's Shaft was much shallower at only 16 fathoms (Bick, *ibid*). Kitto was also responsible for the construction of the pit for a 56ft waterwheel (later replaced by a 55ft wheel) at the lower levels of the site which was fed by a circuitous leat that carried water from the dressing floors (Bick, *ibid*). The later 55ft wheel turned a line of flat rods connected to the machinery at Vaughan's New Shaft at Frongoch (Bick, *ibid*).

2.6 In 1898 both sites were leased by the Belgian company *"Société Anonyme Minière".* The new lease holders endeavored to modernize the site by constructing a hydro-electric power station at nearby Pont Ceunant to power the machinery and mining operations. The five tiered, stone built dressing mill which now dominates the site, was built in 1899 to process the ore from Frongoch. Built on the side of the slope, each tier was occupied by a machine which was supported by a series of platforms and walls, with the dressing process becoming finer downslope. The mill was fed from material from Vaughan's New Shaft at Frongoch via a chain operated tramway which passed under the road by means of a cutting (Bick, *ibid*).

2.7 In spite of such optimistic investments, the venture proved to be ill fated and terminally brief. The metal markets continued to be volatile but were fleetingly favorable between 1898 and 1900. However, full production was not underway until 1902, and even then, the yields paled in comparison to what Kitto had previously achieved in spite of the absence of modern intervention (Bick, *ibid*). It would seem that during this time production at Wemyss was solely focused on processing the waste dumps from Frongoch. The new dressing mills proved to be highly efficient in this task, producing a dump of tailings and fine waste, of monumental proportions which is still visible today.

2.8 Full mining operations ceased at Frongoch in June 1903 although the dressing mill at Wemyss continued processing ore until August of the same year. Finally, the mines and machinery were sold at auction to Messrs R.A King & Company in November 1903 (Bick, *ibid*). Thereafter, much of the

substantial spoil tips at Frongoch were re-processed during the early twentieth-century, whilst Wemyss was left to quietly decay and erode.

3. Recorded Archaeological Sites

3.1 There are no designated archaeological assets within the area of Wemyss mine. Consultation of the regional HER reveals that there are 30 recorded, non-designated archaeological sites within the area and a further 15 archaeological sites were identified as a result of the desk-based assessment and/or the site visit (bell et al 2016). The distribution of these sites is shown in Figure 2 and listed in Tables 1 and 2.

3.2 The majority of the sites listed are concentrated along the north and north-eastern areas of the mine area; either side of the narrow gorge through which flows the mill race stream. The remainder are clustered over to the western end of the mine, effectively creating two distinct areas of archaeology.

Photo 2: Overview shot looking south. The remains of the former dressing mill (PRN 96323) can be seen in the background; top of wheel pit (PRN 96318) is visible in left foreground. 1m scale.

