Glamorgan-Gwent Archaeological Trust
(Contracts Division)

Archaeological Watching Brief
Swansea Bay Improvement Works
(White Rock & Middle Bank)

Report prepared for Swansea City Council

GGAT Project No: A257
GGAT Report No: 96/029

CONTENTS

SUMMARY

In 1995-6, Welsh Water/ Dwr Cymru constructed a new sewer along the Lower Tawe Valley, as part of the Swansea Bay Bathing Waters Improvement Scheme. On behalf of Swansea City Council (as agents to Welsh Water/ Dwr Cymru), an archaeological watching brief was undertaken during part of the groundworks by GGAT (Contracts).

The principal results of the watching brief are:

- The southern section of the route of the new sewer, which extends for much of its course along the former Smith's Canal, appears to have had limited impact on any surviving archaeology.
- The most significant feature directly affected by the groundworks was the site of the 18th-20th century Middle Bank copper works on the banks of the Tawe. The buried floors and foundations of the works were exposed by the cutting of the trench for the new sewer and by the deep excavations for the White Rock pumping station.
- The continuation of the new sewer to northwest of the river, from the Landore Viaduct to the White Rock pumping station, will be undertaken by tunnelling. It is not expected that the buried remains on that side of the river will be severely disturbed.

Acknowledgements

This project has been managed for GGAT (Contracts) by Andrew Marvell (Principal Archaeological Officer) and Martin Locock (Projects Manager - Contracts). The fieldwork was undertaken by Martin Lawler, Martin Locock and Christopher Seabright and the report was prepared by Martin Lawler

The Trust is grateful to the individuals and organisations who have assisted in the project. Particular thanks are due to Hugh Owen and Anthea Perks (Swansea City Council) and Paul Stanworth (Delta Civil Engineering Ltd) for their ready co-operation and advice. SMR data in the collections of GGAT (Curatorial Division) were made available through the courtesy of the SMR Officer, Jan Allen. Further information was kindly supplied by Neil Maylan and Luke Toft.

1.0 INTRODUCTION

1.1 Development proposals and commission

As part of the Swansea Bay Bathing Waters Improvement Project, Welsh Water/ Dwr Cymru Cyf have constructed a new sewer along the Lower Tawe Valley in Swansea. The new sewer extends between the Landore Railway Viaduct and the Tawe Bridge (NGR SS 6612 9578 to SS 6620 9332) where it joins the main sewer connecting it to the new sewage works in Swansea Docks.

Welsh Water/ Dwr Cymru were advised by the Glamorgan-Gwent Archaeological Trust (Curatorial Division) that the intended groundworks might intrude on archaeological remains. In particular, the area between Smith's Canal and the intended White Rock Pumping Station close to the bank of the Tawe was considered to be archaeologically sensitive.

In May 1994, Swansea City Council (City Engineer's Department), as agents to Welsh Water/ Dwr Cymru, commissioned GGAT (Contracts Division) to undertake an archaeological watching brief on the groundworks between the line of the canal and the White Rock Pumping Station. The watching brief was undertaken over a six-week period during October-November 1995.

This report presents the results of the watching brief.

1.2 Specifications for the report

The watching brief was undertaken to fulfill the brief prepared by GGAT (Curatorial Division) for Swansea City Council[1] and in accordance with the *Standard in British Archaeology: Archaeological Watching Briefs.*[2] No further specification was required for the project..

1.3 Arrangement of the report

The report describes the physical environment of the proposed development area (Section 2), summarises the archaeological resource in the area (Section 3) and outlines the likely impact of potential development on the archaeological resource (Section 4). Detailed information is presented in a series of appendices.

1.4 Copyright notice

[1] *Maylan, N 1995* Swansea Bay Bathing Waters Improvement Scheme: Brief for Archaeological Watching Brief *(Brief W187/1/95009/CNM prepared for Swansea City Council by GGAT Curatorial Division)*

[2] *Institute of Field Archaeologists (September 1993).*

2.0 THE GROUNDWORKS

2.1 The route

2.1.1 The new rising main, varying from 600mm to 1200mm in diameter, extends between the Landore Railway Viaduct and the Tawe Bridge (SS 6612 9578 to SS 6620 9332), where it meets the main sewer which leads to the new sewage works in Swansea Docks.

2.1.2 The northern section of the route (from the Landore Viaduct across the river to the White Rock pumping station) is being tunnelled, thus minimising the disturbance to the Hafod Works site which it crosses.

2.1.3 The southern section (from the White Rock pumping station to the Tawe Bridge) was laid in an excavated trench. The groundworks for this section were undertaken in two sections: an initial broad trench excavated to a depth of *c* 0.5m, to enable machine access, followed within a few days by the main deep trench, excavated in sections supported by shuttering.

