

Unit Superheaters Engineering Swansea



Archaeological Evaluation and Watching Brief Report



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on behalf of DFWJ Ltd
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SUMMARY

Oxford Archaeology (OA) undertook a field evaluation and watching brief at the former Unit Superheaters Engineering site, commissioned by Waterman (consultants) on behalf of DFWJ Ltd and Unit Holdings (clients). Two evaluation trenches were excavated within the northern part of the site and encountered primary made ground reclamation levels comprising sand and gravel at 3 m below the modern surface level. These was overlain by a relatively thin sequence of black silt layers that contained abundant pottery production waste in the form of unfinished and broken pottery vessels and various elements and forms of kiln furniture. The assemblage dated to between 1830 and 1880 although a small amount of late 18th-century pottery was also present. The pottery debris represents a significant finding although the extent of these deposits was not established beyond the evaluation trenches. These deposits remain undisturbed in situ. No structures that could be clearly related to these deposits were encountered and the focus of the Cambrian Pottery works lies within the southern half of the site. These deposits probably represent the dumping of waste beyond the boundary of the works. Within the southern area several firebrick structures were recorded in this phase of investigation adding to the previous evaluation and watching brief evidence. Combined, these suggest that significant structural remains are present that could relate directly to the pottery works.

A series of well preserved stone pillars arranged in a grid pattern also encountered across the southern part of the site relate to the Graigola Merthyr Patent Fuel works and can be seen on a contemporary watercolour view of Swansea from 1881. Alongside the Patent Fuel works significant contemporary remains were recorded of the North Dock Basin, canal basin and wharf. These were only exposed at intervals although, combined with a 1940s view photo of workmen infilling these, it is clear that they are likely to survive in very good condition. Likewise, the photo shows that the Patent Fuel Works was levelled and has probably acted as an effective protective covering to any earlier deposits and structures buried at depth.

Remains of Villier's Dry Dock were less well preserved although the entrance to this was located with the wooden lock gate preserved in situ. Much of the interior dock structure had been significantly damaged or removed. However, north of this a series of contemporary walls were present surviving to a height of 0.7 m built above the pottery-rich layers. These sandstone walls represent the Cambrian factory located here on the late 19th century maps. No floor levels or associated deposits were present.

The detailed watching brief and guidance provided by the attending archaeologists to the demolition contractors proved to be a very successful means of removing the modern obstructions without damaging the earlier structures in the process. Potentially significant structures were revealed immediately below and around the foundations of the former Unit Superheaters building foundations. Without the communicative approach and early involvement strategy adopted, it is likely that many of these important remains would have been removed as hard obstacles before their significance was realised.

1 INTRODUCTION

1.1 Location and scope of work

1.1.1 Between June and August 2008 OA undertook a field evaluation and watching brief at the former Unit Superheaters Engineering works, Swansea commissioned by Waterman (consultants) on behalf of DFWJ Ltd and Unit Holdings (clients). The evaluation trenches were excavated in accordance with a Specification for Archaeological Field Evaluation set by Waterman (2007a) through agreement and consultation with Neil Maylan, archaeological advisor to Swansea City Council. OA subsequently produced and submitted a Written Scheme of Investigation (WSI) for the evaluation and a watching brief undertaken for the excavation of a series of geotechnical investigation trial pits (OA 2007 and 2008a). These documents detail how the specification would be met prior to commencing the fieldwork. The specification and details of investigation for the watching brief elements of this investigation were agreed through onsite consultation between Neil Maylan, Clare King (consultant) and Steven Lawrence (OA) and are consistent with those outlined within the WSIs.

1.1.2 The development site is situated to the north east of Swansea city centre, occupying an area between the Mainline railway line and the River Tawe (Fig. 1). It covers an area of approximately 3.4 hectares that was occupied by the footings of large industrial buildings (the former Unit Superheaters Engineering) with areas of hard standing and some scrub-covered waste ground along the bank of the river. It is bounded to the south-west by New Cut Road, to the north-west by Morfa Road, to the north by Corporation Yard and to the east by the River Tawe (Fig. 2).

1.2 Geology and topography

1.2.1 The site lies within an area of unclassified urban soils according to the Soil Survey of England and Wales (SSEW) map sheet 1 (1983). The soils and geology in the area immediately to the east and southeast of Swansea include Palaeozoic sandstone and drift from Palaeozoic and Mesozoic sandstone and shale, which are overlain by soils characterised as well drained loamy and fine loamy soils (*Ibid.*). It is recorded that the site includes part of the former channel of the River Tawe, which was in-filled in the 1940s, and will therefore include a significant volume of made ground in its eastern sector. The current land surface within the varies between 7.5 m and 9.5 m above OD.

1.3 Archaeological and historical background

1.3.1 The archaeological background to the evaluation has been the subject of a separate desk-based study by Waterman (2007b), the results of which were summarised within the Specification (Waterman 2007a) and the preceding evaluation report (OA 2008b) and are repeated below. The original desktop study should be consulted alongside this document for further detail.

- 1.3.2 The Glamorgan-Gwent Archaeological Trust Sites and Monuments Record (GGAT SMR) does not contain any records of human activity within the site, or the 0.25 kilometre radius study area, of earlier than post-medieval origin. However, Taylor (1996) argues for the presence of a medieval watermill on the site of a mill that was part of the Cambrian Pottery works depicted on a map of the town published in 1843 (Fig. 3a). This mill is also shown in line drawn views of the Cambrian Pottery works in the late 18th century and was used to crush flint for use in the production of its pottery (Hughes 2005 figs. 24a and 25).
- 1.3.3 The pottery works were preceded by, and made use of, the buildings of only the second copper works to be established in Swansea. The Cambrian Copperworks was founded in 1720 and was smelting copper until 1745 although the mill may have been used as a metal rolling-mill until as late as 1776 utilising the water mill as a source of power (*Ibid.*).
- 1.3.4 The Pottery Mill is also shown within the site on the 1852 plan of Swansea Harbour, towards the centre of the development area (Fig. 3b). The Cambrian Pottery works were located to the immediate south of the mill and produced high quality earthenware and porcelain between 1764 and 1868 (*Ibid.*).
- 1.3.5 An archaeological rescue excavation was undertaken in February 1983, on land to the south west of the site, beyond its boundary. This identified remains of a large vaulted stone and brick structure, measuring 16 metres by four metres, which had been infilled to a depth of c. 1.7 metres (Sell 1983). This was interpreted as a pottery drying chamber belonging to the Glamorgan Pottery which lay adjacent to, and was partially contemporary with, the Cambrian Pottery. The remains were recorded to a depth of two metres below the existing ground level.
- 1.3.6 The historical map sequence (Fig. 3 a-e) also shows the numerous developments of the canal and dock system that developed alongside the River Tawe and, in the case of the North Dock Basin, directly from the river. Photographs from 1965 supplied by the former Unit Superheaters works show the final stage in the history of water management here with the infilling of the North Dock Basin and reclamation of a large swathe of the former river frontage (OA 2008b plates 5-8).
- 1.3.7 In July 2007, OA undertook a two-trench evaluation within the site boundary. Trenches 1 and 3 were excavated as 2, 4 and 5 were not accessible at the time. A detailed report on the results of the first phase of the evaluation are in a separate report (OA 2008b).
- 1.3.8 Within Trench 1 a high concentration of pottery sherds, kiln furniture and wasters was recovered from a layer 4 m below the modern ground level. The pottery was predominately of early to mid 19th century date and is most likely associated with the Cambrian pottery. The extant remains of three standing structures were also recorded. These comprised two separate, but likely to be related, Pennant Sandstone structures and a reinforced concrete structure.

- 1.3.9 A series of made ground deposits, two walls and a brick culvert were encountered within Trench 3. The two walls are potentially the earliest features encountered within the trench. The walls are of near identical construction with roughly hewn and coursed facing blocks of Pennant Sandstone. The walls were 0.80 m wide and appeared to continue below the excavated base level of the trench suggesting a standing height of *c* 3.00 m. The walls were parallel to each other 1.20 m apart with the facing blocks visible to the full excavated depth suggesting that these were formerly part of the upstanding walls and not the foundations.
- 1.3.10 The evaluation also recorded the upstanding remains of the eastern side of the North Dock Basin and the eastern end of the northern building within the Unit Superheaters factory arrangement (OA 2008b Plates 1, 2 and 3). The latter may represent a wall boundary that fronted the river and can be traced back to the map of 1843.
- 1.3.11 In March 2008 OA also undertook a watching brief upon a series of geotechnical trial trenches (GTT 1-11) that were targeted to investigate the location of Villier's Dry Dock and its entrance off the River Tawe and the density of obstructions that may be encountered at the location of the pottery works. The exact limits of Villier's Dry Dock were not established although the river wall and entrance was suggesting that this extended below the line of the current building. The three trial pits excavated near to the evaluation trenches each produced clear evidence of substantial standing structural remains that are likely to be associated with the pottery works.

2 AIMS

2.1 Evaluation aims

- 2.1.1 The evaluation aimed to establish the presence or absence, extent, date, nature function and phasing of any archaeological remains present within the development boundary. To achieve this it aimed to;
- Determine the thickness, depth and depositional history of any archaeological and environmental deposits
 - Characterise the nature of the main stratigraphic units encountered in terms of their physical composition (stone, sand, gravel, organic materials etc) and their archaeological formation (primary deposits, secondary deposits etc)
 - Assess the overall presence and survival of structural remains relating to the main periods of occupation revealed and the potential for the recovery of additional structural information given the nature of the deposits encountered (e.g. extent of later disturbances etc)
 - Assess the overall presence and survival of the main kinds of artefactual evidence (including pottery, brick, tile, stone, glass, metal, bone, small finds, industrial residues etc)
 - Assess the overall presence and survival of the main kinds of ecofactual and environmental evidence (including animal bone, human bone, plant remains, pollen, peat, charcoal, mollusca, soils etc), its condition and potential given the nature of the deposits encountered

- Appraise the relative value of the main stratigraphic units revealed in terms of their importance for preservation and conservation
- Determine the need for, and scope of, any further mitigation works, such as excavation or archaeological observation during groundworks, that may be required

2.1.2 Whilst the final two aims above are listed, it was only the intention of this evaluation to inform the subsequent consideration of these, rather than provide detailed comment within this report. These also provided the means to inform the methodology for the subsequent demolition and ground slab clearance for the watching brief stage of this investigation.