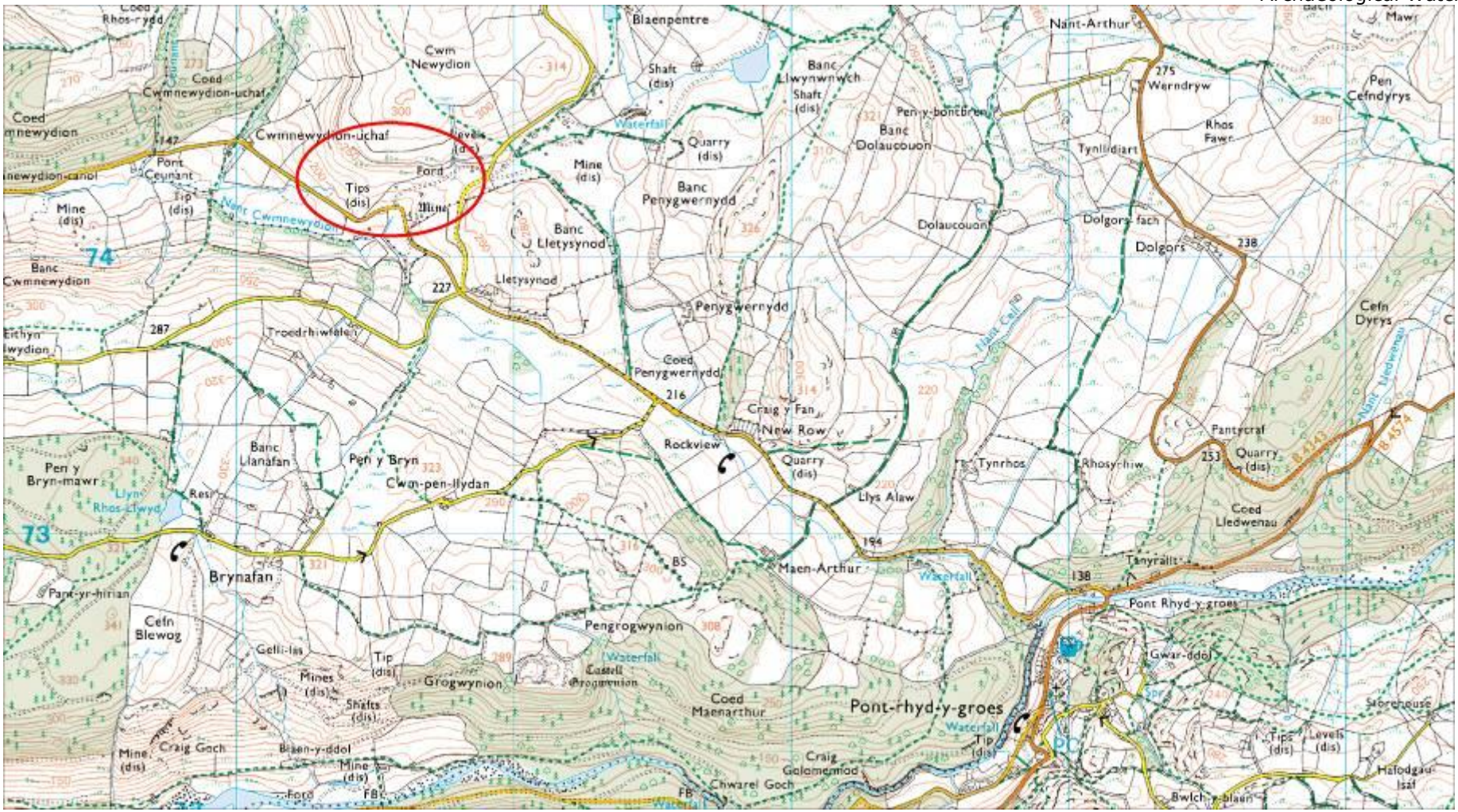

Figure 1: Site location map showing the position of Wemyss mine outlined in red.