2.2 Archaeological monitoring

2.2.1 In practice, it was found that the most useful archaeological information was derived from routine inspection of the initial shallow trench, which exposed most of the upper stratigraphy over a distance of several tens of metres at a time. The subsequent deep excavations were more considerably difficult to examine.

2.2.2 In the vicinity of the pumping station, a deeper and wider trench was excavated on the Middle Bank works site to provide tanks and services. The sides of the trench were inspected and recorded.

3.0 RESULTS OF WATCHING BRIEF

3.1 White Rock Works incline abutment

3.1.1 The course of the rising main followed the trackbed of the former railway to the west of the White Rock furnace site, avoiding the area subsequently designated as the White Rock Scheduled Ancient Monument.[1]

3.1.2 At SS 6638 9478, to the northwest of the main White Rock complex, the route passed close to the surviving abutment for a powered inclined plane which served to raise slag from the White Rock works to the massive tips on the hillslope to the east. The incline probably dates to the mid-19th century.

3.1.3 The trench for the rising main exposed the construction bedding for the abutment. Slightly to the north of this, the trench revealed the foundations of a mortared stone wall crossing the trackbed diagonally, and presumably pre-dating the railway.

3.2 The Middle Bank Works

3.2.1 The Middle Bank Copper Works was the fourth of the non-ferrous smelting works to be established on the banks of the Lower Tawe.[2] It was founded in 1755 by the coal-owner Chauncey Townsend, on a site leased from the Hon. Louisa Barbara Talbot, lying on the river bank immediately to north of the older White Rock works. The works was acquired in succession by John Rotton in 1765, George Pengree in 1769 and Thomas Williams (owner of the Parys and Mona copper mines on Anglesey) in 1785. From 1828, the Middle Bank works was owned by Pascoe Grenfell and Sons, who had also acquired the adjacent Upper Bank works, established by Townsend in 1758.

3.2.2 Though it was probably founded as a lead-smelting complex, the Middle Bank Works concentrated largely on copper smelting and refining during the 18th and early 19th century.[3] In 1796, the works included eight calcining kilns, eight smelting and four roasting furnaces, and was producing 244 tons of copper per fortnight, largely for the sheathing of ships' hulls. After 1850, the works was adapted to cast and roll Yellow Metal (alias Muntz Metal: 60% copper and 40% zinc), used for vessels for brewing and sugar refining, and nails. The works also produced copper firebox plates.

3.2.3 By the end of the 19th century, much of the Middle Bank works' operations had been transferred to the Morfa and Hafod works across the river, and the works closed in 1924, though some activity was still being undertaken on the Middle Bank site as late as the 1930s. The ruins of the works were demolished during the major reclamation operations of the 1960s, but were recorded in advance of this by the RCAHM(W).[4]

3.2.4 As part of the Cross Valley Link road scheme, a roundabout was constructed on the north-east part of the site, at the junction between the A4217 and the new Cross Valley Link road. An archaeological watching-brief was maintained during the groundworks, between July and September 1990; most of the buried structures overlain by the

[1] *White Rock Copper Works Scheduled Ancient Monument (Gm 481).*
[2] *The historical account has been abstrated from* Lower Swansea Valley Factsheet 5: Early copper works, *pps 26-9 (Swansea Museum).*
[3] *Roberts, RO 1980 The smelting of non-ferrous metals since 1750, in John, AH and Williams G (eds)* Glamorgan County History Vol V: Industrial Glamorgan from 1700 to 1970, *chapter II, 47-96.*
[4] *Hilton, KJ (ed)1967* The Lower Swansea Valley Project *(Longmans).*

roundabout were shown to have been left undisturbed by the road construction, other than features lying adjacent to the river.[1]

3.3 Arrangement of the buildings

3.3.1 The internal lay-out of the structures on the Middle Bank site is difficult to determine from the bare outline provided by the Victorian OS plan.[2] In general, however, the later 19th century copper works consisted of a series of banks of reverberatory-type calcining ('roasting'), smelting and refining furnaces, with adjacent blocks containing the various mills, forges and stores etc. The late 19th century Middle Bank site could be divided broadly into three groups of buildings: (a) a western range fronting the quays along the river; (b) an eastern range lying adjacent to the canal and separated from the western range by a central tramroad, and (c) a group of smaller buildings and yards lying to north of the main buildings, between the quays and the railway. Ore was unloaded from the riverside docks while coal was brought in via the canal and railway.

3.3.2 Jones' *Plan of the River Swansey* of 1771 shows the Middle Bank works at that time as a quadrangle of buildings, with one 'L'-shaped range fronting the river and a parallel group of two long blocks lying adjacent to Townsend's horse-drawn waggonway (on the line of the subsequent canal), connected by a branch track. The two longer groups of buildings were connected by shorter ranges. The positions of the 18th century buildings, essentially akin to that of the late 19th century complex, can be plotted with some approximation on the outline of the late Victorian works (see Figure One). It is unlikely that all of the 18th century buildings on the Middle Bank site were actually still standing a century later, but (as on the adjacent White Rock site) the piecemeal development of the non-ferrous works during the 19th century tended to preserve the lay-out of their earlier sites.