2.2 Watching brief aims

2.2.1 The watching brief had very specific aims identified based upon the results of the preceding evaluations and geotechnical watching brief. Combined with the historical map evidence the potential of the site was separated into two distinct zones. These effectively identified a low potential area across the northern part of the site and a high potential area across the southern part coinciding with the expected extent of the pottery works. The aims of the watching brief varied accordingly. The aims as outlined above applied throughout for both areas with the addition that within the northern part a full record of all structural remains was to be made ahead of removal as part of the obstruction removal. Within the southern part a preservation approach was adopted and the watching brief was undertaken with the aim to identify, record and preserve the below ground structural remains *in situ* with minimal disturbance.

3 EVALUATION METHODOLOGY

3.1 Scope of fieldwork

- 3.1.1 The evaluation comprised two trenches, 4 and 5 (Fig. 2). These were positioned within the footprint of the northern building of the former works. At the time of the evaluation the above ground remains of this building had been demolished and the ground slab had been removed leaving open ground. A small area of below ground obstructions had also been removed to the east of Trench 5 prior to the archaeological attendance as part of the demolition although this ceased immediately once the contractor had been informed that these required observation and recording. Trench 4 was excavated in two sections to avoid a monitored borehole. It was aligned north-east south-west. The north-east section measured 13.3 m by 9.4 m. The south-west section measured 6.7 m by 7.1 m. Trench 5 was aligned NNE to SSW and measured 23.6 m by 10.9 m.
- 3.1.2 Following the excavation of the evaluation trenches, a watching brief was undertaken to record any remains that were revealed during the removal of the modern factory footings. This included the removal of the floor slabs across the southern building

footprint, tarmac removal from external areas around the factory, and the removal of identified modern buried brick and concrete tanks and services.

- 3.1.3 Following demolition a watching brief was also undertaken on an additional eight geotechnical trenches (GTT 12 to GTT 19) that were positioned to further investigate the location of Villiers' Dry Dock (Fig. 2).

3.2 Fieldwork methods and recording

- 3.2.1 Trenches 4 and 5 were located on open ground following demolition of the northern former works building and the removal of the ground slab. These were intended to be excavated as stepped trenches which necessitated a larger surface area excavation to allow for the exposure of a trench approximately 20 m long by 2 m wide at an anticipated below current ground level depth of 4 m. In the event, unstable or loose ground and the structures encountered did not allow for the whole of either trench to be stepped. Due to these factors a combination of battered and stepped sides were utilised to allow safe access and working conditions. Also it was not required to fully investigate both trenches to a depth of 4 m below the current ground surface and the archaeological deposits and structures were able to be investigated with only minimal stepping and edge battering.
- 3.2.2 The evaluation trenches were excavated by a 20 tonne 360° mechanical excavator fitted with a toothless bucket. Both trenches were excavated under strict archaeological supervision to the top of any significant archaeological level or structure, the natural geology or the maximum safe excavation depth (4 m) depending on which was encountered first.
- 3.2.3 The stratigraphy of each trench was recorded including where no archaeological deposits were identified. Where deposits or features were encountered that warranted detailed investigation, these were cleaned and excavated by hand. Each of the encountered features and structures were recorded in plan and section where required at scales of 1:50 and 1:20. A photographic record was made using colour slide and black and white print film. In addition, features and trench locations were planned digitally using GPS. A digital photographic record was also made. Recording followed procedures established in the *OAU Fieldwork Manual* (ed. Wilkinson 1992).
- 3.2.4 Trenches were backfilled following approval from the local archaeological advisor.
- 3.2.5 Within the watching brief areas archaeological observation and guidance was provided to the machine operators during the removal of the ground slab and below ground obstructions. The extent and depths of the areas observed are presented in figure 4. Due to the requirements of the demolition the machines were generally fitted with toothed buckets although the close archaeological supervision limited the disturbance of significant remains.
- 3.2.6 Where encountered, archaeological remains observed during the watching brief were planned digitally with a GPS. The maximum depth of excavation from the present

ground surface was recorded alongside the surface height in m OD of the structural remains encountered. Significant archaeological remains were preserved *in situ* across the southern part of the site.

- 3.2.7 Where large stanchions were removed, these were often unsafe to enter and the sides too unstable to allow accurate recording. In these cases depths (to nearest 0.5m) to the top of the remains were approximated below the present ground surface, descriptions and general photographic shots were taken. Structures and other significant remains were fully recorded where possible.

3.3 Finds

- 3.3.1 Finds were recovered from Trench 4 and Trench 5. In both trenches a black deposit produced large quantities of pottery and kiln furniture from which a sizeable and representative sample was recovered.
- 3.3.2 Only a single firebrick example was recovered from a structure within the watching brief areas. No other finds were encountered from these areas reflecting the limited impact of the demolition that did not disturb archaeological horizons buried at depth and the preference for preservation *in situ*.

3.4 Palaeo-environmental evidence

- 3.4.1 No deposits suitable for palaeo-environmental sampling and analysis were encountered within this phase of the investigation.

3.5 Presentation of results

- 3.5.1 The following section outlines the findings from each evaluation trench and the areas observed in the watching brief. The stratigraphic and structure descriptions include references to artefacts and dating evidence where relevant. A full report on the pottery and kiln furniture follows these descriptions. Relevant illustrations and historical plans are presented at the rear of this report. An inventory of all finds and contexts (which includes measurements not presented within the text) is provided in Appendix 1.

4 RESULTS

4.1 Trench 4

- 4.1.1 Trench 4 was excavated in two portions to avoid the location of a monitored borehole (Figs 2 and 5). Machine excavation of the southwest portion of trench quickly revealed that this was centred upon a large concrete foundation (412) that measured 3.5m by 2.5m and was 0.5m thick for an iron stanchion. This was part of the modern buildings from the Unit Superheaters engineering works and hindered further exploration of the trench or the possibility that significant remains could be present.
- 4.1.2 The earliest deposit encountered was in the northeast portion of the trench where a section was machine excavated at the base of the trench to investigate the lower levels of stratigraphy (Fig. 6 section 401). This encountered a soft yellow brown sandy silt with rounded sandstone inclusions (402) that was excavated to a depth of 1.3 m below the contact with the overlying deposit and approximately 2.9 m below the ground level at the time of the evaluation. The full depth of this deposit was not established which could be considerably deeper with this most likely to represent drift deposits within the valley along the riverside. Alternatively this may represent redeposited material from a similar natural process origin intended to raise the ground level alongside the river.
- 4.1.3 Overlying the sterile sandy deposit (402) was a distinct black silt layer (401). This appeared to comprise fine coal or coal dust and had a large amount of broken kiln furniture and pottery incorporated into it. A representative sample this was recovered for analysis that recorded trivets, spacer bars and saggers associated with a considerable amount of broken waster material and some broken finished products with a date range of c. 1830-1860. This was overlain by two thin layers of white crushed chalk or lime separated by a stony silt layer (collectively 413). A further layer of compacted coal dust (404) with similar pottery products and waste inclusions, but dated c. 1860-1880, overlay this sequence.
- 4.1.4 Although clear relationships were not established, it appeared as though the walls (405 and 407) encountered within the northeast portion of this trench had their foundations cut into layer 404. This partly relies upon a correlation of this horizon to the upper horizon of layer 506 and the relationships recorded in Trench 5. A wall (406) that was constructed between 405 and 407 was clearly constructed above layer 404 and butted against walls 405 and 407. Also, in their actual use and existence, these walls clearly stood clear above the level of layers 401 and 404 with neatly finished, albeit rather roughly constructed, faces that were clearly not foundation courses. Each wall was constructed of rough sandstone blocks and slab-like pieces reflecting the natural break pattern of the stone as it was quarried. These were mortared in rough courses and stood 0.5 m to 0.7 m tall above the surface level of deposit 401.

- 4.1.5 Within the southwest portion of the trench a wall (408) of mixed sandstone and brick construction was recorded along the eastern side. The relationship to the other walls was not clearly established although its perpendicular alignment to wall 407 clearly suggests that this was part of a contemporary arrangement. A series of mixed dump layers (410 and 411) comprising slag, silts, coal dust and sand appeared to butt against the western face of this wall although it may be possible that these predate the construction of the wall.
- 4.1.6 The areas between, around and, in places, above the walls were infilled with a mixed rubble deposit (403). This comprised sandstone, brick and tile rubble with mixed silt and clay and was 0.8 m thick mirroring the surviving heights of the walls. This deposit was clearly a demolition and levelling layer representing the destruction of the building represented by the walls recorded within the trench.
- 4.1.7 The uppermost 0.5m of the trench had been cleared of concrete slab and foundation deposits prior to excavation.

4.2 Trench 5

- 4.2.1 The earliest deposit encountered in Trench 5 was a layer of made ground (509) (Fig. 6 sections 501 and 502). This comprised of a friable yellowish brown sandy silt with gravel and sand lenses throughout and is the equivalent of deposit 402 recorded in Trench 4. As in Trench 4, the full depth of this deposit was not established. Also consistent with the sequence of deposits recorded in Trench 4, a 0.12 m thick black silt layer with frequent pottery and kiln furniture waste (506) overlay the primary sand and silt deposit. This produced a near identical assemblage of broken pottery, part finished broken pottery and kiln furniture debris dated c. 1830-1860. This was present throughout the trench and is undoubtedly the same as deposit 401.
- 4.2.2 Several walls (501-505 inclusive) were present within the trench (Fig. 5). Although the stratigraphic relationships between each of these walls and layer 506 was not entirely clear, wall 504 (Fig. 6 section 502) was clearly cut into and built above the black silt, coal dust and pottery waste deposit. The lack of clear construction cuts points to the walls all being trench-built with the foundations filling each trench. Each wall was constructed of roughly hewn sandstone blocks and slabs with a mortar bond and aligned NE-SW or SE-NW (502). The walls generally survived to a standing height of 1-1.5 m above the upper horizon of layer 506.
- 4.2.3 The walls clearly form part of a contemporary arrangement (described in more detail below) although some variation of construction date was suggested by the construction of wall 503 against wall 502 and wall 504 partly over 502.
- 4.2.4 The areas between, around and, in places, above the walls were infilled with a mixed rubble deposit (508) equivalent to deposit 403 in Trench 4 representing the same destruction and levelling of the building(s).

- 4.2.5 The uppermost 0.5 m of the trench had been cleared of the modern concrete slab and foundation deposits prior to excavation.