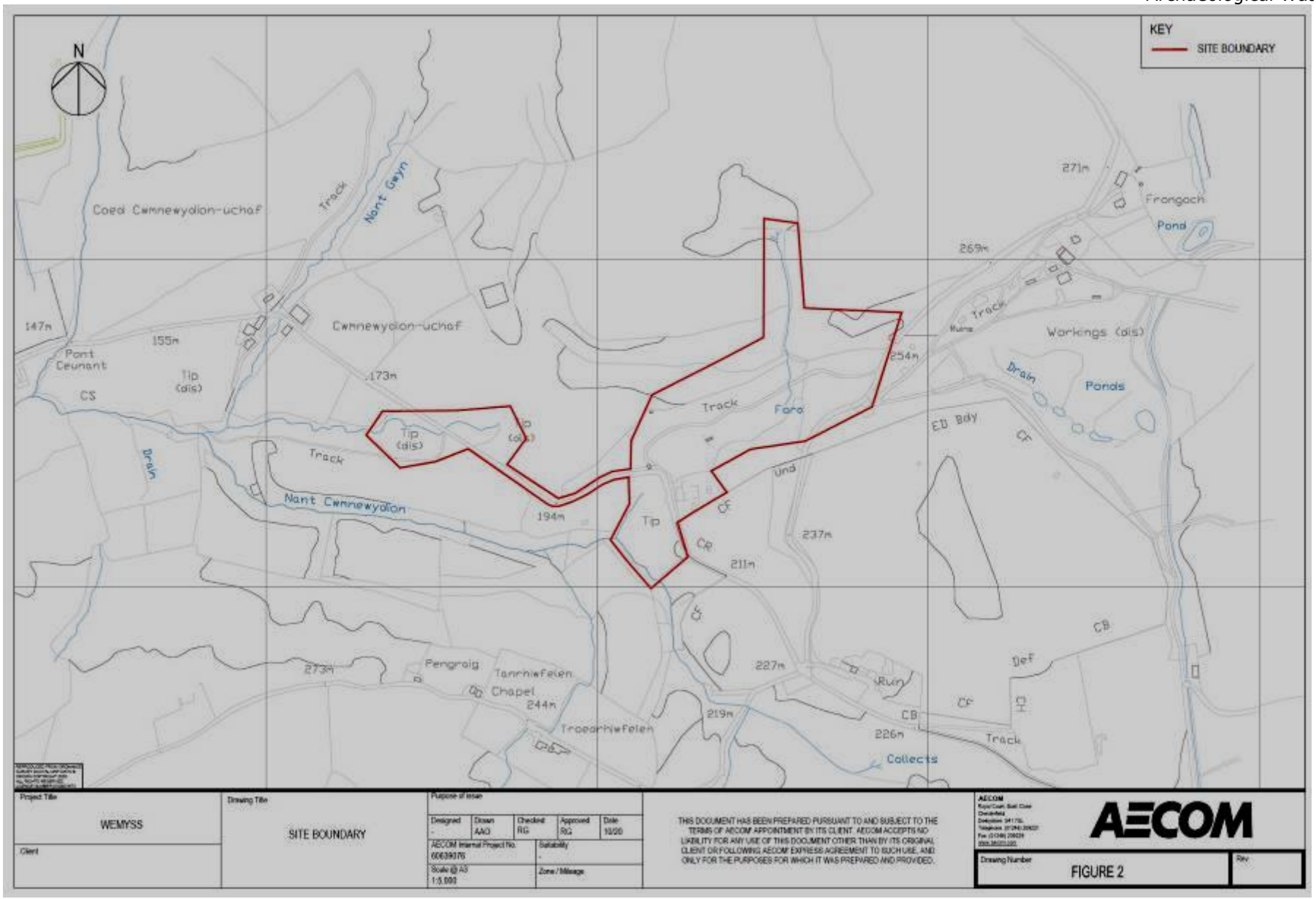

Figure 2: Plan showing site boundary. Not produced to scale.