3.3.3 There is a basic similarity between the 18th century lay-out of the Middle Bank works and that of its better-known neighbour at White Rock, founded some eighteen years earlier. They were established at each end of the same bend of the river, offering extensive level ground for buildings, stockpiles, wastetips and riverside quays. On each site the main furnace range was a long block (known at White Rock as the 'Great Workhouse'), about 100m in length, positioned at the back of the site, with access to the overland coal route.[3] Between the long main block and the river on each site were smaller buildings housing additional furnaces, workshops and offices.

3.3.4 By 1796, the Middle Bank works contained eight calcining furnaces, eight smelting ('ore furnaces'), and four roasting furnaces, and was processing 244 tons of ore to produce 47 tons of copper per fortnight. A total of 62 hands were employed including 16 calciners, 16 smelters, 4 roasters and 1 refiner. By that stage the great Anglesey mines were already in decline, and most of the ore being smelted was derived from Cornwall.[4]

3.3.5 A similar lay-out to that of 1771 is suggested in a small-scale tramroad plan of 1830.[5] By 1852, however, the works was being expanded to the southwest; an additional furnace range had been added parallel to the buildings on the southwest side of the quadrangle, and it appears that the block at the southwest end of the long main southeast range had also been completed by that date. A further building had been added to those on the southwest side by about 1860.[6] (See figure Two).

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[1] *Toft, LA 1991* A4067/A4217 and Cross Valley Link at Pentrechwyth *(Report prepared by GGAT for West Glamorgan County Council).*

[2] *1878 OS 25" Sheet XXIV.1 (Glamorgan)*

[3] *Probably established as a mule track when the White Rock works was founded, but subsequently developed as a waggonway, canal and, eventually, the railway.*

[4] Lower Swansea Valley Factsheet 5: Early copper works, *pps 26-9 (Swansea Museum).*

[5] *NLW Q/RP 26a:* Railway from Tymawr Ystradgynlais to Swansea.

[6] *1865* Le Toure du Monde *(Hachette). See also the discussion in para 3.3.6.*

3.3.6 The lithograph published in 1865 in Hachette's *Le Toure du Monde* shows the Middle Bank works (right) and part of the Hafod works (left), viewed from a point just to the south of the Hafod complex, looking upstream (see Figure Three). Although the illustrator has used artistic licence for effect (particularly in the background details), the foreground buildings are reasonably in keeping with the structures shown in the 1878 1st ed OS 25" plan. The two taller hipped gable-ended buildings on the Middle Bank site are recognisable as typical furnace ranges, with rows of stacks along the roofs and tall projecting bays (marking the positions of the furnaces themselves) on the closer building. These two buildings (marked '2' and '3' in Figure Three) can also be identified on the OS 25" plan as the second and third blocks along from the waste tips; the building closest to the tips (marked '1') is fronted by quayside structures, including steps leading to the waterside. From the evidence of the successive plans, it seems likely that the building marked '3' was part of the complex shown in 1771; building '2' was added between 1830 and 1852, and building '1' between 1852 and about 1860.

3.4 Excavations on the Middle Bank Works

3.4.1 The archaeological impact of the development was concentrated on the buried remains of the works on its lower (western) side. The White Rock pumping station[1] was constructed directly on the site of the copper works buildings, and the excavations for its well and the adjacent tanks and services constituted the principal disturbance. Immediately to south of the pumping station, the trench for the rising main was also excavated through the buried remains of the buildings, though this impact was lessened towards the southeast where the pipe-trench followed the terrace of made ground, which rises towards the modern roundabout (see Figure Four).

3.4.2 The excavation of the deep pumping station well (which was undertaken at an early stage of the groundworks) lay outside the scope of the watching brief. At the time that the site was visited in October 1995, the circular well of the station had already been lined internally, and no buried stratigraphy was exposed. The contractors were able to confirm, however, that the well had been excavated through brickwork, rubble and substantial blocks of stone, which continued to a depth of 3m-4m below the present surface.

3.4.3 Immediately to southeast of the pumping station well, an area of 17m x 8m was excavated for tanks and related services in November 1995. Although it was not possible to monitor the excavation itself, the site was visited shortly afterwards, and the features exposed in the sides of the trench were recorded.

3.4.4 The surviving structural remains on the site were generally sealed by about 0.7m of very mixed levelling debris, presumably dating to the reclamation work of the 1960s. Below this horizon, the structural levels varied, and there were deeper pockets of recent disturbance. The trench was flooded at the time of recording to a height of 2.4m below the present footpath surface, and it was not possible to examine the exposed features below this water-level.

