Upper Bank to White Rock Rising Main, Swansea

Archaeological Watching Brief Report

February 2014

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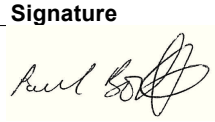
1	Gerry Thacker Senior Project Manager	Steve Lawrence Senior Project Manager	Paul Booth Senior Project Manager	

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Summary

From February to March 2013 Oxford Archaeology undertook a watching brief on the excavation of a pipe trench for a new rising main within the area of the former Middle Bank and White Rock smelting works, Swansea. The work was undertaken on behalf of Barratt Homes (South Wales), and was partly located within the eastern boundary of the White Rock Scheduled Monument. The majority of the pipe trench was excavated into post industrial period disturbed and made ground. Where structures were encountered, interpretation of these was restricted by the limited exposure of the remains. However, the upper courses of several walls were recorded that are likely to relate to the boundaries, and buildings within the former Middle Bank works. A firebrick structure, probably representing part of a copper working furnace, was encountered within a building of the Middle Bank works in proximity to a brick floor. In addition a possible buttress or ramp for the inclined track to the secondary waste tips up hill to the east of the White Rock Works was encountered and recorded.

1 INTRODUCTION

1.1 Scope of work

1.1.1 Oxford Archaeology (OA), was commissioned by Barratt Homes (South Wales) to undertake Scheduled Monument Consent (SMC) application and subsequently the archaeological recording requirements associated with the installation of a new rising foul main between Upper Bank and White Rock, Swansea (Fig. 1). The new main connected services between the pumping station at the southern end of the Copper Quarter development to an existing service located to the immediate east of the White Rock Scheduled Monument (AM 099/GM481), Swansea.

1.1.2 The archaeological watching brief was undertaken as a requirement of the local authority and Cadw, with the line of the service trench passing through the important buried remains of Middle Bank works and along and partly within the eastern boundary of White Rock Scheduled Monument (Fig. 2). The scheme was discussed with the Local Authority's Planning Archaeologist (Neil Maylan), and SMC was granted in May 2012, prior to the commencement and completion of the fieldwork between 7th February and 26th April 2013.

1.1.3 All archaeological work was undertaken in accordance with local and national policies including the relevant Standards and Guidance notes set out by the Institute for Archaeologists. A written Scheme of Investigation (OA 2011) that outlined OA's approach to this site formed part of the SMC application and was agreed with all parties prior to the commencement of works.

1.1.4 The new water main comprises a 225mm diameter pipe requiring the excavation of an approximately 0.5m wide trench for a distance of around 475m. The maximum depth of the trench was between 1m and 2.5m, although it was generally 1.5m deep for the majority of the route. Various chambers were also be required at points along the route (e.g. air valves, washout and hatchbox chambers). These were approximately 1.5m in diameter and required the excavation of a *c* 2m by 2m area in plan to a depth just below the pipe level. Where loose ground conditions were encountered, the pipe trench was widened beyond the approximate 0.5m dimension to allow safe working for the installation team.

1.2 Location, geology and topography

1.2.1 The rising main was constructed between NGRs SS 6643 9502 at the southern end of the recent Copper Quarter development and SS 6636 9472 on the eastern boundary of the White Rock Scheduled Monument (SM) (Fig. 2). The rising main passed beneath the A4217 bridge crossing of the River Tawe and around the parking area to the north of the White Rock SM boundary, before turning back to run alongside the existing buried services and along the north-eastern boundary of the SM. This part of the rising main was required to be routed along the SM boundary due to the limitations of the pipe alignment and angles at each bend and the presence of existing buried services immediately beyond the SM boundary.

1.2.2 The existing ground level at the pumping station site to the north of the pipe trench was situated at approximately 8.5m aOD (above Ordnance Datum), dropping to around 6m aOD beneath the road bridge. Within the area of the White Rock car park the ground level rose up to approximately 9.1m aOD, before rising steeply up the slope towards the A4217 where a maximum height of approximately 19m aoD was recorded.

1.2.3 The solid geology of the site is Carboniferous Upper Coal Measures comprising sandstones and mudstones, containing occasional coal seams. This is overlain by glacial deposits of sand and gravel (BGS 1972). Significant deposits of waste material (slag) resulting from the industrial use of the riverside area are known to exist and have been used to reclaim land along the riverside and raise this well above its original height.

1.3 Archaeological and historical background

1.3.1 The archaeological and historical background to the relevant sites is considerable and available in detail in *Copperopolis* (Hughes 2000). It is not the intention of this document to present a detailed background to the copper work industry (and other materials) for these sites and reference should be made to *Copperopolis* for this purpose. The following is a brief history of the White Rock and Middle Banks works, and a review of recent work in the vicinity that post-dates the publication and revision of *Copperopolis*.

White Rock Works

1.3.2 White Rock was the third smelting operation to be set up in the Swansea Valley, and was established in 1737. The main furnaces were arranged in a long and narrow hall known as the 'Great Work House', which was sited to the eastern side of the works adjacent to the future site of the Llansamlet (Smith's) Canal which was constructed in 1783 (Hughes 2000, 22). The works changed ownership several times until around 1871 when they were taken over by Williams Foster and Co and Vivian and Sons, two of the larger firms of smelters (Hilton 1967, 21). At this point the works changed from the smelting of copper to both silver and lead, and this continued until 1924 when British Copper Manufacturers Ltd took over the running of the Works. Smelting at the site ceased in 1928, and much of the site was cleared of buildings in the 1960s. The original buildings were constructed in Pennant sandstone and dressed in brick (Hughes 2000, 22). The river dock, which is the only survivor of 14 original recorded docks within the valley, and the stone lined trench marking the flue situated on the hill to the east can still be seen today, as can some of the walls of the Great Workhouse, and parts of Smith's Canal.

Middle Bank Works

1.3.3 The Middle Bank Works was established to smelt lead in 1755 by Chauncey Townsend and Company, who also established the neighbouring Upper Bank Works. By 1765 the works had converted to the smelting of copper under the ownership of John Rotten and Co. (Hilton 1967, 21). The works changed hands several times in the following years, but were still involved in the smelting of copper until 1924 when the works finally shut down. A large part of the Middle Bank Works is located beneath the A4217 roundabout White Rock car park, adjacent to the road bridge across the River Tawe.