4.3 Watching brief

Area below the northern (demolished) building

- 4.3.1 This area refers to the footprint of the former standing building demolished immediately prior to the excavation of evaluation Trenches 4 and 5. The concrete slab had been removed prior to the excavation of the trenches. Following the excavation and recording of the evaluation trenches the surrounding area was further reduced by 0.5 m to search for, and remove, modern obstructions. Where walls that predated the modern building were encountered, these were recorded and preserved *in situ*. Deposits and structures were not investigated below the reduction depth of 0.5 m.
- 4.3.2 A series of walls aligned NE-SW and NW-SE were encountered 0.3-0.5 m below the level of the removed concrete slab. These clearly related to the walls recorded in Trenches 4 and 5 forming a building (Structure 513) approximately 55 m long (NW-SE) by 8 m wide (Fig. 5). Consistent with the walls recorded in detail in the evaluation trenches, these were constructed from roughly hewn and coursed blocks and slabs of sandstone and bonded with a friable mortar. Structure 513 corresponds to be the buildings shown on the 1879 and 1919 maps (Fig. 3) that generally post-date the pottery works to the south of this area.
- 4.3.3 Along the northwest limit of the site and to the immediate northwest of structure 513 a separate red brick structure (520 and 521) was recorded. This was difficult to interpret due to the remains only being viewed in section at the very edge of the site. The arrangement of this structure was not possible to establish although it did have angled 'corners' (Plate 1). It is possible that these relate to the demolished building although this appeared unlikely during the fieldwork.
- 4.3.4 South of the brick structures a short length of sandstone wall (522) was revealed. This was aligned roughly east to west towards the western end of structure 513 and seems likely to be related. A wall is shown on the 1879 and 1919 maps that fits this location and association although an earlier structure is also shown within this area on the 1852 map (Fig. 3).

Central area, partly below both (demolished) buildings

- 4.3.5 This area refers to the southern extent of the northern building (south of the remains described above) and the northern extent of the larger southern building. More specifically this refers to the location of the former Villier's Dry Dock and the various arrangements relating to the Swansea Canal and the North Dock Basin. This area also included several large reinforced concrete structures (Fig. 7).

Concrete structures

- 4.3.6 The large concrete structure encountered in Geotechnical Trial Trench 2 (GTT 2) and GTT 4 (OA 2008c) was removed and proved to be a large cellar-like structure constructed from reinforced concrete. The roof of the structure was made from iron tubes filled with concrete laid horizontally across the width of the structure with a corrugated iron sheet laid over the top and a 0.2 m thick slab of concrete poured over this. The whole structure measured 9.3 m by 2.5 m by 2.5 m deep with a single doorway entrance with steps leading up to ground floor level.
- 4.3.7 Two similar structures were found to the north and east. Structure 409 measured 10.15 m by 2.7 m by 2 m deep with broken concrete slab and iron rods filling the room space from the collapsed roof. It is likely the roof fell in prior to or during the demolition works. To the east, the third structure was 10.3 m by 4.2 m by 2 m deep. Each had a single entrance with steps leading to surface level. These seem most likely to have been air raid shelters from the second World War.

Villier's Dry Dock

- 4.3.8 The river wall and entrance to Villier's Dry Dock had previously been located in GTTs 9, 10 and 11 (OA 2008c). However, the actual dry dock structure had not been conclusively encountered. Therefore, more GTTs were excavated over the area of the dock to establish its precise location and state of preservation.
- 4.3.9 The south side of the dock entrance was further investigated in GTT 15 and was encountered 2 m below ground level consistent with the evidence from GTTs 9 and 10. This was constructed in Pennant sandstone blocks with pecked faces that were well preserved with the top course displaying a curved edge indicating that the original height of the dock and river walls survives at this point. A modern brick and concrete wall aligned north-south was built across the dock wall. This wall and the stanchion foundations had caused some truncation to the dock wall with the height of this sharply dropping to 3.5m below ground level where the faced sandstone blocks had been removed. The core of the wall comprised rough sandstone blocks bonded with a pale yellowish grey mortar. The line of this wall was followed to the northwest before it fell below the water table at 4 m below ground level. The machine bucket was used to follow the line of the wall below the water level where it was found to turn to the west. The extent of this part of the wall was not established. Due to the depths that the wall was encountered and the narrow trench that was dug to investigate it, this was only recorded as an alignment from the surface and it was not possible to record exact levels to the top of the remains.
- 4.3.10 GTT16 was positioned 23 m to the northwest along the projected line of the dry dock southern wall. This encountered a wall 3.5m below ground level that matches the projected alignment of the dock. To the west of this further Pennant sandstone remains that probably represent the continuation of the dock wall were also recorded in GTTs 14 and 17 although these were heavily disturbed and not clearly revealed.

- 4.3.11 The north side of the dock was similarly investigated to establish an accurate alignment for the dock and the degree of preservation/truncation. Previously the river wall had been encountered in GTT 11 (OA 2008c). GTT 18 was excavated to confirm the findings of GTT 11 and to locate the dock wall. This revealed the substantially preserved remains of the dock entrance with the wooden dock gate *in situ* in a closed position (Plate 2). The river entrance to the dock was also substantially preserved with the rusted remains of iron clamps preserved in the top of the Pennant sandstone wall. Within the dock the northern wall itself had been partly removed with the rubble core remaining 3.5 m to 4 m below the modern ground level. The alignment of the wall was projected to GTT 19 where an obstruction was recorded at 3.5 m below ground level under the water table. This did not allow conclusive identification of this as the dock wall although this seems most likely.
- 4.3.12 The western extent of the dry dock was not further established. Previously, GTT 8 had suggested the presence of a wall on an angled alignment to that of the parallel dock sides that could represent the end of the dock (OA 2008c). GTT 12 was excavated to further investigate this. A sandstone wall was recorded at the southern end of the trench although this lay beyond the expected location of the dock wall. This may relate to structures shown on the 1879 and 1919 maps between the lock basin and the dry dock. No other remains that could represent the western end of the dry dock were encountered suggesting that this may have been removed at this point.

The lock basin, wharf and north dock basin

- 4.3.13 A variety of structures were encountered approximately 20 m to the south of, and parallel to, Villier's dry dock. Several exposed portions of sandstone wall (514, 515, 516 and 517) representing a single structure conform to the location of the wharf along the northern side of the lock basin and entrance from the canal into the north dock basin as shown on the maps of 1879 and 1919. However, previous to the wharf arrangement, this was also the location of the mill and mill pond as shown on the 1843 and 1852 maps and the possibility of these having an association to these structures remains equally possible. The brick elements of wall 514 appear to match the location of a building first shown on the 1879 map between the lock basin and Villier's dry dock.
- 4.3.14 South of wall(s) 514/515 two inspection chambers (518 and 519) to a series of stone-built culverts were encountered. These had modern drain covers sitting on brick at surface level although the remainder of the culvert was neatly constructed in sandstone.
- 4.3.15 The western chamber (518) opened into a substantial shaft with an arched opening at the western end and a flat opening at the eastern end with water freely running through towards the River Tawe to the east (Plate 3). On the south side of the chamber was an iron grill, with vertical rods, covering a rectangular opening which was raised above the floor and water level. It was 4m deep from the top of the

capstones. The eastern inspection chambers (519) contained a large metal girder or possible mechanism towards the top of the access (Plate 3).

- 4.3.16 Walls (528 and 529) relating to the entrance from the canal basin lock into the north dock basin were also recorded to the south of Villier's dry dock. Only the Pennant sandstone face of the northern wall (529) was uncovered approximately 2 m below ground level although this was very well preserved with the upper course of wall surviving *in situ* (Plate 4). Several portions of the southern side (528) of this entrance were uncovered with remains being similarly well preserved (Plate 4). Here the dock wall was also built of neatly squared Pennant sandstone blocks with a rubble-coursed wall built above that. This wall could relate to that shown rising from the dock side contemporary with the Graigola Merthyr Patent Fuel Works shown on the 1879 map and the watercolour view across Swansea from 1881 (Hughes 2005 frontispiece). Parts of wall extending to the south of this represent the western side of the North Dock Basin. The eastern side of this was recorded during the primary evaluation of the site and remains as a complete wall standing partly above the current ground level (OA 2008b).

The Cambrian pottery and Graigola Merthyr Patent Fuel Works

- 4.3.17 The southern part of the site produced substantial evidence for the preservation of structures. Adjacent to evaluation Trench 3 (OA 2008b) a sandstone wall (523) was recorded with the upper courses 'rebuilt' in brick. This was aligned NE-SW with wall 524 aligned NW-SE off this forming a division. The Unit Superheaters factory foundations had caused some truncation to this wall although further damage was minimised by careful removal. Where the foundations were too difficult to remove without causing significant disturbance, these were left *in situ*. Only the uppermost courses of the walls were exposed without revealing the full height of the standing (buried) remains. However, these almost certainly relate to the walls recorded in and GTT 7 and Trench 3 that suggested standing remains to c. 3 m.
- 4.3.18 Across the southern part of the former Unit Superheaters building and to the immediate south of this firebrick, stone and more recent concrete structures were recorded. These correspond in part to the remains recorded in the previous evaluation (OA 2008b) and watching brief (OA 2008c).
- 4.3.19 Two separate structures (525 and 526) built in firebrick were encountered just to the south of the demolished building (Fig. 7 and Plates 5 and 6). Structure 525 was encountered only 0.2 m below the ground level and revealed in plan before backfilling and preserving *in situ*. This was constructed of yellow firebricks with the bricks set in a shallow 'trough' at the western end leading into a semi-circular opening at the eastern end (Plate 5). This was 2.7 m long in plan from east to west and 1.1 m across although it clearly extended beyond the area exposed. Approximately 4 m to the south of this was a further well preserved structure (526) similarly constructed in yellow firebrick. Seven courses of firebrick were exposed with a curved 'roof' above (Plate 6). It was not possible to establish the extent of this

structure or how it may have been arranged although it clearly extended beyond the area excavated. These firebrick constructions are located close to those recorded in GTT 6 of the previous watching brief (OA 2008c) that were also upstanding and well preserved.

- 4.3.20 Extending for 25 m to the ESE of structure 526 were segments of a sandstone wall (530) that were exposed intermittently. These were undoubtedly part of the same or a contemporary building and these closely match the location of a wall shown on the 1852 map.
- 4.3.21 Structures 526 and 530 were encountered due to the removal of a large concrete tank-like structure aligned NW-SE (Not shown on the figures, see Fig. 4 area to south of buildings and north of Trench 1 for this location). This was revealed just under the modern tarmac surface and comprised formed and reinforced concrete with an internal space of 3 m wide by 3 m high (Plate 6). This was backfilled with modern brick, concrete, iron sheet, wire and plastic overlying blue clay with slag and clinker in the base. The SE limit of the structure was not revealed. This structure is identical to that exposed within the upper part of Trench 1 (OA 2008b). Combined, they match the two channel-like structures shown on the 1949 OS map with a building annotated as a 'Ruin' that possibly drained into the disused and partly infilled North Dock Basin.
- 4.3.22 Within the footprint of the demolished Unit Superheaters building to the north of the concrete tanks and firebrick structures, several pillars (531) up to 2 m square were revealed under the floor slab (Plate 7). These formed a grid pattern on an approximate 5 m spacing (Fig. 7). These stood a minimum of 1 m high although the full depth of these structures was not investigated. These appear to be the pillars that supported a raised platform for loading/unloading at the Graigola Merthyr Patent Fuel Works as illustrated in the watercolour view across Swansea from 1881 (Hughes 2005 frontispiece).