3.4.5 The most prominent feature was the line of a masonry wall, which was exposed in the opposing northeast and southwest sides of the trench. On the northeast side, the wall was 1.5m in width, and constructed of coursed sandstone rubble with a rubble core. On the southwest side of the trench, the wall was only 0.5m in width, although its construction and position suggested that it was part of the same alignment. Reference to the outline of the buildings shown on the OS 1st ed 25" map shows that the position of this wall was approximately on the line of an external wall further to the northwest.

[1] *NB: the name of this pumping station refers only to the general area of White Rock. The site of the White Rock copper works itself (to south of the Middle Bank works) was not affected by the development.*

3.4.6 *Area A*
This wall divided the excavated area into two unequal portions, described here as Area A and Area B. On the southeast side of the masonry wall was a brick-floored bay, two metres across, defined by a brick wall on its east side, parallel to the masonry wall. The brick floor was laid on a substantial dump of puddled clay, at least 0.8m in thickness. The brick-floored bay appeared to be also represented on the opposite side of the trench, though the section on that side was more more disturbed.

3.4.7 On the northern side of the trench, a second alignment of walls was exposed, at right angles to the coursed masonry wall described. This consisted of a mortared wall, 0.5m in width, of thin rounded slabs, adjoining a thicker brick wall. To southeast of this, a second brick wall extended at right angles, partly exposed in the trench section. On the west side of the cobble wall was an intrusive water pipe trench, cut from a higher level. To west of the pipe trench was a bed of clay at a depth of 2m below the present ground surface, overlain by a substantial layer of ash and coal-dust.

3.4.8 *Area B*
In contrast to the features on the northeast side of the principal masonry wall (described in 3.4.6 and 3.4.7 above), those on the southwest side were characterised by areas of very burnt brickwork and sand. The burnt brickwork did not extend as far as the masonry wall itself, but was separated from the wall face, on the southeast side of the trench, by a deep bed of loose coarse sand, 2m in width. Immediately to west of the sand bed on that side of the trench was a platform of very burnt and decayed brickwork, five courses in thickness, and four metres across. To west of this platform was an area of brickwork overlying coursed sandstone rubble, defined on its west side by a substantial masonry revetment.

3.4.9 The exposed deposits on the opposite (northwest) side of the trench were similar in character but not in direct alignment with those on the southeast side. At a distance of 2m from the principal coursed masonry wall was a deep bed, some 1.5m across, of loose broken dark glassy copper slag, which may have extended up to the wall face, though this was uncertain. To west of this was a brick floor, bedded on sand. Further to west was a second area of very decayed and burnt brickwork, whose extent was difficult to define.

3.4.10 Further remains were exposed in the pipe trench, which extended to southwest of the deep trench described. The ongoing machining operations on this section of trench at the time of monitoring made it difficult to investigate these features, but they included additional walls, areas of burnt brickwork and beds of ash, similar to those described.

3.5 Discussion

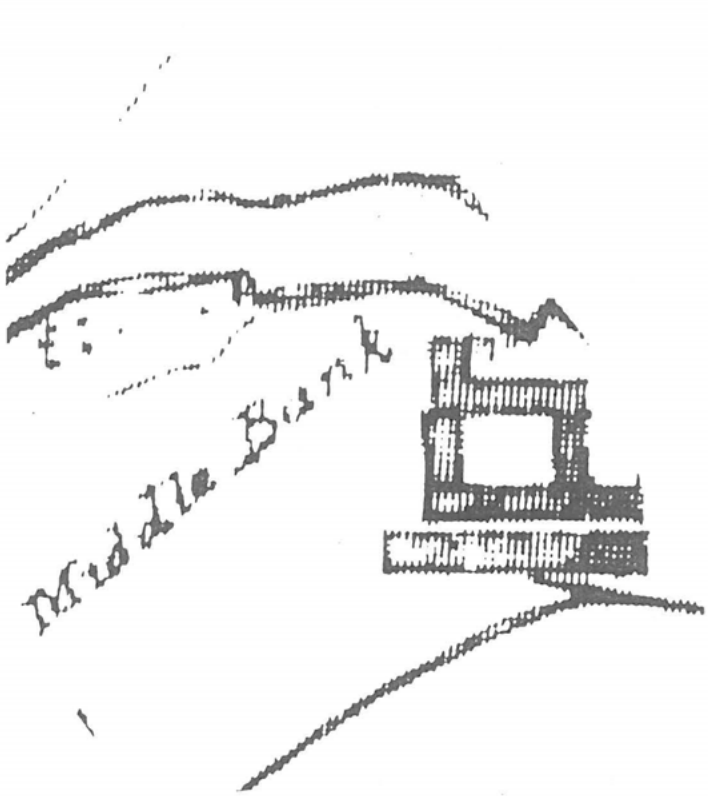
3.5.1 Although it is difficult to make a detailed interpretation from relatively limited observations, some provisional comments can be made here. The most important evidence is that there are extensive and significant buried remains of the Middle Bank copper works, surviving at least up to contemporary furnace floor levels. It is likely that the structures have survived to an even greater height further to southwest, where the site was terraced into the hillslope and is now sealed by the modern A4217 road and the roundabout. The recent excavations for the sewer and pumping station have clearly had some impact on these remains, but (as can be seen from the plan in Figure 1) the areas of disturbance are a relatively small proportion of the whole complex.