Recent work

1.3.4 Throughout 2007 and 2008 Oxford Archaeology undertook substantial archaeological excavation and recording ahead of construction of the Copper Quarter on the site of the former Upper Bank works to the north-east of this investigation. As part of this phase of development, the location of the pumping station was archaeologically excavated and recorded. This revealed a sequence of furnace remains associated with the later years of the Upper Bank works. The upper faces of the remaining furnace structures were encountered at up to 8.85m aOD.

1.3.5 Recent investigative work has also been undertaken by Time Team within the Scheduled Monument of White Rock. This revealed well preserved floor levels, although substantial investigation of earlier deposits was limited by the necessity to preserve the Scheduled Monument.

2 PROJECT AIMS AND METHODOLOGY

2.1 Aims

2.1.1 The archaeological aim of the pipeline project was to preserve by record all archaeological remains that were encountered through the below ground works caused by the construction of the new rising main.

2.2 Specific aims and objectives

2.2.1 The specific aims and objectives were:

(i) to record the general deposit sequence and identify slag heap tips and made ground limits;

(ii) to identify the boundary between the different works;

(iii) to identify structures and establish their function;

(iv) to identify and record floor horizons and levels;

(v) to recover dating material associated with all deposits;

(vi) to report on the findings.

2.3 Method

2.3.1 A 15m section of pipe trench was opened daily by a 13 tonne tracked excavator fitted with a toothless ditching bucket or a toothed bucket where required to penetrate ground that could not otherwise be excavated with a toothless bucket. All excavation work was constantly monitored by an OA Archaeologist. Where practicable the trench was excavated in level controlled spits to the construction depth. When deposits or structures were encountered that required more detailed archaeological investigation or

recording, machine excavation was halted. Once recording was completed construction was allowed to continue with the installation of the rising main pipe and backfilling of the trench with the arisings before the process was repeated along the next 15m length.

2.3.2 All structures encountered were recorded on pro forma context record sheets, and scale plans were drawn. The trench location and and revealed structures were located using a global positioning system. Representative scale sections of the stratigraphic sequence were drawn at set points along the course of the water main (Figs 4 and 8). Where walls were encountered, these were revealed to their full extent within the limitations of the rising main trench before recording and removing to allow the installation of the pipe.

2.3.3 A digital and black and white photographic record was maintained.

2.3.4 All recording was undertaken from the current ground surface as safe entry into the trench was not possible unless deposits/structures of interest were encountered at shallow depths. Consequently it was problematic to retrieve building material samples and take exact measurements of some of the structures uncovered. Where possible samples of bricks from individual walls were recovered for analysis and dating purposes (Section 3.3 below).

2.3.5 The surveyed locations of the uncovered structures were overlain onto the 1879 Ordnance Survey map for the purpose of interpretation (Figs 5-7).

3 RESULTS

3.1 Description of deposits

3.1.1 The base of the rising main trench was excavated to a depth of *c* 1.5m below current ground level in the area of the footpath beneath the A4217 road bridge. This equated to a maximum impact level of *c* 6m aOD which was the lowest point along the trench. The impact depth varied along the route and and the design drawing is reproduced here for reference (Fig. 3).

3.1.2 Towards the north-eastern end of the pipe trench adjacent to the pumping station, a considerable depth of made ground was present (101). It is possible that this derived from the roadworks and roundabout construction immediately to the south-west. This deposit consisted of up to 1.7m of mixed dark silty soils containing slag, concrete fragments, pieces of stone and occasional large segments of brick structures, none of which were *in situ*. Alternatively, this deposit may have derived from the post industrial period of demolition and landscaping when many of the structures were levelled.

3.1.3 To the south-west, beneath the road bridge and adjacent to the White Rock car park deposit 101 was sealed beneath 0.2m of concrete surfacing and 0.1m of associated compacted gravel make up (110). Within the White Rock car park the surface (105) comprised a 0.1m thick layer of tarmac overlying a 0.2m thick layer of compacted concrete rubble hardcore bedding layer (110). This in turn sealed mixed rubble layer 101.

3.1.4 Adjacent to the A4217 Pentre-Chwyth Road, topsoil (111) sealed up to 0.7m of an orange brown clay deposit (112) which was only sporadically present along this part of the trench. Beneath layer 112 was at least 1.8m of dark brown sandy clay (113) which contained frequent rounded gravel inclusions. It seems likely that both deposits 112 and 113 are associated with the fairly recent construction of the road.

3.2 Description of structures

3.2.1 Wall 100 (Figs 4 and 6 and Plate 1) was located close to the pumping house and remained upstanding. This was not disturbed by the excavations, but was briefly recorded as its condition was fairly poor and it bordered the open cut trench for the rising main. The wall was constructed in red domestic brick and was L-shaped in plan with a NW-SE orientated section 1.9m long, and a WNW-ESE orientated section 3.5m long. The bricks, which were bonded in an off white lime mortar, measured 220mm by 110mm by 80mm (2⅞" x 4¼" x 8⅞"). These were laid in 'English Bond' with alternating courses of headers and stretchers. The internal (west facing) side of the wall had the remnants of lead flashing towards the top indicating a roof line, with a double tile drip course above. The highest remaining course of wall 100 was recorded at a height of 13.45m aOD. No associated floor level was evident. If present, this is likely to be buried below the modern layer of made ground (101) butting up to the wall.

3.2.2 Adjacent to wall 100, and probably abutted by it, was wall 102, which was orientated NE-SW on the western side of the pipe trench (Figs 4 and 6, Plates 2 and 3). This was was also upstanding with deposit 101 butting the structure and sealing any likely associated surface horizons. The wall was constructed of well faced and unevenly coursed Pennant Sandstone blocks, with occasional red bricks and copper slag blocks included in the fabric. The wall survived for a length of 2.9m and was up to 0.5m in width and was exposed to a standing height of 2.1m. The upper course of the wall survived to 12.27m aOD. As with wall 100, no associated surface horizon was identified within the adjacent pipe trench.