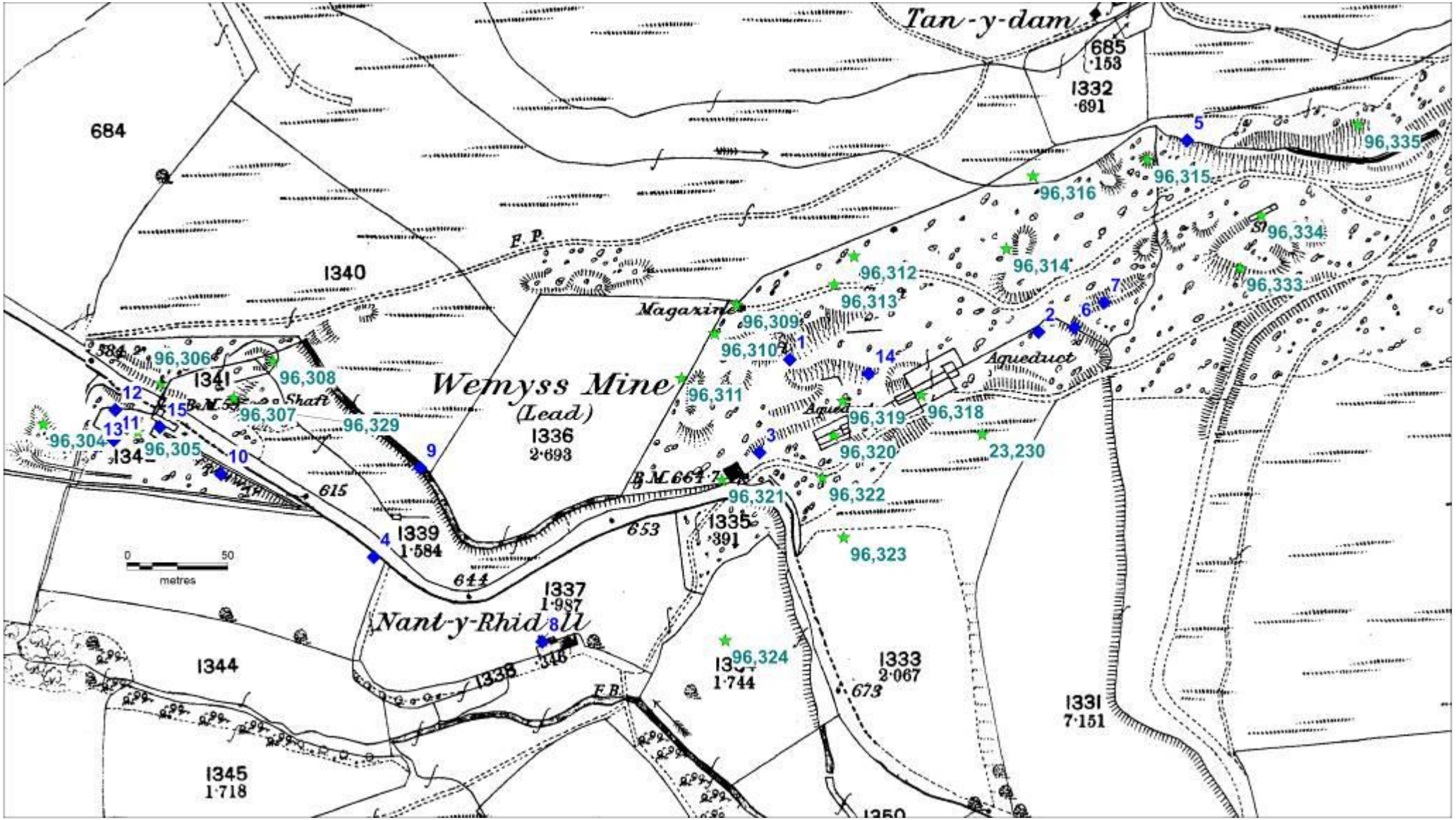

Figure 3: Extract of the OS 1st edition 1:2500 map published in 1905 showing the archaeological sites recorded on the HER within the area of Weymss mine (green stars), as well as additional sites recorded during the 2016 walkover (blue diamonds). Sites listed in Tables 1 and 2.

Table 1: Archaeological assets within the area of Wemyss mine (shown in Figure 3).
Comments in italics are updates to the HER record created following the site walkover in 2016 (Bell et al 2016).

PRN	NPRN	Name	Summary	NGR
23230	33907	Zinc Mine,Lead Mine	The Wemyss mine was a lead and zinc mine which operated in conjunction with Frongoch Mine intermittently from 1861 to 1899. In 1899 a dressing mill was built on the site to process ore from Frongoch Mine. Modernised and provided with electric power from the Pont Ceunant generator house at the end of the 19th century.	SN717742
96303		Wheel Pit	Virtually no trace of waterwheel apart from a brick quoined masonry tailrace culvert just to south at base of vegetated tips (Protheroe-Jones 1993, mine 159, no.3). *Only visible on 1905 2nd edition, 1:2500 OS map (MB Feb, 2016)*	SN7115374272
96304		Spoil heap	Fines dumps (Protheroe-Jones 1993, mine 159, no.4). *Visible on 1st edition 1888. 1:2500 OS map, spoil tips cover a larger area on 2nd edition, 1905 OS map. (MB Feb 2016).*	SN7123374215
96305		Dressing Floor	No remains at all of dressing floor (Protheroe-Jones 1993, mine 159, no.5). *Possible buddles and slime pits/settling tanks shown on 1st edition 1888. 1:2500 and 2nd edition, 1905 OS maps. These may be the site of the new dressing floors built in 1864 (MB Feb 2016).*	SN71287421
96306		Balance Pit	Bobpit; fairly good condition; no other trace of route of flat rods (Protheroe-Jones 1993, mine 159, no. 6). *This is not shown on either the 1st edition 1888. 1:2500 or 2nd edition 1905 OS maps. (MB Feb 2016).*	SN7129274234
96307		Spoil heap	Coarse tips with much vein stuff (Protheroe-Jones 1993, mine 159, no.7). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016).*	SN7132874226
96308		Level	Deep Adit level: rock cut; open; very wet; fairly large (Protheroe-Jones 1993, mine 159, no.8). *This is likely to be the hollow shown on the 1847 tithe map and may be the "original" Wemyss adit. Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016).*	SN7134874244
96309		Magazine	Substantially intact magazine (Protheroe-Jones 1992, mine 159, no.10). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016).*	SN7157974267
96310		Shaft	Irregular rock cut shaft or stope come to surface; open (Protheroe-Jones 1993, mine 159, no.11). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016).*	SN7156874253
96311		Gulley	Gulley- probable site of a level (Protheroe-Jones 1993, mine 159, no.15).	SN7155174231

			Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016).	
96312		Mine Building	Minimal ruins of building (Protheroe-Jones 1993, mine 159, no.12). *Only visible on 2nd edition 1905 OS map. (MB Feb 2016)*	SN7163874290
96313		Shaft	Ball's Shaft: cratered and run in. Development rock tips to west, possible site of ore bins to south (Protheroe-Jones 1993, mine 159, no.14). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. Annotated as "Ball's shaft on 1896 Crosswood plan of Wemyss (MB Feb 2016).*	SN7162874276
96314		Level	Gulley- probable site of level (Protheroe-Jones 1993, mine 159, no.15). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. Annotated as "adit" on 1896 Crosswood plan of Wemyss (MB Feb 2016).*	SN7171474292
96315		Shaft	Glanville's Shaft: run in crater; vegetated tip to south (Protheroe-Jones 1993, mine 159, no.16). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. Annotated as "Glanville's Shaft" on 1896 Crosswood plan of Wemyss (MB Feb 2016).*	SN7178574335
96316		Leat	Well-defined leats (Protheroe-Jones 1993, mine 159, no.17). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016).*	SN7172874328
96318		Wheel Pit	Large, well-built waterwheel pit; east part much filled by stream washing gravel in. Minimal remains of balance bob pit to east; no trace of structure to west (Protheroe-Jones 1993, mine 159, no.20). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. This is also shown on the 1896 Crosswood plan. It is most likely that this is Kitto's 56ft wheel pit (MB Feb 2016).*	SN71677422
96319		Level	Masonry arched entrance, fairly small, to a level. Open (Protheroe-Jones 1993, mine 159, no.21). *Not marked on historic OS mapping (MB Feb 2016)*	SN7163174218
96320		Wheel Pit	Slight remains of water wheel pit although virtually entirely washed away by stream (Protheroe-Jones 1993, mine 159, no.22). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. This is also shown on the 1896 Crosswood plan. Secondary wheel to PRN 96318 (MB Feb 2016).*	SN7162674201
96321		Building	Ruined building (Protheroe-Jones 1993, mine 159, no.23). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. This is also on the 1896 Crosswood plan and is annotated as a "Smithy" (MB Feb 2016).*	SN71577418
96322		Spoil heap	Mixed coarse and crushed tips (Protheroe-Jones 1993, mine 159, no.24). *Only visible on 2nd edition 1905 OS map (MB Feb 2016)*	SN71627418

96323		Dressing Mill	Well-preserved ruins of dressing mill on 5 levels, great deal of loadings etc. (Protheroe-Jones 1993, mine 159, no.25). *Only visible on 2nd edition 1905 OS maps. These were built in 1899 under the Belgian company Société Anonyme Minière (MB Feb 2016)*	SN71637415
96324		Spoil heap	Fine dumps - large (Protheroe-Jones 1993, mine 159, no.26) *Only visible on 2nd edition 1905 OS maps (MB Feb 2016).*	SN71577410
96328		Tramway	Only trace of route of tramway from West Frongoch (160) mine is hedge bank alignment (Protheroe-Jones 1993, mine 159, no.30). *Visible on 1st edition 1888 1:2500 OS map, not shown to be extant on 2nd edition 1905 1:2500 OS map (MB Feb 2016)*	SN7115774201
96329		Shaft	Cratered, run in shaft (Protheroe-Jones 1993, mine 159, no.31). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. The 2nd edition also appears to show it. (MB Feb 2016)*	SN71347422
96333		Spoil heap	Development tips protruding from grassy hummocky area (Protheroe-Jones 1993, mine 158, no.6). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016)*	SN7183074280
96334	33846	Shaft	Boundary shaft: stonewalled collar; blocked with refuse; well preserved balance bob pit to south west with set of steps entering from north (to aid greasing of bearings) (Protheroe-Jones 1993, mine 158, no.7). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016)*	SN7184174306
96335		Spoil heap	Slight trench above grassy tips (Protheroe-Jones 1993, mine 158, no.8). *Visible on 1st edition 1888. 1:2500 and 2nd edition 1905 OS maps. (MB Feb 2016)*	SN71897435

Table 2: Additional archaeological sites within the area of Wemyss mine recorded during the 2016 site walkover (Bell et al 2016) (Figure 3).

Wemyss Site Number	Type	Summary	Evidence	NGR
1	Building	Ruined Stone building emerging from eroding spoil tips in the northern area of the site and is level with a trackway runs parallel to its front.	Ruined Building	SN7160574239
2	Launder	RPJ 1993 Site No. 19 Wemyss (Mine 159): "Stone footing on site of launder"	Documentary	SN7172974256