3.5.2 The pumping station excavations were located within the group of larger buildings lying adjacent to the river, probably straddling two adjacent buildings, as the coursed masonry wall suggests. The western part of the recorded trench (Area B) probably lay

within the further of the tall, hipped gable-fronted buildings shown on the 1865 Hachette lithograph (marked '3' in Figure Four); a building which had probably been constructed by 1771. The areas of very burnt brickwork, found in association with deposits of slag and sand in Area B, suggest the proximity of furnaces, though no distinctive features or overall plan could be identified within the confines of the trench.

3.5.3 Area A, on the east side of the trench, probably lay in a separate, though adjoining building, aligned at right-angles to that of Area B. There also appeared to have been a division within Area A, between the northwest and southeast sides of the trench. It is reasonable to suppose that the partition along this axis was defined by the cobble and brick walls which were exposed in the northeast side of the trench. The 1771 plan of the complex indicates an external wall at approximately this position. It is possible, therefore, that the distinctive cobble and mortar wall revealed was the northwest external wall of the 18th century range, embedded in a mass of later brickwork.

3.5.4 The different character of the structures and deposits in Area A (which did not produce comparable burnt brickwork, slag and sand) may imply that the building had a different function to that represented in Area B. It should be stressed, however, that the areas exposed by the recent excavation were fairly limited, and there is not enough evidence at present to support a detailed interpretation.



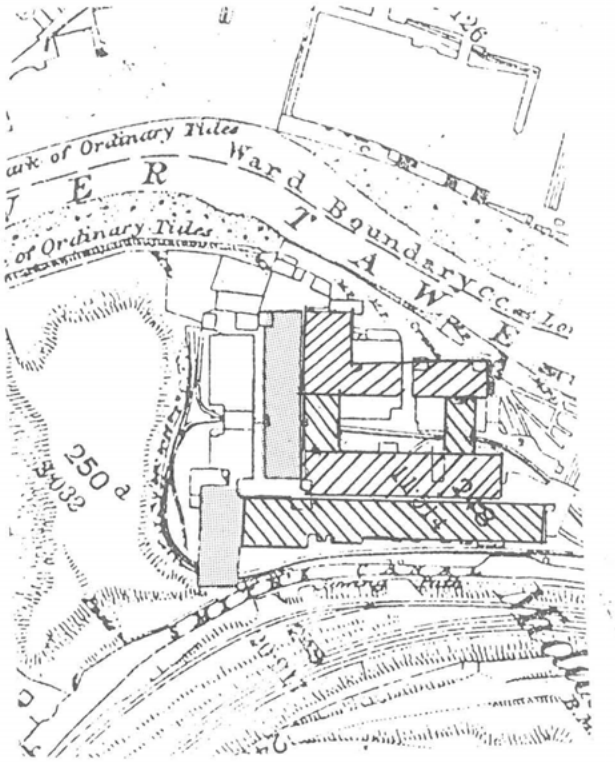


Figure One: Middle Bank works. Suggested phase plan of buildings.