3.2.3 Only the upper three courses of wall 103 were uncovered within the base of the pipe trench (Figs 4 and 6, Plate 4). The wall was substantial at 0.92m wide and well constructed comprising regularly coursed Pennant Sandstone blocks with typical dimensions of 0.5m by 0.25m by 0.25m. The wall was orientated NW-SE with fair faces in both directions. Around 2.2m of the total length was uncovered. The top of wall 103 was at 9.7m aOD.

3.2.4 Wall 104 (Figs 4 and 6, Fig. 8 section 101, Plate 5) was constructed in red domestic brick with dimensions equivalent to those that formed wall 100 (2⅞" x 4¼" x 8⅞"), and was bonded in a hard grey mortar (see Section 3.3 below). The wall was orientated NW-SE and consisted of five courses in 'English bond' above the upper part of an arched opening which was only just visible within the base of the trench. The remaining height of the wall as uncovered was approximately 1.7m. The top of the wall was recorded at 10.3m aOD.

3.2.5 Wall 106 was 'L' shaped in plan (Figs 4 and 6, Plate 6), with the majority of the revealed length orientated NW-SE, before it returned to the north-east at the eastern end. The wall was constructed with Pennant Sandstone blocks, with a protruding course, potentially the upper part of the wall footing, along the north facing edge. The wall measured 0.5m wide, and the upper course was at 7.2m aOD.

3.2.6 Immediately adjacent and parallel to wall 106, a brick wall 107 was present 0.3m to the south-west (Figs 4 and 6, Plate 6). The wall, which measured 0.2m wide, was constructed of un-frogged domestic bricks measuring 55mm by 108mm by 223mm (2½" x 4¼" x 8⅞"), laid in the 'English bond' style, and bonded with an off white lime mortar. The top of wall 107 was at 7.2m aOD.

3.2.7 A few metres to the south of wall 107, brick wall 108 was orientated WNW-ESE, and was the only wall uncovered to be constructed out of refractory (fire) brick (Figs 4 and 6, Plate 7). The bricks recovered from the wall were incomplete, with dimensions of

121mm by 70mm (2¾" x 4¾") and 115mm by 70mm (2¾" x 4½ "). The wall was, like the others uncovered, constructed in 'English bond' style with a thick white lime mortar, and measured 0.2m wide. The bricks were coated in copper residue at one end, and had been subject to considerable heat. The top of wall 108 was recorded at 7.38m aOD. No associated surfaces (floor or furnace base) were encountered within the excavation limit.

3.2.8 A possible brick floor, 109, was located to the south-east of wall 108, (Figs 4 and 6, Plate 8). The floor, which was partially uncovered at the base of the pipe trench, was constructed of a mixture of domestic and refractory bricks laid in the 'stretcher' style. Around 1.4m of the structure, which was horizontal, survived. The floor sat at 7.08m aOD.

3.2.9 Towards the southern end of the pipe trench a NNW-SSE orientated wall (114) was uncovered (Figs 5 and 7, Plate 9). The wall was observed for a length of 4.2m and to a depth of over 2m. The wall was constructed using ashlar Pennant Sandstone with regular courses of large blocks, each measuring 0.7m by 0.6m by 0.4m, and bonded with an off white lime mortar. The upper course of wall 114 was recorded at 18.66m aOD.

3.3 Finds

The Brick

identified by John Cotter

Context	Description	Date
104	2⅞ x 4¼ x 8⅞"; complete machine-made brick, domestic or industrial, in orange-red dense fabric, indeterminate maker's brick stamp in mortar from the brick stacked at right angles to this one. Hard grey mortar covered.	Late 19/20th c
107	2½ x 4¼ x 8⅞"; complete domestic brick, in pale orange-brown fabric with white inclusions, unfrogged or marked.	19th c
108	2¾ x 4¾" x ?; industrial brick end, broken and used as half-brick, unfrogged, yellowish fabric with black inclusions (? clinker/slag). Fire brick. Copper staining at one end and scorched. White lime mortar.	19th c
108	2¾ x 4½ "x ?; industrial brick end, unfrogged, yellowish fabric with black inclusions (?clinker/slag). Fire brick. Copper staining and intensely scorched - from kiln or furnace. Thick white lime mortar.	19th c

4 DISCUSSION

4.1.1 The walls that were uncovered adjacent to the pumping station at the north-eastern end of the pipe trench possibly correspond with the boundaries of the Upper Bank and Middle Bank works. Although the fit with the the 1879 OS map is not perfect (Fig. 6), wall 103 may be part of the south-western boundary wall of the Upper Bank works.

4.1.2 Wall 100 may form the north-eastern boundary of the yard area, (as shown with the terminal ends of railway tracks on Figs 5 and 6), that was situated at the north-eastern end of the Middle Bank works. Wall 102, which adjoins wall 100 is more difficult to interpret, but was perhaps a wall that linked the boundary walls of the two works.

4.1.3 Wall 104, assuming that it was *in situ* where uncovered, represents the top of an arched opening, and this suggests that the contemporary ground level was a considerable distance below the base of the pipe trench. The wall is clearly not a good fit with the buildings marked on the map, but could represent the later addition of a building within the yard area, and the brick appears to be of 20th century date (see Section 3.3 above).

4.1.4 Walls 106 and 107 coincide with external walls of the buildings that were situated within the core of the Middle Bank Works, although the gap between them (only around 0.3m) would appear to be far too small. The differing construction materials used, one wall in brick and one in stone, and relative sizes, may also count against this interpretation, but it seems unlikely that two walls of different phases would both survive to a similar height. It is, perhaps, more likely that the slighter brick wall (107) is an internal structure to the building represented by wall 106 and that this is related to structure 108. Structure 108 was exclusively constructed in refractory (fire) bricks. This seems very likely to be the remains of a furnace for which wall 107 could be the upper courses of an associated rake out pit. Such combinations of brick rake out pits and refractory furnace walls and beds were recorded within the Upper Bank excavations. This explanation seems all the more likely when combined with the copper staining and evidence of extreme heat exhibited on the brick samples. However, too little of the potential furnace was uncovered to form a reliable conclusion. The presence of this structure in a long rectangular building within the southern part of the Middle Bank complex may indicate that this was one of the final refining furnaces. The layout of the complex would appear to support this with the bulk materials (coal) arriving at site from the north by rail and (earlier) canal. Floor 109 may represent a remnant of working floor associated with the potential furnace.