3	Office and Workshop	Site of "Office & Workshop" depicted on 1896 Crosswood plan of Wemyss mine; not shown on any other mapping. No visible trace on ground.	Documentary	SN7158974193
4	Lime Kiln	"Old Lime kiln" identified on 1905 OS map, Structure visible on modern AP. Site not visited	Documentary	SN71396274145
5	Leat	Leat northeast of "Glanville's Shaft" running east-west, not recorded in HER	Earthwork	SN71805274344
6	Aqueduct	Remains of "Aqueduct" feeding wheel pit PRN 96319 as depicted on historic OS maps, not recorded in HER. Earthwork remains still visible	Earthwork	SN71747274252
7	Gully?	Possible remains of old trench or shaft. Not recorded in HER, shown on historic OS maps but not annotated as such.	Earthwork	SN71762 274264
8	House	Remains of Nant-y-Rhidyll farm house as shown on the 1888 1st edition OS map. Structural remains visible on modern AP	Ruined Building	SN71479274101
9	Leat?	Curvilinear feature shown on 1888 1st edition OS map, 1896 Crosswood plan and 2nd edition 1905 OS map. Also visible as earthwork with bank on southern side with flat bottomed channel. Starts at Adit (PRN 96308) and ends at the Smithy building (PRN 96321).	Earthwork and Documentary	SN71420274189
10	Tramway	Narrow gauge tramway shown on 1888 1st edition OS map at Western end of Wemyss site. Disused by 1905 2nd edition OS map	Documentary	SN7132174188
11	Buddles?	One possible buddle shown on 1st edition 1888 OS map. Three then shown on 1905 2nd edition OS map. On 1st edition OS, buddle appears to be fed by launder/leat	Documentary	SN7126874206
12	Leat/launder?	Possible leat or launder shown on 1st edition 1888 OS map feeding possible buddle (Site 11)	Documentary	SN7126974221
13	Slime pits?	Two rectangular structures shown on 1st edition 1888 OS map	Documentary	SN7125974203
14	Adit	Small "adit" marked on 1896 working plan map	Documentary	SN7164474231
15	Wheelpit?	Possible wheel pit shown on southern side of road on both 1888 and 1905 1:2500 OS maps. Possible leats and launders connected to it. As part of PRN 96306	Documentary	SN71291274212

4. Exploratory Holes

4.1 The watching brief will monitor the excavation of a total of 29 trial trenches and 13 hand-dug inspection pits. No other ground investigation works require monitoring.

4.2 Details of the proposed exploratory holes are listed in Table 3 below. The grid references are listed within the Ground Investigation Specification. During the excavations the archaeological contractor, in agreement with the site contractor, can 'fine tune' the location of an investigation if any archaeological constraints are identified.

4.3 Figures 4-8 show the locations of the exploratory holes overlaid on an extract of the OS 1st edition 1:2500 map published in 1905.

Table 3: List of proposed exploratory holes

Hole Number	Hole Type*	Scheduled Depth (m bgl)	In-situ Testing**	Instrumentation	Remarks
FP-TP2	TT	3	HV	None	
FP-TP3	TT	3	HV	None	
FP-TP4	TT	3	HV	None	
FP-TP5	TT	3	HV	None	
FP-TP6	TT	3	HV	None	
MS-TP1	TT	3	HV	None	
CMT3-1	RC / WS	Proof of underlying natural strata, maximum 15m	SPT, HV	CMT 3-port Water Monitoring	Inspection Pit to 1.2m bgl Assumed 15m to rockhead
CMT3-2	RC / WS	Proof of underlying natural strata, maximum 15m	SPT, HV	CMT 3-port Water Monitoring	Inspection Pit to 1.2m bgl Assumed 15m to rockhead
CMT3-3	RC / WS	Proof of underlying natural strata, maximum 15m	SPT, HV	CMT 3-port Water Monitoring	Inspection Pit to 1.2m bgl Assumed 15m to rockhead
DR-TP1	TT	3	HV	None	
DR-TP2	TT	3	HV	None	
DR-TP3	TT	3	HV	None	
DR-TP4	TT	3	HV	None	
FSS-IP1	IP	1.2	HV	None	
FSS-IP2	IP	1.2	HV	None	
FSS-IP3	IP	1.2	HV	None	
FSS-IP4	IP	1.2	HV	None	

* RC – Rotary Cored Borehole, TT- Trial Trench, WS – Window/windowless Sample, HV- Hand Shear Vane, PID-Photoionization Detector, SPT- Standard Penetration Test, PZ – Piezometer Standpipe, IP – Hand dug Inspection pit

Hole Number	Hole Type*	Scheduled Depth (m bgl)	In-situ Testing**	Instrumentation	Remarks
UP-TP1	TT	3	HV	None	
UP-TP2	TT	3	HV	None	
UP-PZ1	PZ	2	n/a	Casagrande Standpipe for gauging of groundwater level	Assume hand driven into soft marshy peat of Upper Pond
UP-PZ2	PZ	2	n/a	Casagrande Standpipe for gauging of groundwater level	Assume hand driven into soft marshy peat of Upper Pond
TR-TP1	TT	3	HV	None	
MRS-IP1	IP	1.2	HV	None	
MRS-IP2	IP	1.2	HV	None	
MRS-IP3	IP	1.2	HV	None	
MRS-IP4	IP	1.2	HV	None	
MRS-IP5	IP	1.2	HV	None	
MRS-IP6	IP	1.2	HV	None	
WPP-TP1	TT	3	HV	None	
WPP-TP2	TT	3	HV	None	
MRS-TP1	TT	2	HV	None	MRS-TPs to be replaced by IPs if vehicle access unsuitable / ecological constraint
MRS-TP2	TT	2	HV	None	As above
MRS-TP3	TT	2	HV	None	As above
MRS-TP4	TT	2	HV	None	As above
MRS-TP5	TT	2	HV	None	As above
MRS-TP6	TT	2	HV	None	As above
CP-TP1	TT	3	HV	None	
CP-TP2	TT	3	HV	None	
CV-TP1	TT	3	HV	None	
FC-TP1	TT	3	HV	None	
FC-TP2	TT	3	HV	None	
FC-TP3	TT	3	HV	None	
FC-TP4	TT	3	HV	None	
FP-TP1	TT	3	HV	None	