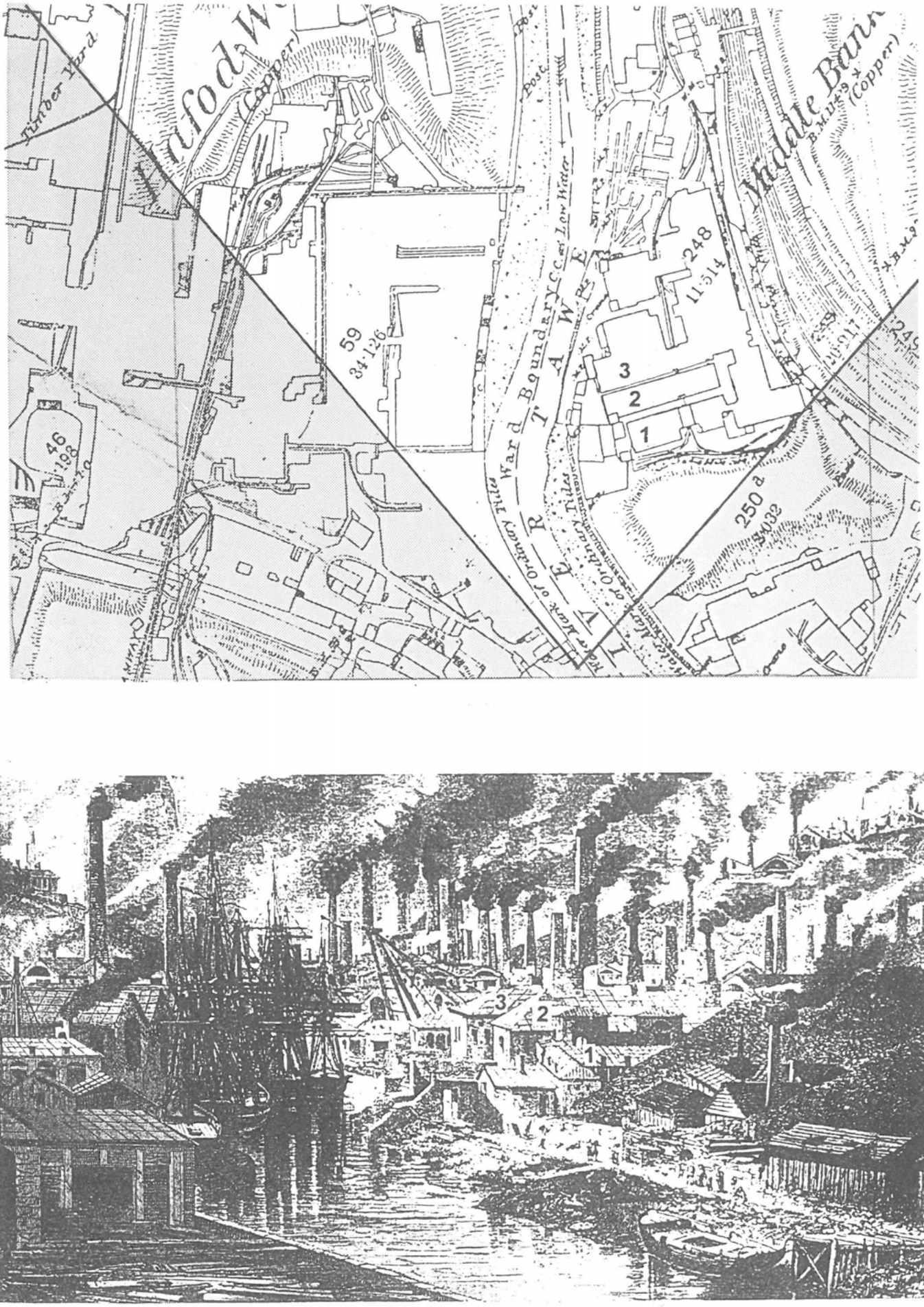


Figure Two: Middle Bank works. Reproduction of 1865 lithograph from Hachette's Tour du Monde, *with detail of 1st ed OS 25" plan.*