4.1.5 The ashlar wall 114 encountered to the east of the White Rocks Works complex coincides with the location of raised trackway. This was used to transport slag to White Rock's secondary heaps up the hill to the east of the works and the point where this was recorded during the field investigation approximately coincides with where the rail line passes below this as shown on the map of 1879 (Figs 5 and 7). The wall may have been constructed to buttress the raised trackway or was part of the underpass supporting structure.

5 CONCLUSIONS

5.1.1 With the exception of the localised discoveries of the probable furnace and associated floor level (107, 108 and 109), no structures reflecting the ground/floor levels of the Middle Bank and White Rock Works were encountered. The only other significant features were the more substantial structural walls of which only the upper courses were encountered. No associated floor horizons were located. These walls were also sealed by mixed debris deposits that included demolition material post-dating the heavy metal industrial use of the area. Combined, these clearly indicate that the majority of the potential buried remains of these Works that lie within the footprint of the rising main construction impact are likely to exist at a depth below that currently excavated. Indeed, the arched brick construction (104) indicates that contemporary floor levels may be considerably deeper than the impact of the rising main trench. Such a situation would not be unusual when compared with the evidence from the excavation of the Upper Bank Works by OA in 2007 and 2008. At this site significant structural masonry and furnaces of the works were revealed often surviving in excess of 3m below the modern ground level.

5.1.2 The only area which appeared to be truncated more recently and to greater depth is that beneath the road bridge. Here no remains of walls and other structures were encountered, indicating that this area has largely been affected by the construction of the bridge.

APPENDIX A. ARCHAEOLOGICAL CONTEXT INVENTORY

Context	Type	Depth	Width	Length	Comments	Finds	Date
100	Structure	5	0.3	5.4	Extant brick wall	-	-
101	Layer	>1.7	-	-	Made ground	-	-
102	Structure	2.1	0.5	2.9	Sandstone, brick and slag block wall	-	-
103	Structure	-	2.2	0.5	Sandstone wall	-	-
104	Structure	1.7	0.22	-	Brick wall	Brick	Late 19th - 20th century
105	Layer	0.1	-	-	Car park surface	-	-
106	Structure	-	1	0.5	Stone wall	-	-
107	Structure	-	1	0.2	Brick wall	Brick	19th century
108	Structure	-	1	0.2	Fire brick wall	Fire brick	19th century
109	Structure		1	2	Brick floor	-	-
110	Layer	0.2	-	-	Make up layer	-	-
111	Layer	0.12	-	-	Topsoil	-	-
112	Layer	0.73	-	-	Made ground	-	-
113	Layer	>1.8	-	-	Made ground	-	-
114	Structure	2	-	4.2	Stone wall	-	-

APPENDIX B. BIBLIOGRAPHY AND REFERENCES

BGS, 1972 *Sheet 247 Swansea,* Geological Survey of Great Britain

Hughes, S, 2000 *Copperopolis, Landscapes of the Early Industrial Period in Swansea,* RCAHMW

Hilton, K.J. (ed.), 1967 *The Lower Swansea Valley Project*, Longman, London

OA 2011, Upper Bank to White Rock Rising Main Installation, Swansea. Written Scheme of Investigation for an Archaeological Watching Brief. (unpublished client document)

APPENDIX C. SUMMARY OF SITE DETAILS

Site name:	Upper Bank to White Rock Rising Main, Swansea
Site code:	SWROCK 13
Grid reference:	Between NGR SS 6643 9502 and SS 6636 9472
Type of watching brief:	Targeted watching brief upon the excavation of a trench for new rising main, partially though the area of the White Rock Scheduled Monument.
Date and duration of project:	7th February and the 26th April 2013.
Area of site:	475 linear metres by approximately 0.5-1m wide
Summary of results:	From February to March 2013 Oxford Archaeology undertook a watching brief on the excavation of a pipe trench for a new rising main within the area of the former Middle Bank and White Rock smelting works, Swansea. The work was undertaken on behalf of Barratt Homes (South Wales), and was partly located within the eastern boundary of the White Rock Scheduled Monument. The majority of the pipe trench was excavated into relatively modern disturbed and made ground. Where structures were encountered, interpretation of these was restricted by the limited exposure of the remains. However, the upper courses of several walls were recorded that are likely to relate to the boundaries, and buildings within the former Middle Bank works. A firebrick structure, probably representing part of a copper working furnace, was encountered within a building of the Middle Bank works in proximity to a brick floor. In addition a possible buttress or ramp for the inclined track to the secondary waste tips up hill to the east of the White Rock Works was encountered and recorded.
Location of archive:	The archive is currently stored at OA's main office at Janus House, Oxford, OX20ES and will be deposited with Swansea Museum in due course under the accession number SM 2013.9.