5 WATCHING BRIEF

5.1 The definition of archaeological watching brief, taken from the Chartered Institute for Archaeologists Standards and Guidance: for Archaeological Watching Briefs (CIfA S&G: AWB 2014) is a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.

5.2 The purpose of a watching brief, as laid down in the CIfA S&G AWB is:

to allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works;

to provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment.

5.3 This document provides a scheme of works for:

Archaeological attendance and recording during the excavation of ground investigation trial trenches and inspection pits within the area of Weymss lead/zinc mine, Ceredigion.

5.4 The following tasks will be completed:

- To follow this approved written scheme of investigation.
- To monitor ground works in order to identify the presence/absence of any archaeological deposits
- To establish, where possible, the state of preservation, character, extent and date range for any archaeological deposits disturbed
- Appropriate investigation and recording of any significant archaeological remains will be undertaken if revealed
- Production of a report and an archive of the results

6 WATCHING BRIEF METHODOLOGY

3.1 This WSI should be read in conjunction with the Ground Investigation Specification prepared by AECOM and the Environmental Action Plan prepared by Natural Resources Wales.

3.2 The Ground Investigation Specification describes a range of intrusive ground works, some of which such do not require archaeological monitoring. Following discussions with the archaeological curator (Dyfed Archaeological Trust-Development Management) it is understood that an archaeological watching brief should be carried out during the excavation of 29 trial trenches and 15 inspection pits, whose proposed locations are shown in Figures 3-6.

3.3 The site contractor shall fine tune the positioning of an investigation location based on any archaeological constraint identified by the Archaeological Contractor.

3.4 The watching brief will entail an archaeologist being present during all ground works where there is a potential for archaeological remains to be exposed, damaged or destroyed. This will include the machine excavation of trial trenches or the hand excavation of inspection pits.

3.5 It is essential that coordination between the site contractors and archaeologist is established at the outset to avoid any potential disturbance to the monument without an archaeologist being present, or unnecessary visits to the site when works are being carried out that do not require the presence of an archaeologist.

3.6 Adequate time must be made available to the visiting archaeologist to ensure that appropriate recording can be undertaken of any archaeological features or deposits exposed during ground works.

3.7 Recording of all archaeological features or deposits will conform to best current professional practice. Significant archaeological features or deposits will be drawn at a suitable scale (no less than 1:20) and photographed in an appropriate format.

3.8 All archaeologically significant finds (if found) will be retained and, where possible, related to the contexts from which they derived. All finds, except those deemed to be Treasure, will remain the property of the landowner.

3.9 Under the 1996 Treasure Act, "treasure" can be summarised as:

- Any object other than a coin containing at least 10% gold or silver and at least 300 years old;
- Any prehistoric assemblage of base metal;
- Coins found together which contain 10% gold or silver (but no single coins) and groups of at least 10 coins of other metals, provided they are at least 300 years old;
- Any object found associated with treasure except unworked natural objects; and
- Any object which would have been Treasure Trove before the 1996 Act but not covered above.

6.10 In the event that unforeseen archaeological discoveries are made during the development, or that archaeological remains of high significance are exposed, the appointed Archaeological Contractor shall have the power to halt any ground works and shall inform the site agent/project manager and prepare a written statement with plan detailing the archaeological evidence. Following assessment of the archaeological remains the appointed Archaeological Contractor shall, if required, implement on behalf of the Client a contingency scheme for salvage excavation of affected archaeological features.

6.11 In the very unlikely event that human remains are encountered, the District Coroner's Office and the Police will be notified immediately. All human remains will, where possible, be left *in situ*. If preservation *in situ* is not possible all statutory permissions will be obtained in writing before removal begins.