4.4 Finds

Pottery

- 4.4.1 A full and detailed listing and description of the pottery recovered during the course of the evaluation and watching brief is presented in Appendix 2. In summary a total of 810 sherds of pottery weighing 8,054 g. were recovered from five contexts of which nearly all of 19th-century date. This assemblage mirrors that of the 2007 evaluation comprising domestic pottery, pottery wasters and pottery kiln furniture clearly representing production waste from (presumably) the Cambrian Pottery.

Other finds

- 4.4.2 A small amount of roof tile and slag was recovered from the evaluation contexts. This is not reported in detail. The roof tiles are all of 19th-century date and slag was present across the extent of the site and was not attributable to any particular episode

or event in the life of the site other than as a backfill material or levelling deposit in more recent history.

5 DISCUSSION AND INTERPRETATION

5.1 Fulfilment of the evaluation and watching brief aims

- 5.1.1 The evaluation and watching brief have provided clear evidence that fulfil the aims of this phase of investigation. These varied according to the historical use and the likely remains that could be encountered across the site.

Preservation levels

- 5.1.2 The guidance of the demolition crew by the attending archaeologist proved to be very successful and large modern foundations were able to be removed with very little or no impact upon earlier remains. In the few cases where the existing foundations proved to be too difficult to remove, these were noted and remained *in situ*. The upper level of preservation of all structures was recorded in relation to Ordnance Datum (Fig. 8). These values provide a means of assessing future impact levels.

The Cambrian copper, pottery and patent fuel works

- 5.1.3 The southern half of the site was occupied first by the Cambrian Copperworks in the second quarter of the 18th century, to be followed by the Cambrian Pottery Works in the second half of the 18th century. Due to the potential that the remains encountered within this part of the site could be associated with these important early works, all encountered structures were preserved *in situ*.
- 5.1.4 Several structural elements recorded across the southern area can be related to the historical maps or the likely period association. Although obvious kiln structures were not encountered, at least three separate firebrick structures (525, 526 and a structure in GTT 6) were present within this area. It is not clear if these are directly related to the pottery although this seems quite likely. Structure 526, an apparent linear structure with a possible arch vaulted roof, could be a pottery drying chamber although interpretation of all of the smaller structures is limited by the limited exposure of these and associated horizons and deposits.
- 5.1.5 None of the structures can be conclusively associated to the copperworks although the early pottery works utilised the existing buildings so the potential for remains of this period to survive remains reasonable. Certainly, the extent of 'standing' remains as encountered within Trench 3 (OA 2008b) demonstrates that substantial structural remains do survive at the site.
- 5.1.6 The most recognisable remains recorded were those of the stone pillars (531). As mentioned above, these can clearly be seen within the Graigola Merthyr Patent Fuel Works in the watercolour view across Swansea from 1881 (Hughes 2005 frontispiece). The particular significance of these and the watercolour view lies in the degree of preservation that they represent. The watercolour shows the pillars as

supporting an upper loading/unloading crane and cart track. However, the ground floor level of the pillars appears to be already raised slightly to that of the surrounding wharf area. In addition, a photo view from the west along the canal entrance to the North Dock Basin during its infilling also shows the demolished patent fuel works and a significantly raised land surface within this area (Plate 8). Therefore, preservation levels across this part of the site are demonstrated to be particularly good. Combined with the results from GTTs 5 and 6 and evaluation Trenches 3 and 1, there is little reason to doubt that significant archaeological structures and deposits are preserved across the location of the Cambrian works.

Canal and dock walls

- 5.1.7 Across the central, and eastern part of the site significant remains of the dock walls, canal basin, north dock basin (528 and 529) and associated structures (514-519) were seen during the removal of stanchions and in the geotechnical trenches. These remains were very well preserved with the upper courses of stone remaining *in situ* and the walls undamaged by the later foundations. It is quite clear from the image mentioned above that this is the result of methodical infilling during the 2nd quarter of the 20th century immediately preceding the expansion of the Unit Superheaters works over this area (Plate 8).

Villier's dry dock

- 5.1.8 The entrance and northern side of this structure were conclusively identified during the watching brief phase of work. However, this has suffered varying degrees of truncation/preservation. Surprisingly, the entrance to the dock was immaculately preserved with the wooden gate surviving and parts of the iron mechanism. However, the interior had been substantially damaged and/or removed and much of the southern side along its western end could not be identified despite the excavation of several deep trial pits designed to locate it.

The northern area

- 5.1.9 The northern part of the site covered by the evaluation trenches and subsequent watching brief provided clear evidence for the extent and importance of the remains in this area. The evaluation trenches revealed significant pottery waste material overlying primary made ground levels. These deposits (401, 404 and 506) appear to represent dumping of waste material to the north of the pottery works and, as such, include a significant amount of information on the products and production methods employed at the pottery. Indeed, the quantities present were of such a density that only a representative sample was recovered for analysis. However, no clearly associated structures were defined within the evaluation trenches. The walls recorded across this area each appeared to be later than the pottery waste deposits although this was not conclusive. The extent of the pottery and kiln waste rich deposits was not established as only the modern concrete slab, foundations and upper 0.5 m of underlying material was subject to removal, crushing and reinstatement with the pottery deposits remaining below the level of the demolition impact.

- 5.1.10 Moderately well preserved structures were present across the northern area with walls standing to a height of c. 0.7 m. These form a linear building arrangement aligned NW-SE corresponding to the Cambrian Factory buildings shown at this location on the 1879 and 1919 maps. Associated floor levels were not identified within the rooms of this building and it is likely that these were removed prior to demolition. The building is annotated as 'Disused' on the 1919 map.

Air raid shelters

- 5.1.11 A series of subterranean reinforced and formed concrete air raid shelters were recorded, principally within the infilled Villier's dock area although another was recorded to the south of the former factory buildings and within evaluation Trench 1. The northern range of structures were of identical construction with the roof of each made from iron tubes filled with concrete laid horizontally across the width of the structure and a sheet of corrugated iron laid over the top prior to a 0.2m thick slab of concrete being poured on top. The southern structure had a formed and conventionally reinforced roof. Each had a single entrance and stairs for access.

APPENDICES

APPENDIX 1 ARCHAEOLOGICAL CONTEXT INVENTORY

<i>Ctxt No</i>	<i>Type</i>	<i>Width (m)</i>	<i>Thick. (m)</i>	<i>Comment</i>	<i>Finds</i>	<i>Date</i>
Trench 4						
401	Layer	5	0.13	Pottery debris layer	Pottery and Kiln waste	19th
402	Layer		1.3+	?Made ground layer		
403	Layer		0.8	Levelling layer	Pottery and Kiln waste	19th/20th C
404	Layer	4	0.08	Pottery debris layer	Pottery and Kiln waste	19th
405	Structure	0.47	0.93	Stone wall		
406	Structure	0.71	0.43	Stone wall		
407	Structure	0.64	1.1	Stone wall		
408	structure	0.5	1.48	Stone wall		
409	Structure	2.7	2	Concrete tank		
410	Layer		0.12	Make up layer		
411	Layer		0.54	Make up layer		
Trench 5						
501	Structure	0.63	1.29	Wall. Stone		
502	Structure	0.66	1.17	Wall. Stone		
503	Structure	0.55	0.2	Wall. Stone		
504	Structure	0.69	1.46	Wall. Stone		
505	Structure	0.57	0.09	Make up layer		
506	Deposit		0.1	Pottery debris layer	Ceramics	19th
507	Structure	0.89	0.48	Concrete structure		
508	Deposit			Levelling layer	Ceramics	19th/20th C
509	Deposit	4	1.2+	?Make up layer		
Watching Brief						
510	Structure			Wall with slag block coping stones		
511	Structure			Firebrick chimney		
512	Structure			Stone wall		
513	Structure			Group. Walls in north area of site		

<i>Ctxt No</i>	<i>Type</i>	<i>Width (m)</i>	<i>Thick. (m)</i>	<i>Comment</i>	<i>Finds</i>	<i>Date</i>
514	Structure			Wall		
515	Structure			Wall		
516	Structure			Wall. Continuation of 515		
517	Structure			Wall. Continuation of 515		
518	Structure			Culvert inspection chamber		
519	Structure			Culvert inspection chamber		
520	Structure			Red brick structure		
521	Structure			Red brick structure		
522	Structure			Wall. Stone		
523	Structure			Wall. Stone and brick		
524	Structure			Wall. Stone and brick		
525	Structure			Curved firebrick structure		
526	Structure			Curved roof, firebrick structure		
527	Finds reference			Round firebrick with holes. From near to structure 520.		
528	Structure			Stone dock basin wall. South side of entrance to North Dock Basin from the canal lock.		
529	Structure			Stone dock basin wall. North side of entrance to North Dock Basin from the canal lock.		
530	Structure			Stone wall		
531	Structure			Stone pillars. Patent Fuel Works		

APPENDIX 2 POTTERY AND POTTERY PRODUCTION WASTE ASSESSMENT

by John Cotter

Introduction and methodology

A total of 810 sherds of pottery weighing 8,054 g. were recovered from five contexts. This is nearly all of 19th-century date. These totals include domestic pottery, pottery wasters and pottery kiln furniture. All the pottery was examined and spot-dated during the present assessment stage. For each context the total pottery sherd count and weight were recorded on an Excel spreadsheet, followed by the context spot-date which is the date-bracket during which the latest pottery types in the context are estimated to have been produced or were in general circulation. Comments on the presence of datable types were also recorded, usually with mention of vessel form (jugs, bowls etc.) and any other attributes worthy of note (eg. decoration etc.). The main categories of material: domestic pottery, pottery wasters and kiln-furniture were quantified separately for each context as was done for the earlier evaluation at nearby SWUNIT 07.

Date and nature of the assemblage

The pottery assemblage is in a good but fragmentary condition although the sherds are large and fresh. A few complete vessel profiles have survived or can be reconstructed. Ordinary domestic pottery types are represented as well as clear evidence for pottery production in the form of pottery wasters and kiln furniture. The types present are summarised below. More detailed descriptions can be found in the spot-dates list.