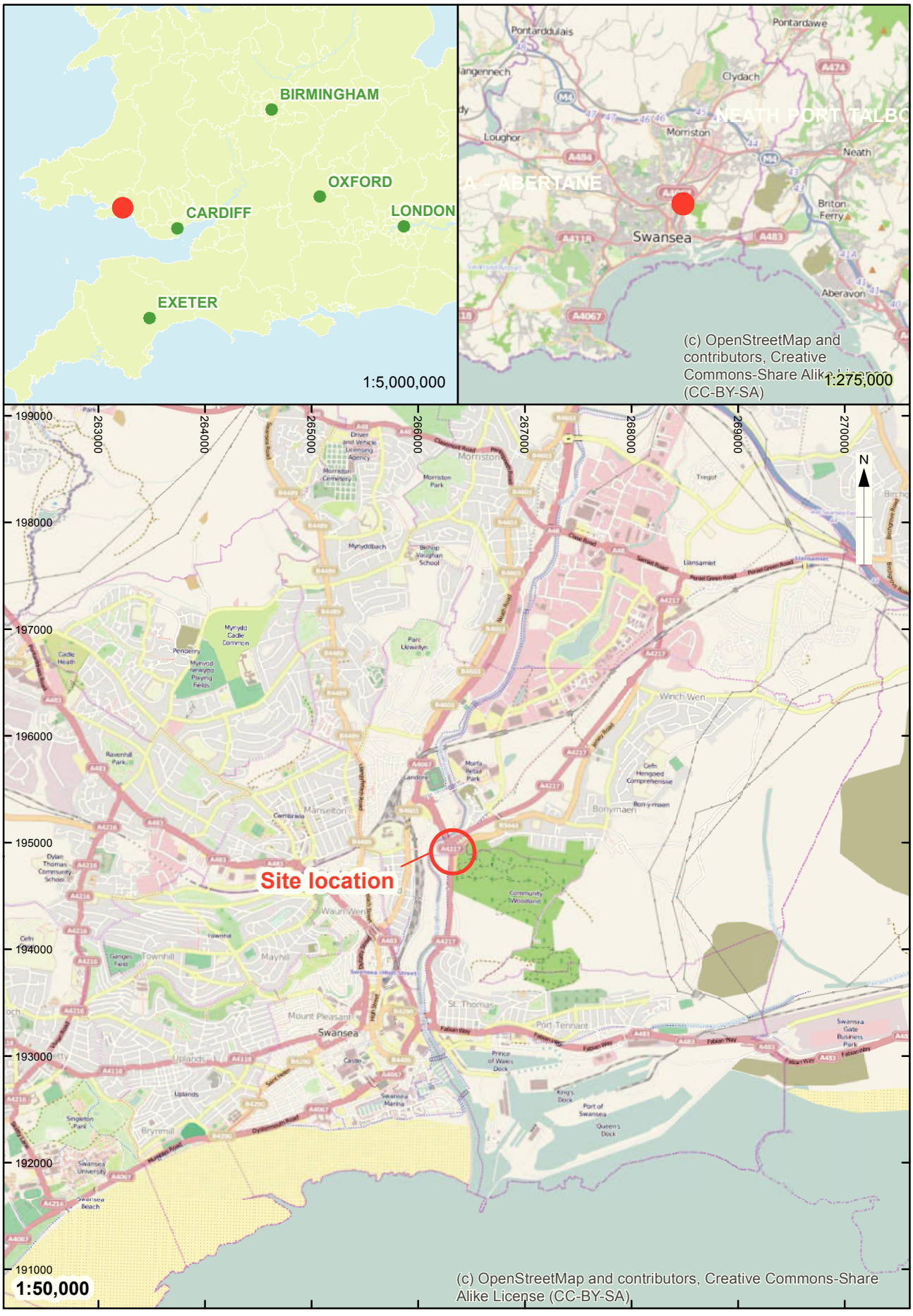

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Figure 1: Site location

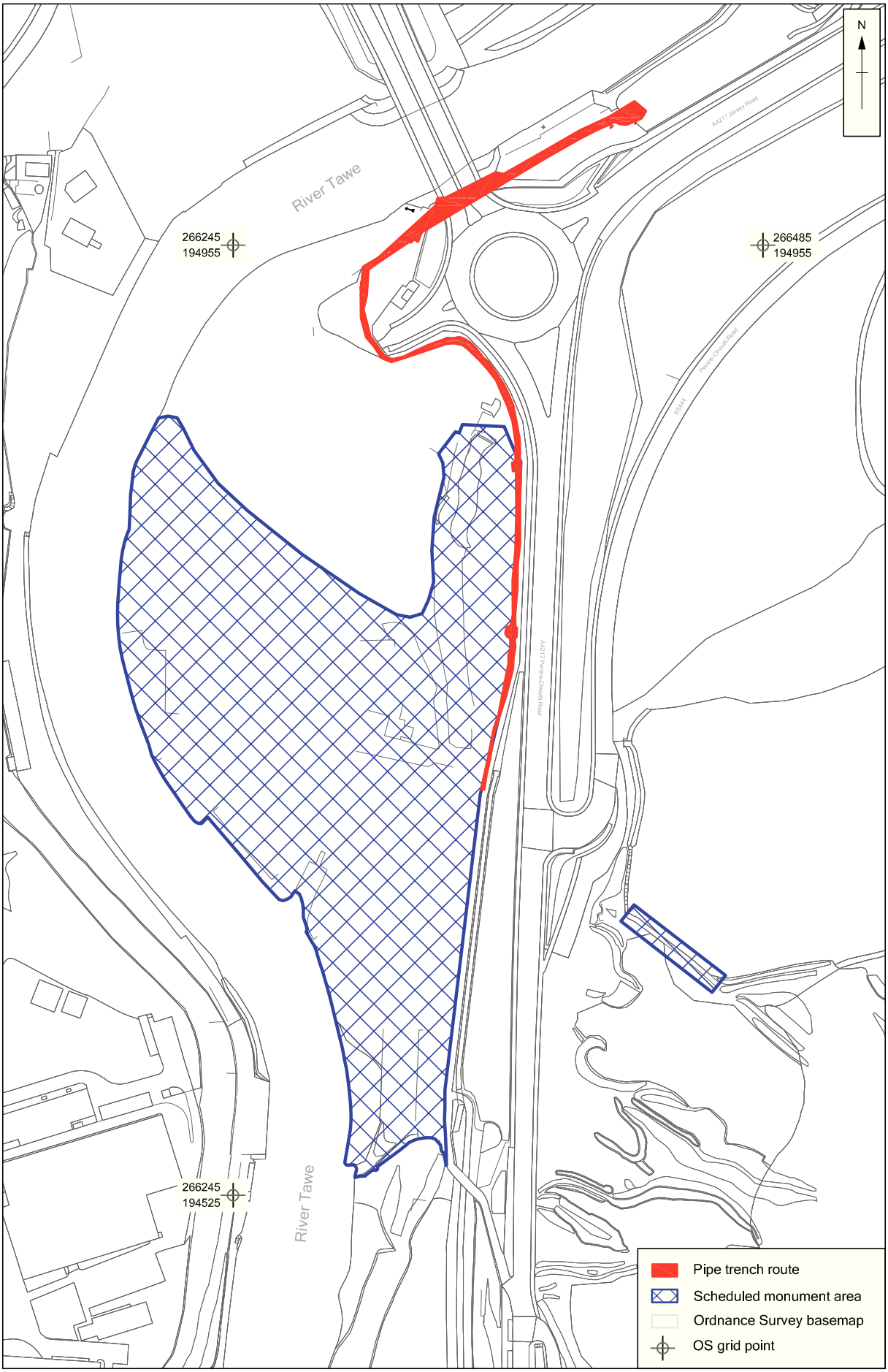

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Figure 2: Pipe trench location and the White Rock Works Scheduled Monument boundary