7 POST-FIELDWORK REPORTING AND ARCHIVING

7.1 An archive will be prepared if it meets the requirements of the Dyfed Archaeological Trust archive retention policy (2018). If it does, then data recovered during the evaluation will be collated into a site archive structured in accordance with the specifications in Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation (Brown 2011), and the procedures recommended by the National Monuments Record, Aberystwyth. The National Standards for Wales for Collecting and Depositing Archaeological Archives produced by the Federation of Museums and Art Galleries of Wales will also be adhered to. Digital archives will be collated using the Royal Commission on the Ancient and Historical Monuments of Wales systems (2015) and deposited with the RCAHMW. The Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs) shall be followed.

7.2 Appropriate specialists will need to be named by the appointed Archaeological Contractor for the analysis of artefacts and ecofacts, to include palaeo-environmental analysis and ceramic identification/analysis. Further specialists may also be required.

7.3 The results of the fieldwork will be assessed in local, regional and wider contexts.

7.4 The results will be used to inform subsequent design considerations of the proposed development so that they can aim to avoid impacts upon any archaeological remains or that further archaeological mitigation can be implemented before such remains are disturbed.

7.5 The project archive, including all significant artefacts and ecofacts (excepting those which may be deemed to be Treasure) will be deposited with an appropriate body following agreement with the landowner (if retained and containing more than just digital information).

7.6 The appointed Archaeological Contractor will arrange for the deposition of finds, and ascertain the costs of storage and deposition, with an approved body before the project commences and inform DAT-DM of the arrangement which has been made.

7.7 A summary of the project results, excluding any confidential information, may be prepared for wider dissemination (e.g. Archaeology in Wales and special interest and period-specific journals).

7.8 The report will be prepared to follow the Standard and Guidance for Archaeological Watching Briefs (CIfA S&G: AWB 2014).

7.9 Digital copies of the report will be provided to the client, as well as the regional HER and DAT-DM.

8 STAFF

8.1 The project should be managed by a member of the chartered institute for archaeologists (MCIfA).

8.2 The on-site works will be undertaken by experienced archaeologists, with appropriate CSCS cards.

9 QUALITY ASSURANCE

9.1 The appointed Archaeological Contractor should have considerable experience of undertaking all categories of archaeological fieldwork and always operate to best professional practice; adhering to CIfA guidelines where appropriate. The appointed Archaeological Contractor should be a Registered Organisation with CIfA and all staff should abide by their code of conduct and adhere to their relevant standards and guidance.

9.2 The appointed Archaeological Contractor should operate robust internal monitoring procedures that ensure that the standard of each project is maintained from commencement to completion.

10 MONITORING

10.1 The fieldwork may need to be monitored by Dyfed Archaeological Trust – Development Management (DAT-DM), in their role as archaeological advisors to the planning authority, who should be provided access to the site at any time during the works.

11 HEALTH AND SAFETY

11.1 All permanent members of staff should be CSCS registered.

11.2 Service information should be obtained prior to the start of the works.

11.3 A health and safety risk assessment must be prepared prior to the works commencing to ensure that all potential risks are minimised.

11.4 The site staff will go through the health and safety risk assessment prior to works commencing and all site staff must sign the document to confirm that they have read, understood and will comply with the document.

11.5 All site inductions, H&S procedures, H&S constraints and site rules of the client or any on-site contractor should be made known to the archaeological staff at the start of the works.

11.6 All relevant health and safety regulations must be followed, including compliance with Welsh Government guidelines on working practices during the current Covid-19 Pandemic, and guidance issued by CIfA.

11.7 CIfA recommends that ROs should ensure that their own risk assessments and local site operating procedures take account of Prospect's COVID-19 site working advice (updated 4 May).. If the site cannot operate in line with this guidance it must not open or continue to stay open.

11.8 The project risk assessment should detail the precautions put in place to reduce the spread of Covid-19 coronavirus during fieldwork.

11.9 Safety helmets, high visibility vests and boots are to be used by all site personnel as necessary. The developer will make all site staff aware of any other PPE that may be required.

11.10 Working with machinery: all staff must ensure that their presence on site is communicated to all relevant site contractor staff, especially the machine operator. The archaeologist observing the excavation of trenches by machine will establish a safe working procedure with the machine operator at the start of work. This will include explaining the purpose of the works itself and the method by which the trenches shall be machined. This will include ensuring that the machine driver is aware that topsoil is stripped carefully to avoid disturbing archaeology. This will also include discussing the methodology for safe working, ensuring that no machining is done without an archaeologist being present.

12 ARBITRATION

12.1 Any dispute or disagreement arising out of a contract in relation to this work shall be referred for a decision to the Chartered Institute of Archaeologist's arbitration scheme.

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