The domestic pottery types and pottery waster types present are all very similar to those produced on the earlier evaluation nearby at SWUNIT 07 (see report) with the significant difference that the earlier evaluation produced a large quantity of Chinese porcelain (perhaps from a shop/showroom?) which was almost entirely absent from the present evaluation assemblage. The earliest context assemblages have been dated to c 1830-1860 (401, 403 and 506). The remaining two contexts have been dated to c 1860-1880 (404) and c 1862-1880 (508). The material from these contexts was all of a very similar nature and many earlier 19th-century pottery types were present as residual material in the two mid/late 19th-century contexts (404 and 508) and several probable cross-joins were noted. The evidence for dating context (404) to c 1860-1880 rather than earlier was only slight but consisted of the presence of one or two styles of decoration on the blue transfer-printed wares that were more typical of the mid 19th century than earlier (eg. 'flow blue' style decoration) and also because some the pottery kiln-furniture in this context had a more modern, industrialised look about it and was possibly machine made. Some of this later-looking kiln-furniture had (as yet unidentified) stamped makers' marks and numbers on it unlike the earlier kiln furniture which could mostly have been handmade rather than cast in moulds or made in presses. Context 508 was dated to c 1862-1880 by presence of a Staffordshire refined whiteware sherd with a mark datable to 1862-1904 and by the presence of a much more diverse assemblage of mid/late 19th-century wares including a rare marked French stoneware bottle made for Japanese ink. Small amounts of residual 18th-century pottery were present in most contexts.

A large element of the domestic pottery and wasters is comprised of mass-produced refined white earthenwares ('willow' pattern etc.) identical to Staffordshire wares of

the same period. These are all tablewares - plates, bowls, dishes, cups, saucers, jugs, chamberpots and possibly candlesticks. Other domestic pottery includes many pieces of Creamware which is known to have been produced here c 1790-1830. Some of these are decorated with distinctive coloured slip (paint) decoration in shades of blue, brown and white and wasters of this type of decoration testify that this was made here. A few possibly plain Creamware and Pearlware pot bases have overglaze painted numbers underneath which may be batch marks etc.

Pottery wasters in refined white earthenware and pottery kiln furniture form a significant proportion of the assemblage and provide clear evidence for pottery manufacture on or near the site. These derived from the Cambrian Pottery which was operational here 1764-1868 (Hughes 2005, 11-16) although the pieces here appear to be 19th century. The wasters are distinguished by the fact that they are all unglazed but none is otherwise distorted or over-fired. They would appear to derive from a stock of vessels ready for glazing and re-firing but broken before this could take place. Forms include plates, saucers, carinated teacups, mugs and sugarbowls and larger bowls with turned footring bases. Some pieces are plain but many have transfer-printed decoration - probably in cobalt blue but here in unfired form appearing dark grey.

Pottery kiln furniture, intended to support and separate vessels in the kiln, comprises a surprisingly large proportion of the assemblage - a full 362 sherds or 45% of the entire assemblage. This is all made from white pipeclay mostly with a thin clear glaze resembling a Creamware glaze. These include very many pieces of three-armed trivets and many smaller 'cockspur' trivets shaped a little like pyramids with projecting corners. There are also several neatly-made setter rings of rectangular cross-section. Context (403) produced an unusual cylindrical clear-glazed 'prop' with a scalloped rim. The remainder of the kiln furniture assemblage mostly consists of pipeclay rods (some flattened), squeezed and dented rods and sausage-like pieces of pipeclay. One larger lump of pipeclay which is crudely hand-formed and squeezed into shape may be something like a seal for a saggar lid. There are also a few pieces of a saggar (a coarse drum-shaped vessel which protected delicate wares from direct contact with flames and soot). These are thick and made from coarsely crushed pieces of fired pipeclay (grog) cemented together. The outside and sometimes inside is usually covered with a thick yellowish-brown clear glaze.

Summary and recommendations

The pottery assemblage (like that from SWUNIT 07) provides important and direct evidence for the existence and production of the Cambrian Pottery which stood here during the 18th-19th century, but only for white earthenware production rather than the short-lived period of porcelain production. It also comprises an interesting range of the types of kiln furniture used in the production of pottery here. This material is worthy of more detailed study and publication but this should await the excavation of a larger and more representative sample of pottery from the site.

Context	Spot-date	Sherds	Weight (g)	Comments
401	c1830-1860	91	1509	POTTERY Mostly Creamware etc domestic forms , jugs, bowls, saucers, cups, tankards etc. Also plain & transfer-printed refined white earthenware incl blue, and green transfers post c 1830. Daisy embossed whiteware sideplate c1825-60. Some polychrome handpainted 'canal' or 'Barge' ware. Some Pearlware. Few sponged. Some of the Creamware & whiteware ?jug bases have small overglaze freehand numbers painted underside incl '3' & '6' & a black ?cross. Another has '13' in blue - these possibly batchmarks etc? Some colour banded whitewares incl one prob c1800-30 with neo-marbled effect in blue and light brown on dark brown slip background on white fabric. 1x stoneware ink bottle base. 1x red earthenware. 1x ?jug base refined N Devon gravel-tempered ware
401	c1830-1860	29	443	POTTERY WASTERS. Refined white earthenware (less likely porcelain). All unglazed. Similar to wasters from SWUNIT 07. Some transfer-printed incl tankard with int grey (?blue) border - foliage sprays. 1 plate rim plain but a feather-edge type. 1 flanged chamberpot rim. 1 poss candlestick cup
401	c1830-1860	141	768	KILN FURNITURE (PIPECLAY). Very similar to KF from SWUNIT 07. Three-armed trivets = 78 frags, most of triangular cross-section, 4-5 of square cross-section. 1 of circular cross-section. Cockspurs = 47, mostly complete, with 3 little feet and one upper point. Misc setter rods of flattened rod or sub-rectangular cross-section, 1 square-section, all gently curved in plan = 14, incl 1 made from folded sheet or layers of pipeclay & slightly twisted. Circular setter ring of rectang cross-section c90mm diam, with applied pyrimidal prong = 1. Saggar body sherd of crushed pipeclay = 1, with yellowish glaze int, unglazed cream colour ext
403	c1830-1860	16	178	POTTERY. Mostly Creamware and poss some plain Pearlware incl dishes & teacup handles. 1x blue transfer-printed dish base c 1830/40 with 'Willow Pattern' dec. 1x blue sponged ware cylindrical vess wall sherd. 1x late Pearlware handpainted dish/saucer footring with blue floral dec c1780-1830?
403	c1830-1860	17	149	POTTERY WASTERS. Refined white earthenware (less likely porcelain). All unglazed. Similar to wasters from SWUNIT 07. Some transfer-printed incl fluted teacup or small vase bs with dark blue pastoral scene incl flowers and quadruped feet. Dish wall bs with Willow pattern-style border int. Globe & cylinder-shaped jug rim with illeg scrolling band ext & int with some kind of floral scene in ?black transfer. Bs perforated ?soap dish with 'monkey tree' like foliage on floor in grey-blue. Undec broad flanged dish rim, bowl rim, footringed tankard base, plant-like jug handle
403	c1830-1860	102	427	KILN FURNITURE (PIPECLAY). Very similar to KF from SWUNIT 07. Three-armed trivets = 43 frags (130g), most of triangular cross-section, 1 of square cross-section. 1 with specks blue cobalt glaze. Cockspurs = 21(49g), mostly complete. Misc setter rods of flattened rod or sub-rectangular cross-section, 3 square-section incl 2 shorter thicker ones covered in ?salt glaze and sandy quartz encrustation/gritting, all gently curved in plan = 37 (228g). 1x (14g) v unusual waisted cylindrical tube/prop in wheel-thrown white ?stoneware with pipeclay fabric with small simple flattened ?base c50mm diam and splayed plain ?rim prob originally with 5 semicircular slots cut from the rim of which 3 survive

Context	Spot-date	Sherds	Weight (g)	Comments
404	c1860-1880?	48	610	POTTERY (but spot-date partly based on kiln-furniture below). Mostly refined white earthenware plus few Creamware. Many blue transfer-printed pieces incl 2x 'Flow blue' prob mid 19C. Also several sponged ware plus 'Willow Pattern' dec. 1x late-looking refined white earthenware/ironstone door knob. Blue & black banded wares. 2-3 mod English stoneware. Large robust ?chamberpot rim with blue transfer dec on top rim - scrolling foliage & ?willow tree scene ext in accidentally flowing blue. 1x English porcelain ?teacup bs w horiz gilded line
404	c1860-1880?	23	199	POTTERY WASTERS. As above contexts. Unglazed mostly. Dish rims, deep bowl rim with faint dark grey/blue transfer printed scrolling foliage band on downward-turned flanged rim & floral dec int. Tankard base, bowl footring bases. Dish base w greyish-brown Willow pattern scene incl pagoda. Bs & rim blue-banded ?jug. Rim whiteware dish glazed ext but with severe patch of glaze 'crawl' on upper surface. 1x thin white bs w thin salt-like glaze ext and none int
404	c1860-1880?	25	444	KILN FURNITURE (PIPECLAY). Three-armed trivets = 15 incl mostly square cross-section & few triangular, generally more developed than those in contexts above - some prob machine-made & ending in neatly faceted prongs. One trivet frag (square section) has stamped inscrip in raised letters 'B & G---' (prob 'G' less likely 'C' or 'O') maker's mark - looks mid-late 19C. One trivet (sq sx) has the no. '7' stamped underside incuse & deliberately roughened 'pimpled' upperside & another has same pimpling & conical prongs (2 back to back) the upper with shell-like ribbing - poss anti-stick devices?. Cockspurs - 4, mostly complete incl 2x mod-looking cockspur/trivets mould-made with stamped circ depression underside containing raised letter 'G & C' with no. '4' beneath. Setter rods = 4. Extra large setter-rod/sausage in white pipeclay with purplish-brown kiln gloss allover ext & dented - poss a saggar seal/stand? = 1. Saggar base with basal angle & allover ext yellowish-brown vitrification/glz & int sand bedding = 1
506	c1830-1860	111	1028	POTTERY. V similar to 401 & 403 above. Mixture Creamware, blue transfer-printed c 1830/40 with 'Willow Pattern' dec. Blue sponged ware. Cylind tankard and jug rims in Cream/Pearlware as seen above with horiz colour slip banding ext on tankard and pseudo-marbled or with groups of paintbrush strokes in blue, black, white and light brown slip - like scales or a jay bird's feathers (see wasters for identical examples - clearly made here). 'Developed' feather edge rim Pearlware plate with small 'fir trees' and fleur-de-lis like sprays on border instead of feathers c 1830/40? Small Pearl tankard base with black transfer fishing/river scene. 1-2 porcelain. 1x unglz red earthenware small worn handle - 18C?
506	c1830-1860	53	456	POTTERY WASTERS. As in 401 & 403 above. Mostly unglazed whiteware, some with 'willow pattern' transfer printed dec - incl pagoda in greyish/brown. Unglz bss of colour-banded Cream/Pearlware with brown & blue scale or 'jay wing' dec as above. 1 sherd v burnt/blackened. unglz plain small tankard base footring diam 60mm with simple foliate handle terminal
506	c1830-1860	79	522	KILN FURNITURE. As in 401 & 403 above. All pipeclay except saggars. Pipeclay trivets = 43, triang and square cross-sx. Cockspurs = 6. Circular trivets with Creamware glaze = 4, one of these has widely-spaced prongs (prob 3) on both upper and lower face, rectang cross-sx. Setter rods = 24. Saggar, frags from floor = 2, poss same as those in contexts above - yellowish glz int, unglz brown ext