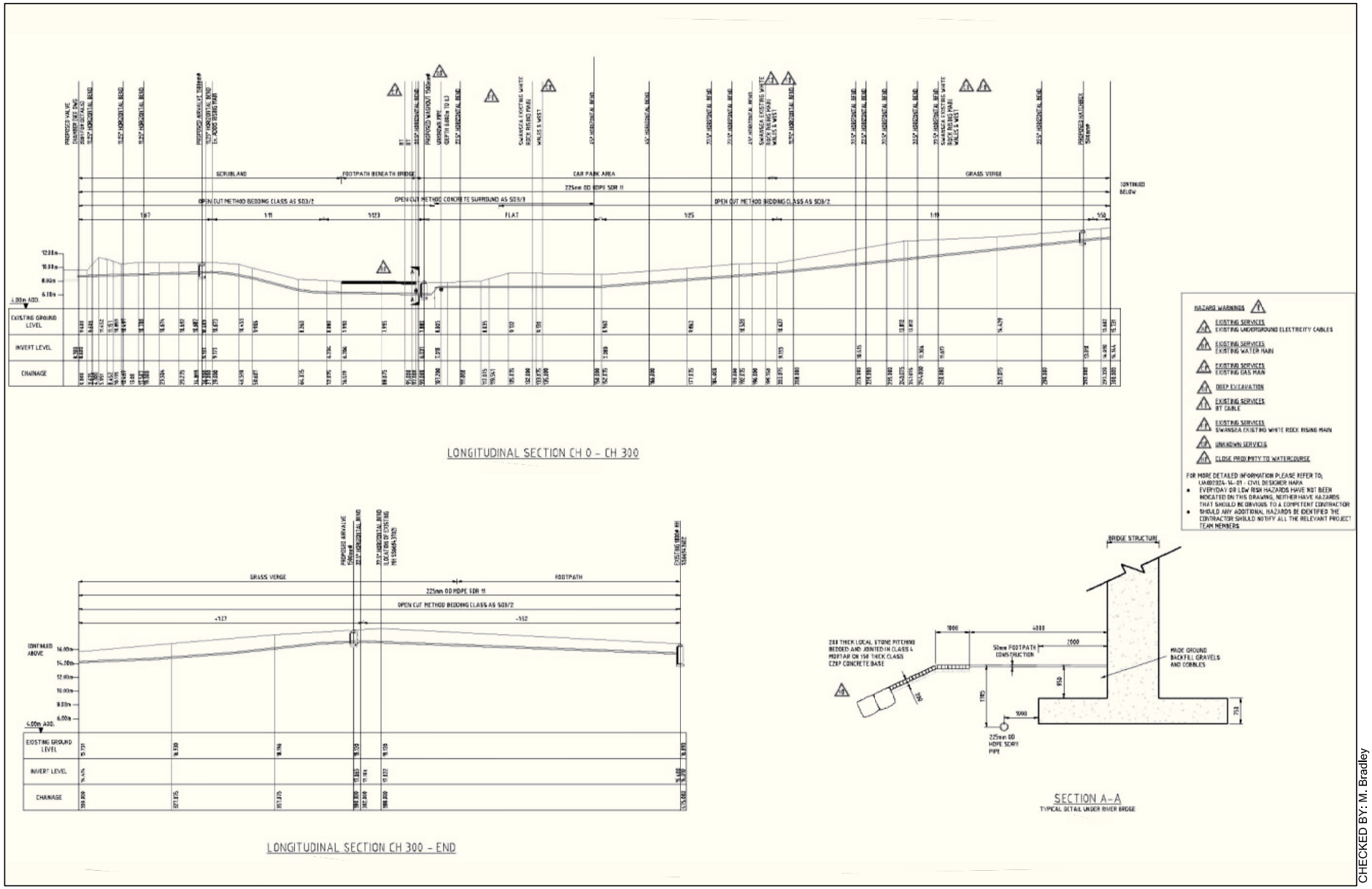

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Figure 3: Longitudinal section showing ground level and impact depths of the pipe trench