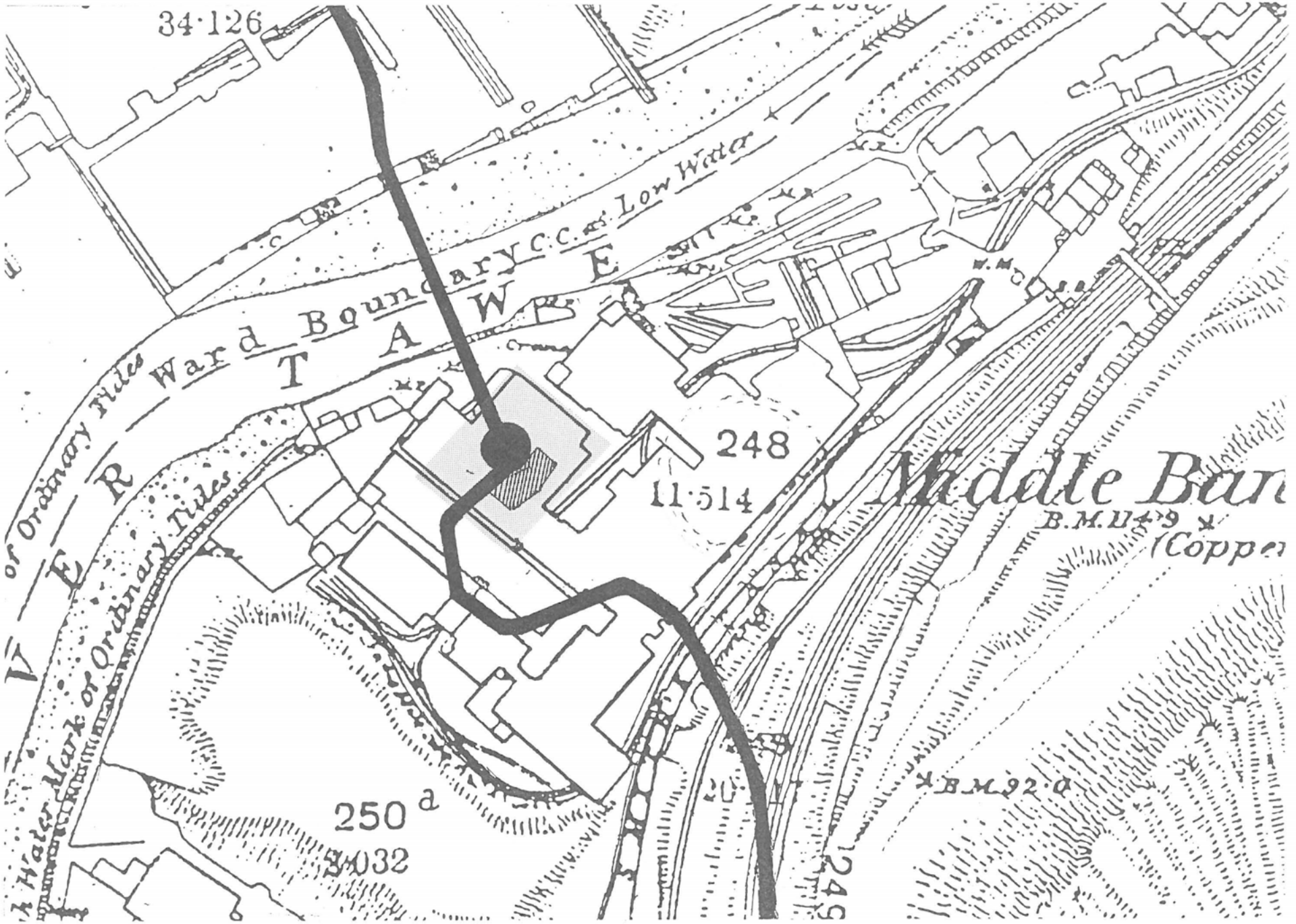
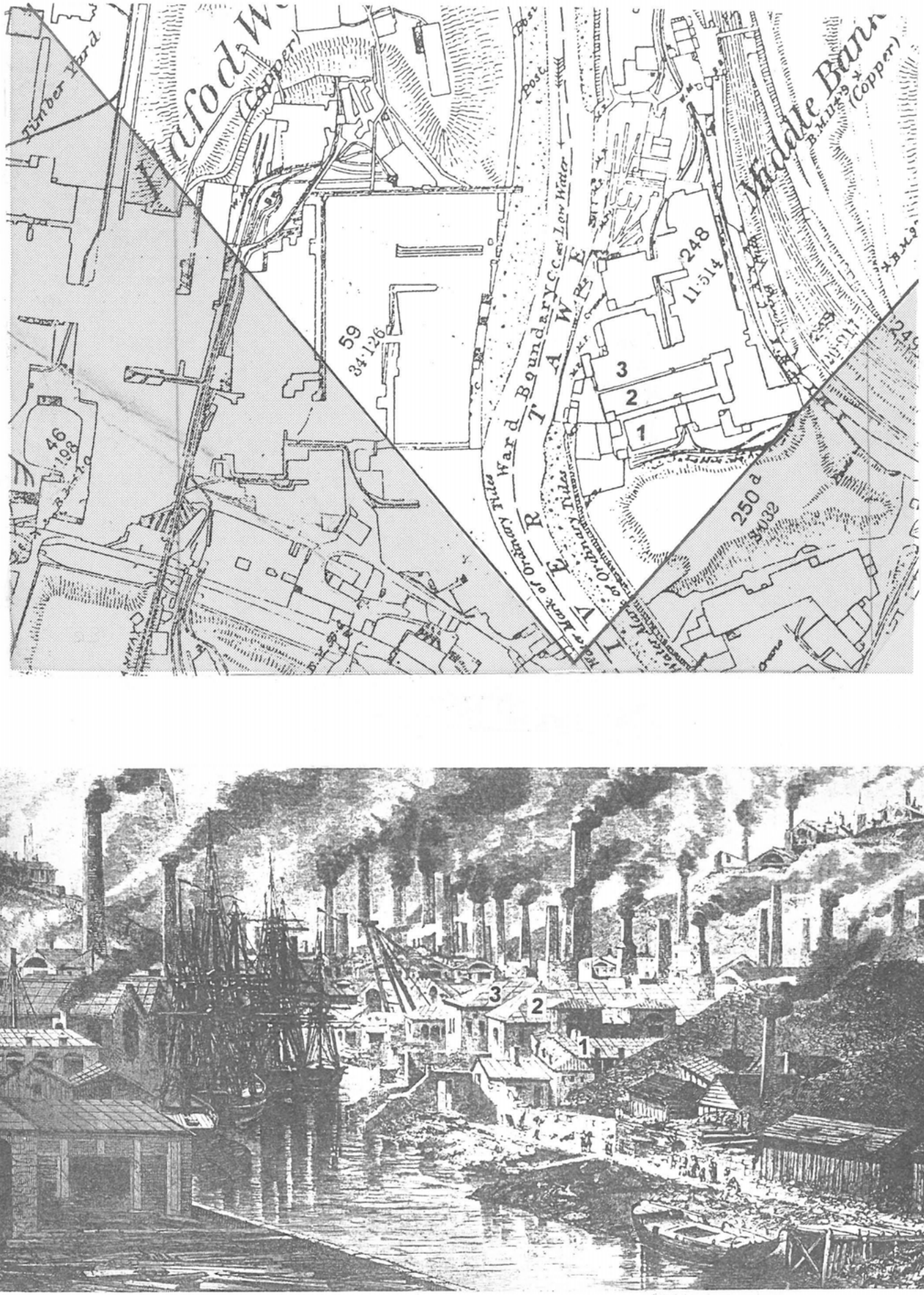