Context	Spot-date	Sherds	Weight (g)	Comments
508	c1862-1880	55	1194	POTTERY. Misc collection with more variety than other contexts and less Creamware. Incl small ironstone-type sherd with blue transfer shield mark 'B.W.M &...' on shield sash by firm of Brown-Westhead Moore & Co., Hanley (Staffs) (Godden 1968, 48). Pearlware (late?) tankard profile with applied crowned 'IMPERIAL' meure mark with grey-blue horiz banding prob c 1840-60? Misc blue transfer etc. Small porcelain figurine, gilded. Eng porcelain. Base brown cylindrical stoneware ink bottle with stamp inscrip in rectang frame 'ENCRE JAPONAISE. N. ANTOINE & FILS' mid/late 19C French - base diam 98mm, stamp just above slight pad base, grey stoneware with treacly brown glaze int & ext. Rim large yellowware mixing bowl. Rim 19C redware large bowl. Rim N. Devon gravel-temp jar w lid-seated rim. Small bs 18/19C brown slipware
508	c1862-1880	5	77	POTTERY WASTERS. Unglz whiteware as in contexts above incl chamberpot rim with well-preserved highly complex 'Willow pattern' transfer diaper dec in greyish (unglazed cobalt blue probably). Bs with traces of pagoda
508	c1862-1880	15	50	KILN FURNITURE. As in 401 & 403 above. All pipeclay. Pipeclay trivets = 9, triang and square cross-sx. Cockspurs = 2. Unique small circular ?trivets of 5-pointed star cross-sx = 1, diam 50mm. Setter rods = 3
TOTAL		810	8054	

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APPENDIX 4 SUMMARY OF SITE DETAILS

Site name: Unit Superheaters Engineering, Swansea

Site code: SWUNIT 08

Grid reference: SS 6595 9370

Type of evaluation: Two evaluation trenches c. 23 m by 10 m. The watching brief was undertaken across the 3.4 ha area wherever foundations of the former Unit Superheaters buildings were removed.

Date and duration of project: Evaluation completed between 16th - 24th June 2008. Watching brief undertaken from 25th June to 7th August 2008.

Area of site: 3.4 ha

Summary of results:

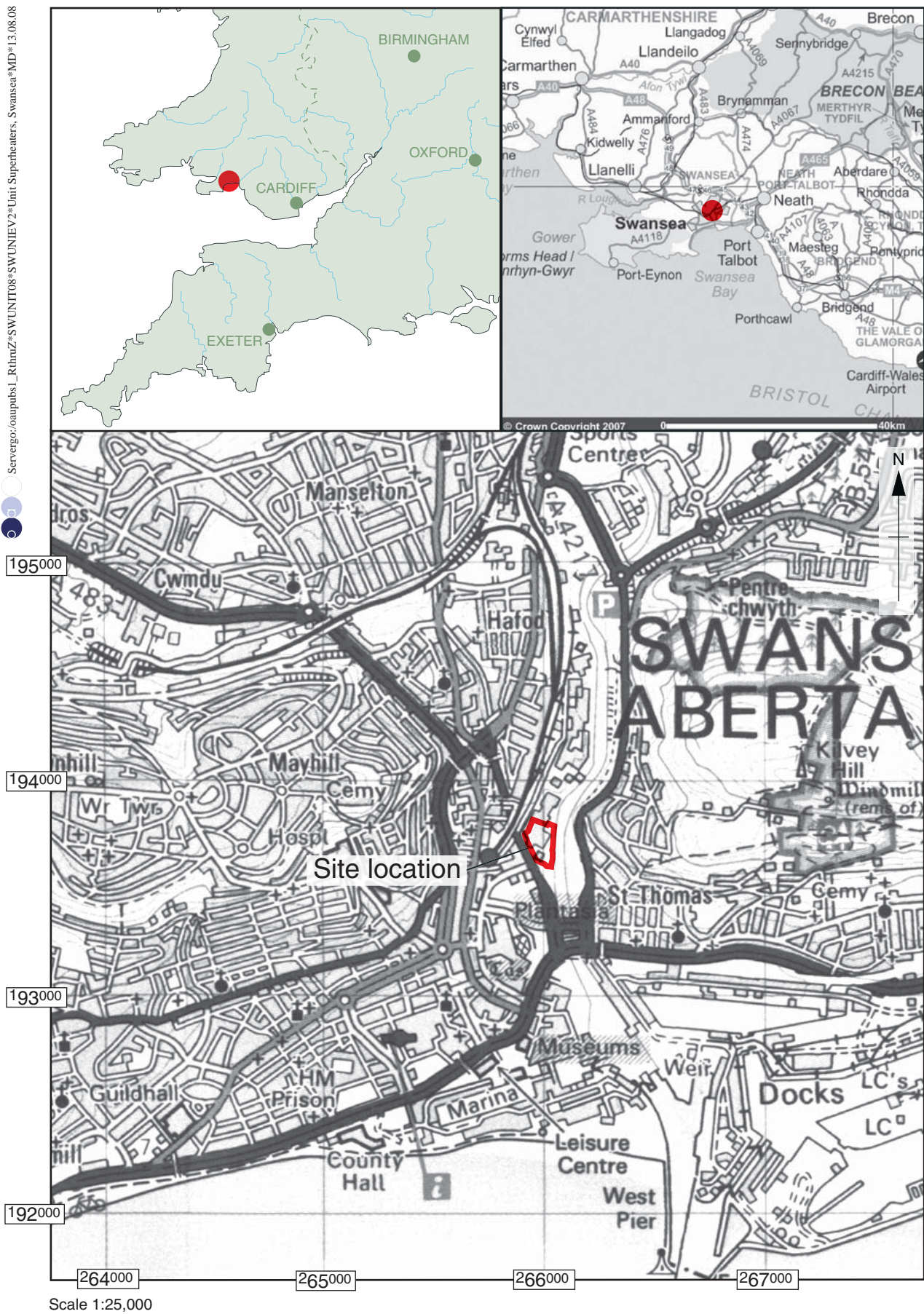
Oxford Archaeology (OA) undertook a field evaluation and watching brief at the former Unit Superheaters Engineering site, commissioned by Waterman (consultants) on behalf of DFWJ Ltd and Unit Holdings (clients). Two evaluation trenches were excavated within the northern part of the site and encountered primary made ground reclamation levels comprising sand and gravel at 3 m below the modern surface level. These were overlain by a relatively thin sequence of black silt layers that contained abundant pottery production waste in the form of unfinished and broken pottery vessels and various elements and forms of kiln furniture. The assemblage dated to between 1830 and 1880 although a small amount of late 18th-century pottery was also present. The pottery debris represents a significant finding although the extent of these deposits was not established beyond the evaluation trenches and remain undisturbed in situ. No structures that could be clearly related to these deposits were encountered and the focus of the Cambrian Pottery works lies within the southern half of the site. These deposits probably represent the dumping of waste beyond the boundary of the works. Within the southern area several firebrick structures were recorded in this phase of investigation adding to the previous evaluation and watching brief evidence. Combined, these suggest that significant structural remains are present that could relate directly to the pottery works.

A series of well preserved stone pillars arranged in a grid pattern also encountered across the southern part of the site relate to the Graigola Merthyr Patent Fuel works and can be seen on a contemporary watercolour view of Swansea from 1881. Significant remains were recorded of the North Dock Basin, canal basin and wharf. These were only exposed at intervals although, combined with a 1940s view photo of workmen infilling these, it is clear that they are likely to survive in very good condition. Likewise, the photo shows that the Patent Fuel Works was levelled and has probably acted as an effective protective covering to any earlier deposits and structures buried at depth.

Remains of Villier's Dry Dock were less well preserved although the entrance to this was located with the wooden lock gate preserved in situ. Much of the interior dock structure had been significantly damaged or removed. However, north of this a series of contemporary walls were present surviving to a height of 0.7 m built above the pottery-rich layers. These sandstone walls represent the Cambrian factory located here on the late 19th century maps. No floor levels or associated deposits were present.

The detailed watching brief and guidance provided by the attending archaeologists to the demolition contractors proved to be a very successful means of removing the modern obstructions without damaging the earlier structures in the process. Potentially significant structures were revealed immediately below and around the foundations of the former Unit Superheaters building foundations. Without the communicative approach and early involvement strategy adopted, it is likely that many of these remains would have been removed as hard obstacles before their significance was realised.

Location of archive: The archive is currently held at OA, Janus House, Osney Mead, Oxford, OX2 0ES, and will be deposited with Swansea Museum in due course.