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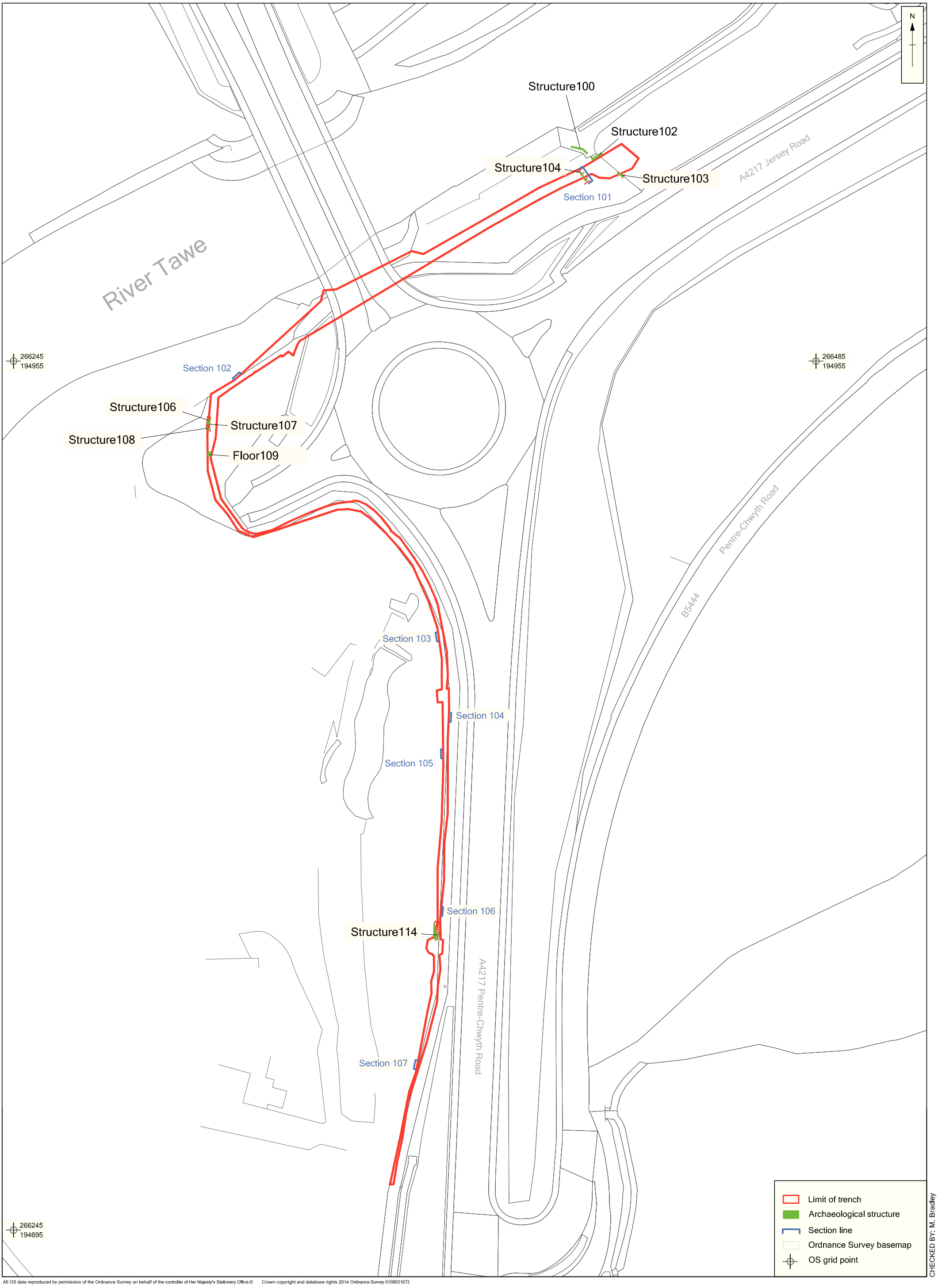

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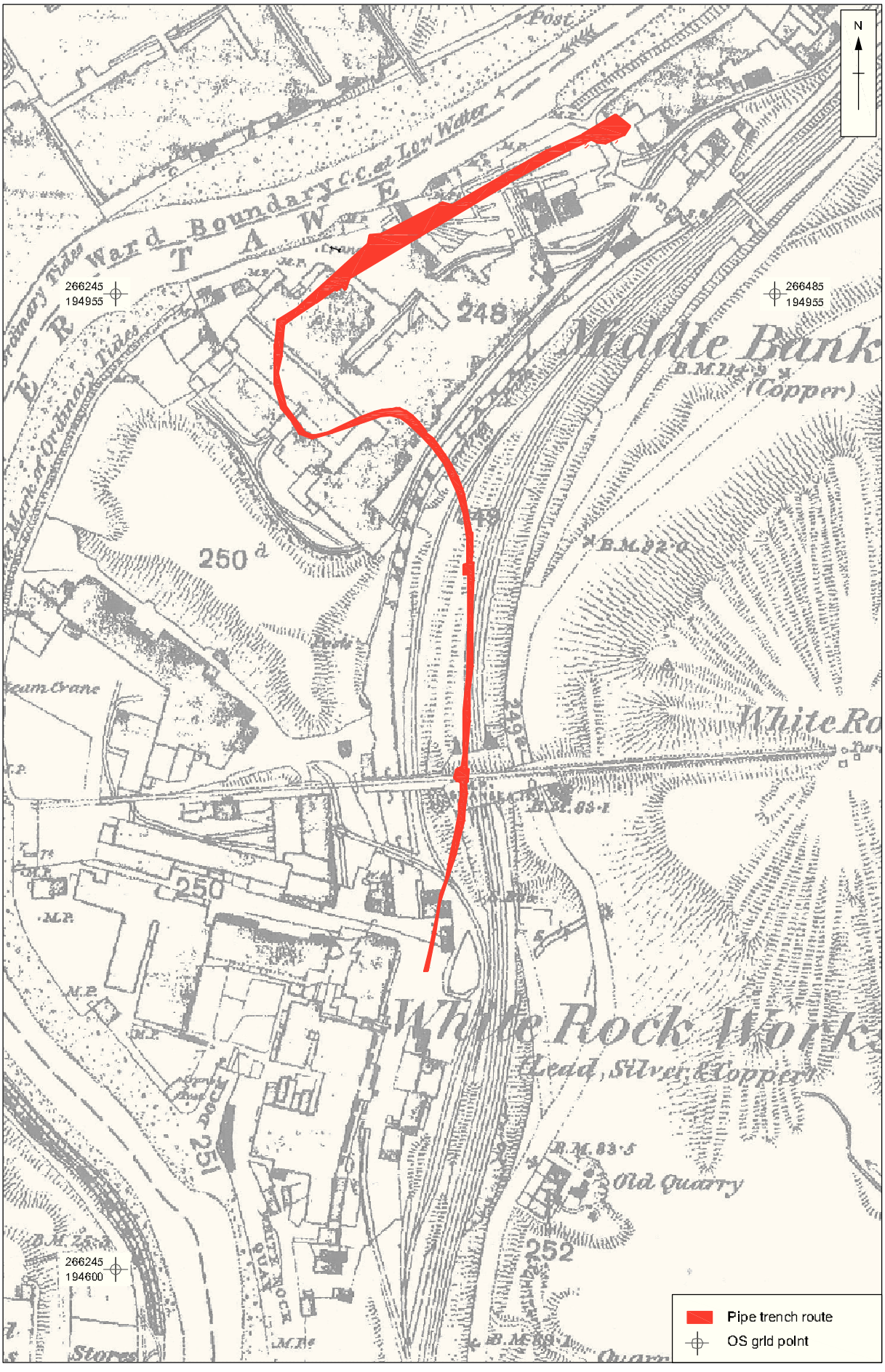
Figure 4: Location of structures and sections