Figure Three: Middle Bank works. Detail of 1st ed OS 25" plan, showing course of rising main and position of White Rock pumping station. Area of Figure Four shaded.



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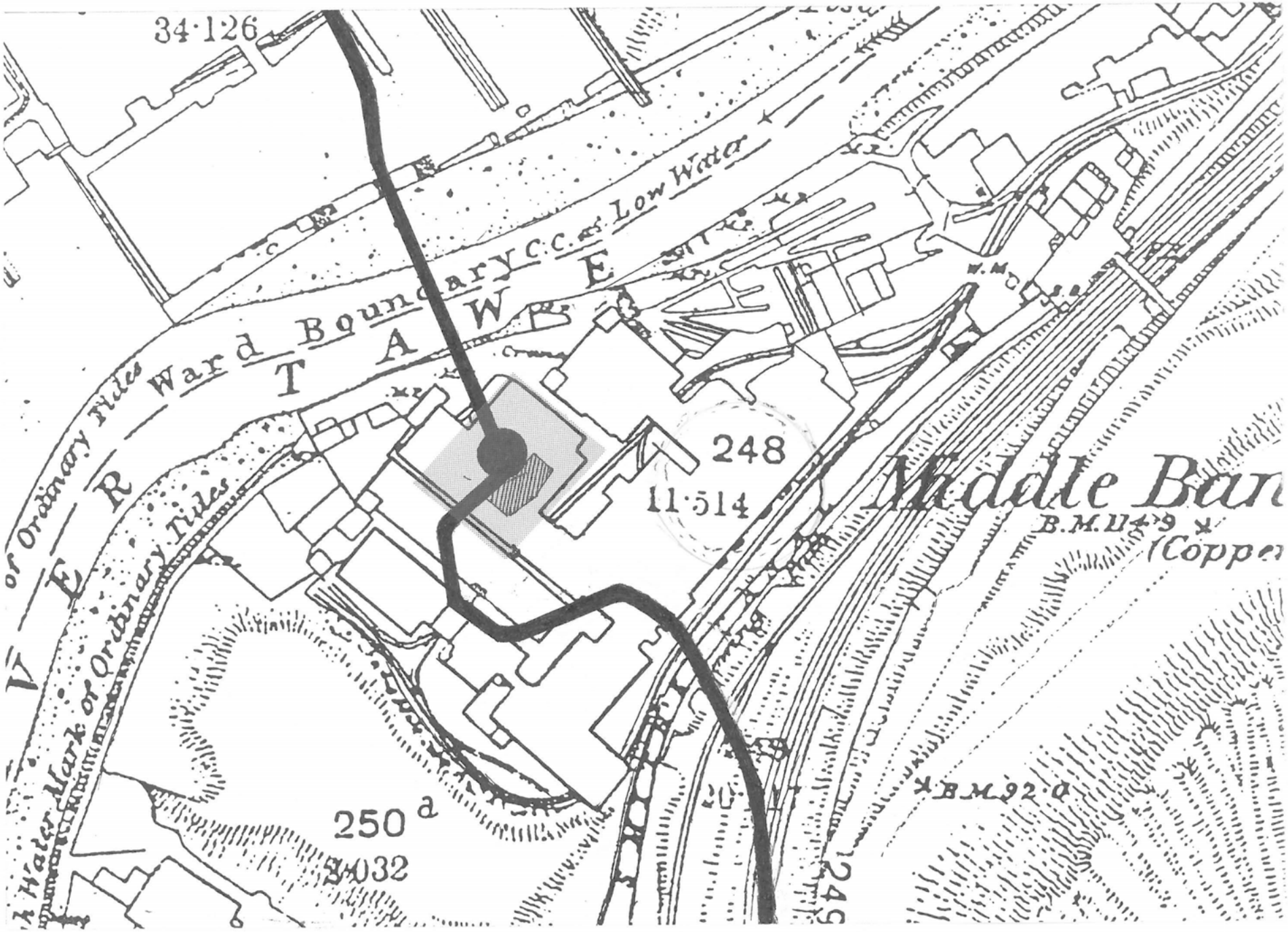

Figure Three: Middle Bank works. Detail of 1st ed OS 25" plan, showing course of rising main and position of White Rock pumping station. Area of Figure Four shaded.