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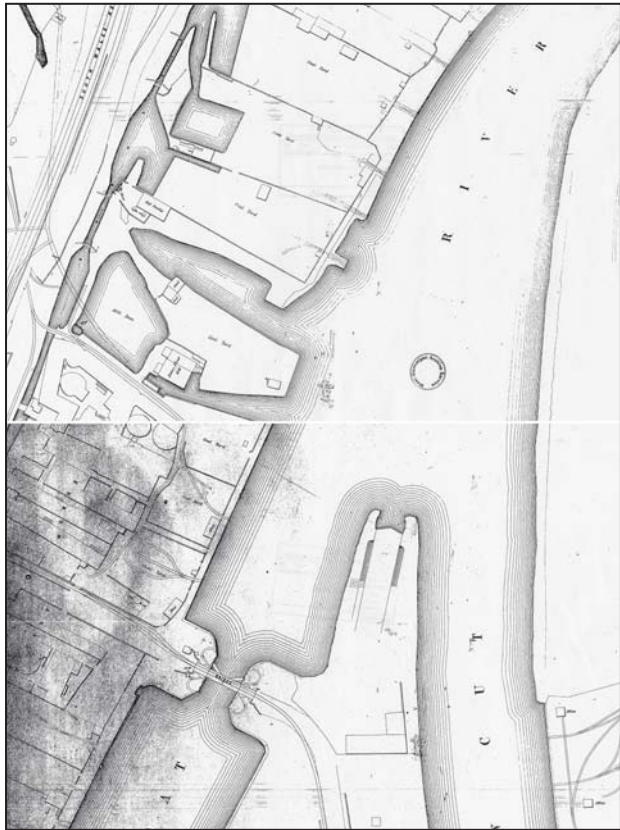
Figure 1: Site location



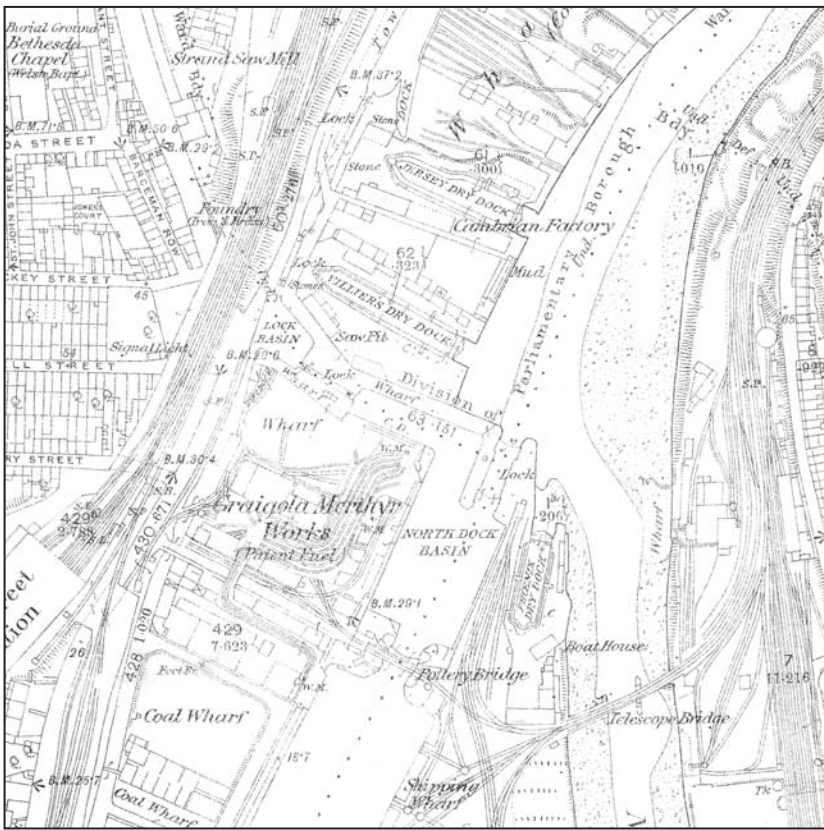
Figure 2: Evaluation and geotechnical trial trench location



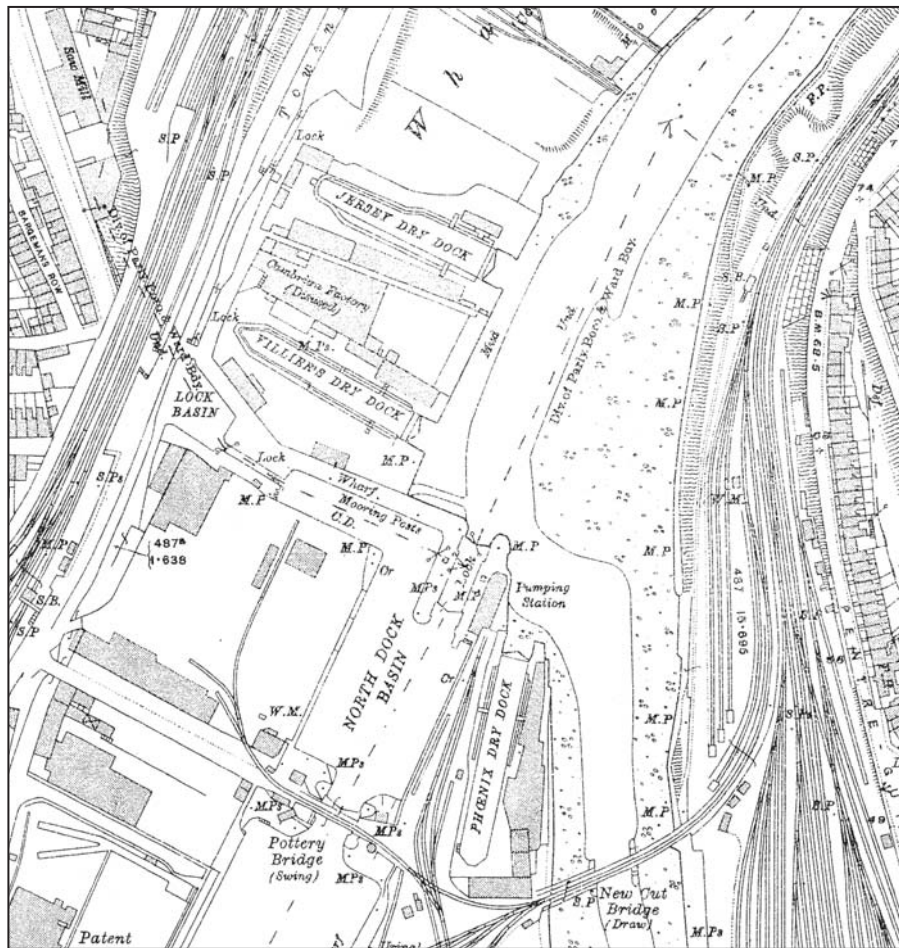
a. Plan of the Town of Swansea, Glamorganshire 1843



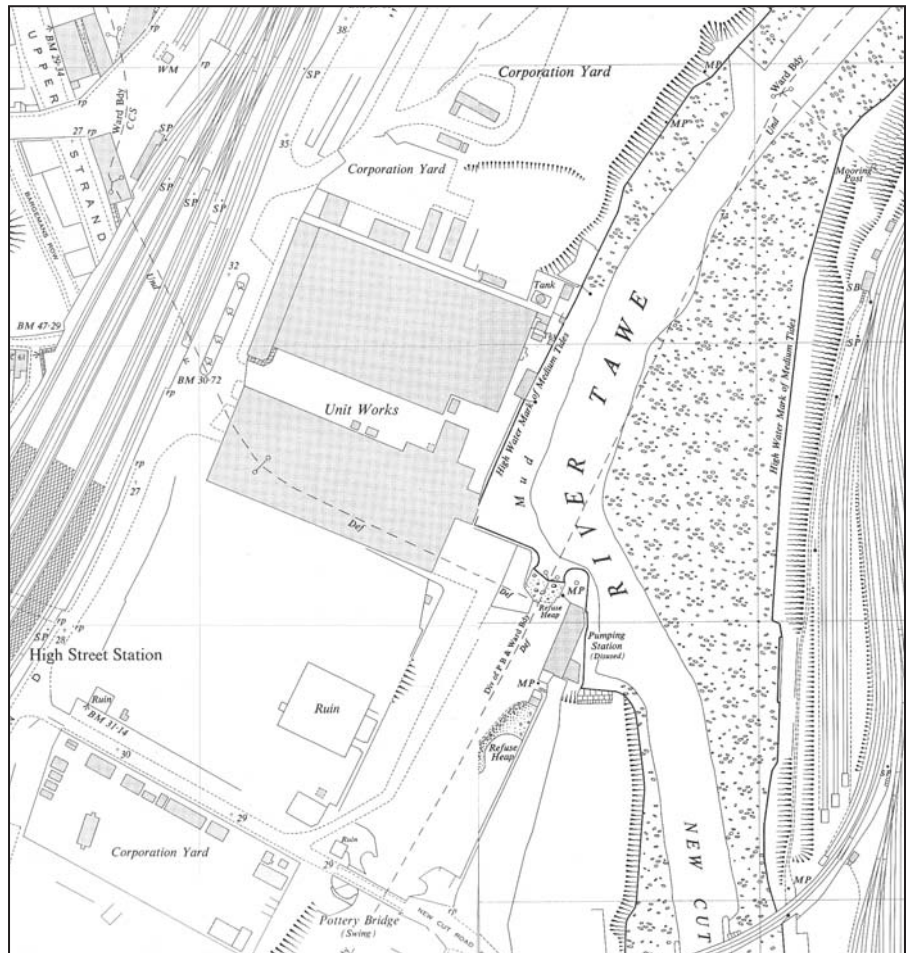
b. Swansea Local Board of Health, Survey of the Borough of Swansea, 1852



c. First Edition Ordnance Survey Map, 1879



d. Third Edition Ordnance Survey Map of 1919



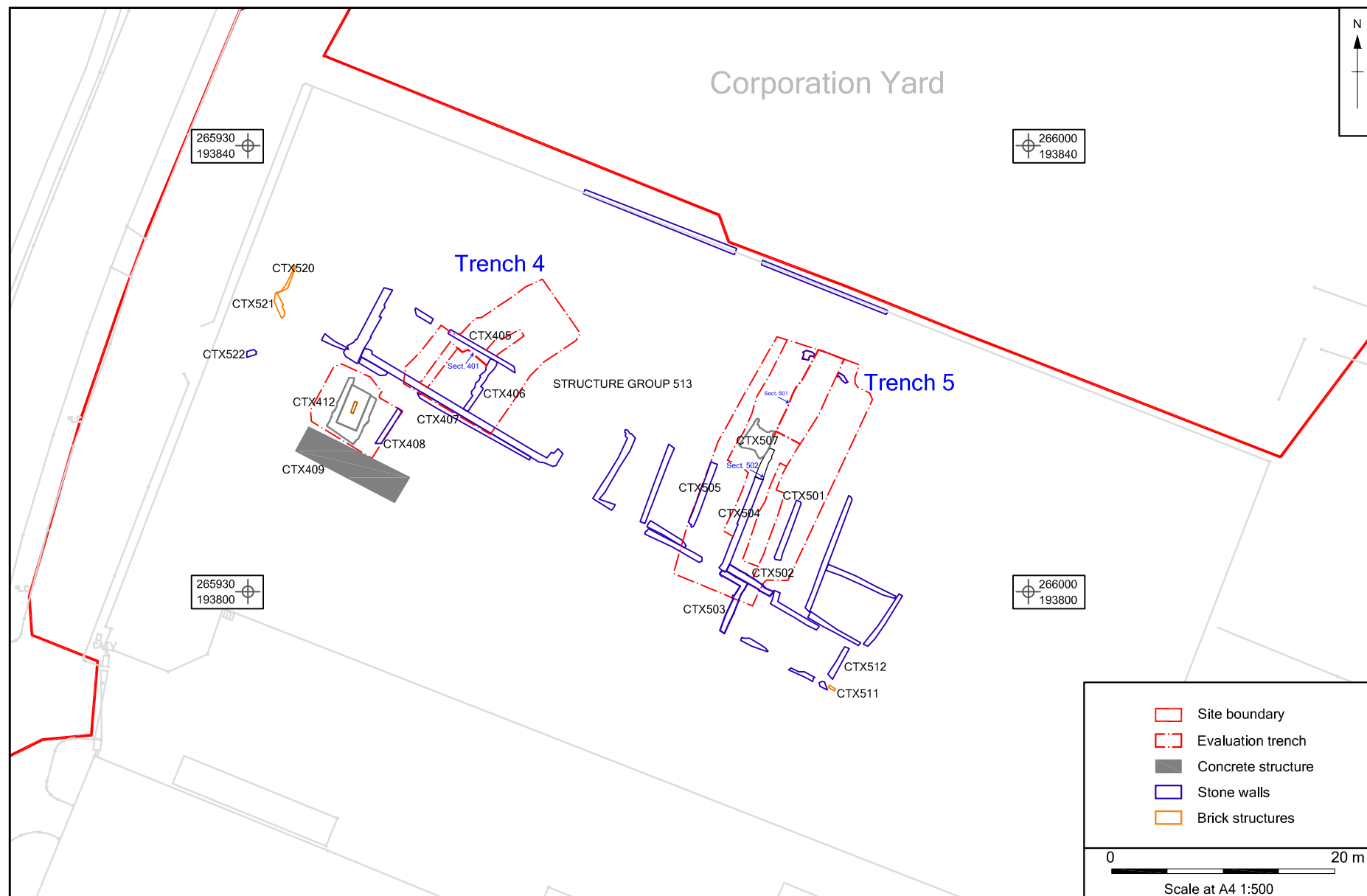
e. New Series Ordnance Survey Map of 1949/1950



Figure 3: Historic maps (courtesy of Waterman)



Figure 4: Remediation observation areas and depths



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Figure 5: Trenches 4 and 5 and the northern area

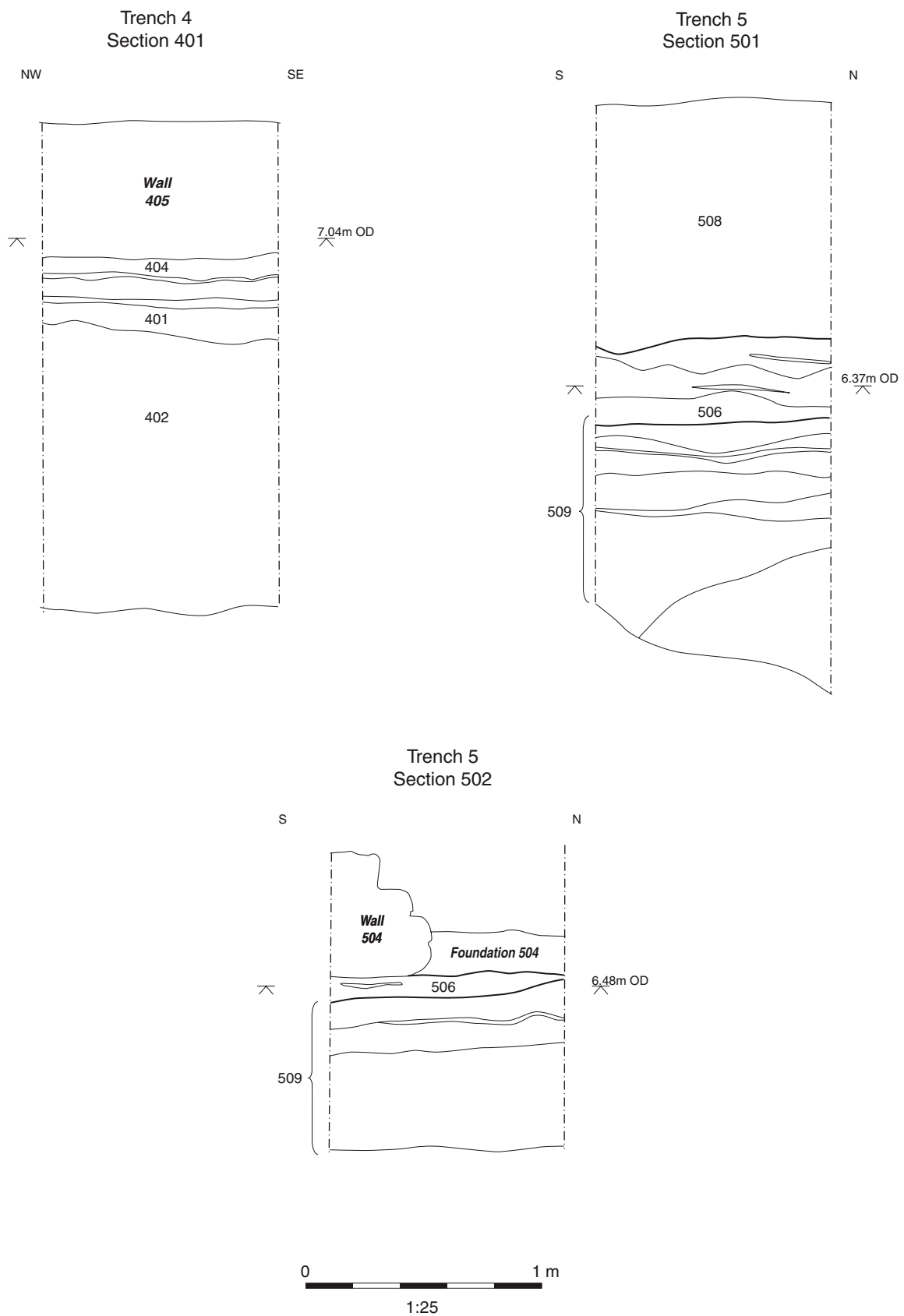


Figure 6: Sections

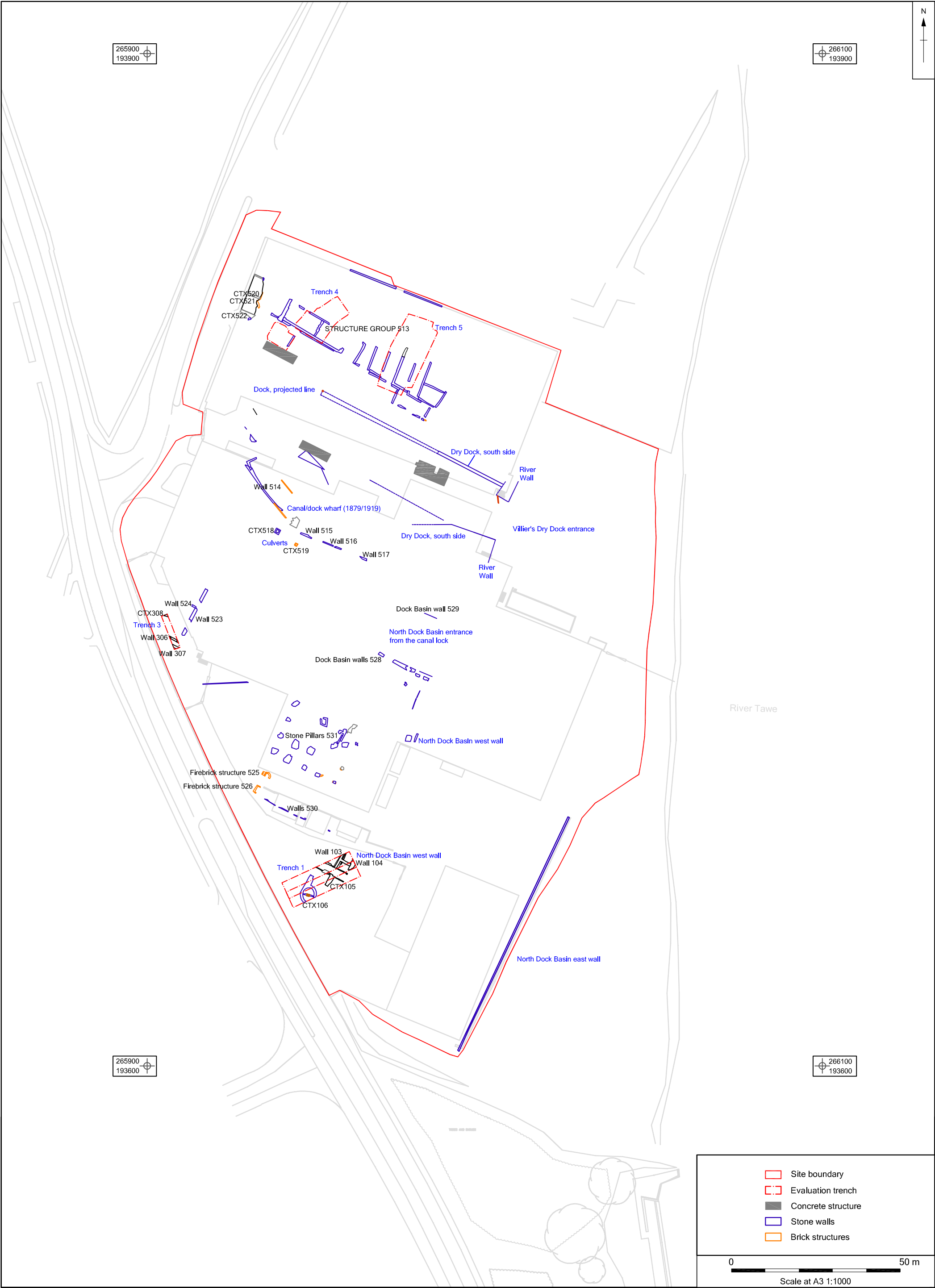


Figure 7: Summarised structural remains



Figure 8: Upper levels of structural preservation in m aOD



Plate 1: Walls 520 and 521



Plate 2: Villier's Dry Dock entrance



Plate 3: Stone culvert structures 518 and 519



Plate 4: North Dock Basin walls 529 and 528



Plate 5: Firebrick structure 525



Plate 6: Firebrick structure 526 and reinforced concrete structure



Plate 7: Stone pillar from structure group 531



Plate 8: The Lock Basin, Lock and North Dock Basin being infilled (?1940s)



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