X:\s\SWBRWWB1_White Rock_ Rising Main_Swansea\010Geomatics\02 CAD\001current\SWBRWWB1_Swansea_2014-02-20.dwg(Figure 5)***SWBRWWB1*steve.lawrence* 21 Feb 2014

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0 100 m

1:2000 at A4

Figure 5: Rising Main location overlain on the 1879 Ordnance Survey map

Structure 102
Structure 100
Structure 103
Structure 104
Section 101
N
266290
195000
Section 102
Structure 106
Structure 107
Structure 108
Floor 109
266290
194915
266435
194915
Limit of trench
Archaeological structure
Section line
OS grid point
CHECKED BY: M. Bradley
0
20 m
1:500 at A3
X:\sIS\WBRWWB1_White Rock_ Rising Main_Swansea\010Geomatics\02 CAD\001current\SWBRWWB1_Swansea_2014-02-20.dwg(Figure 6)**SWBRWWB1*Emily Plunkett* 21 Feb 2014

Figure 6: Northern part of the pipe trench route overlain on the 1879 Ordnance Survey map

X:\s\SWBRWWB1_White Rock_ Rising Main_Swansea\010Geomatics\02 CAD\001current\SWBRWWB1_Swansea_2014-02-20.dwg(Figure 7)***SWBRWWB1*steve.lawrence* 21 Feb 2014

0 20 m

1:500 at A3

Figure 7: Southern part of the pipe trench route overlain on the 1879 Ordnance Survey map

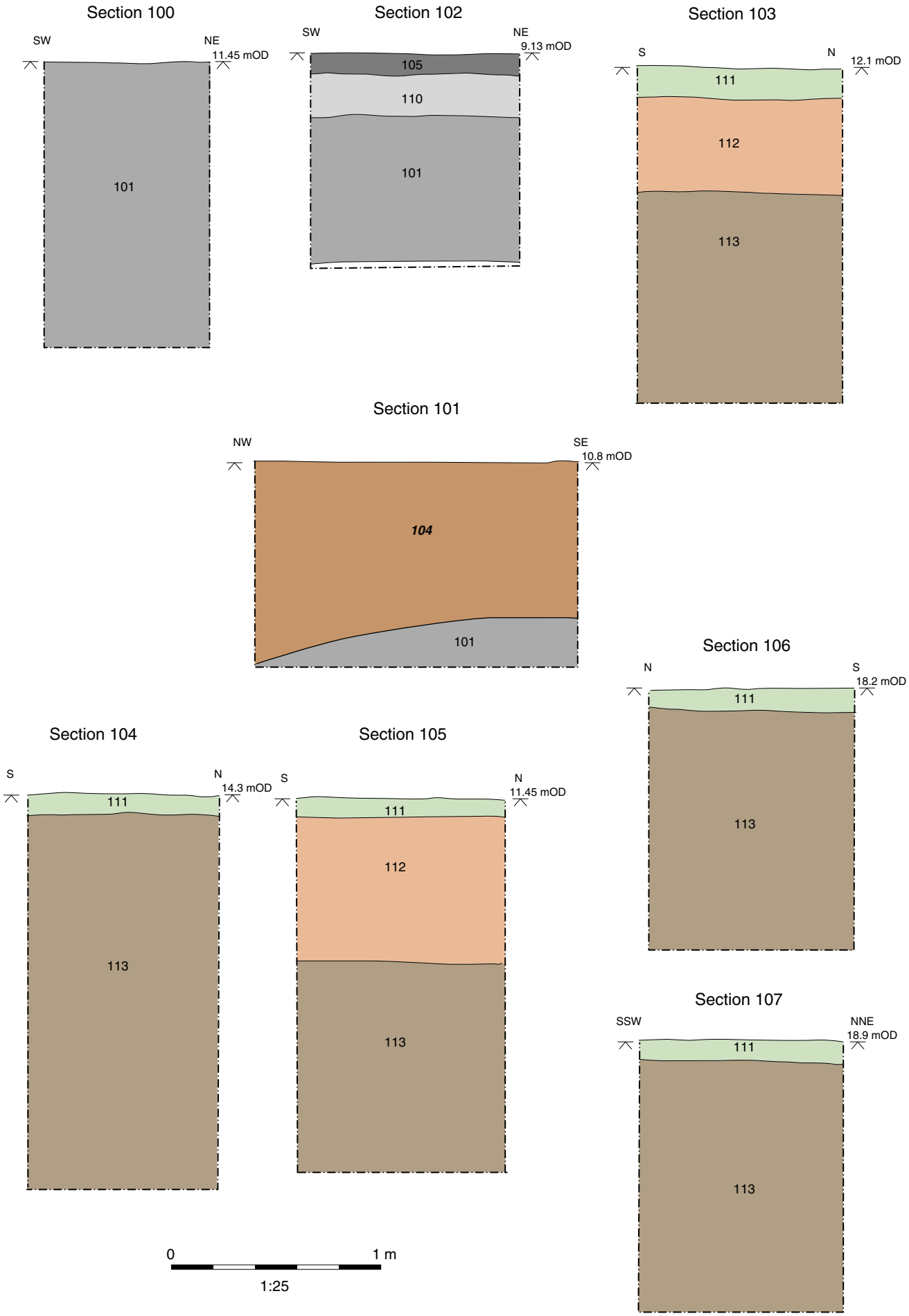

Figure 8: Sections

Plate 1: Wall 100

Plate 2: Wall 102 and soil bund

Plate 3: Wall 102

Plate 4: Wall 103

Plate 5: Wall 104 showing top of arch

Plate 6: Walls 106 and 107

Plate 7: Wall 108

Plate 8: Brick floor 109

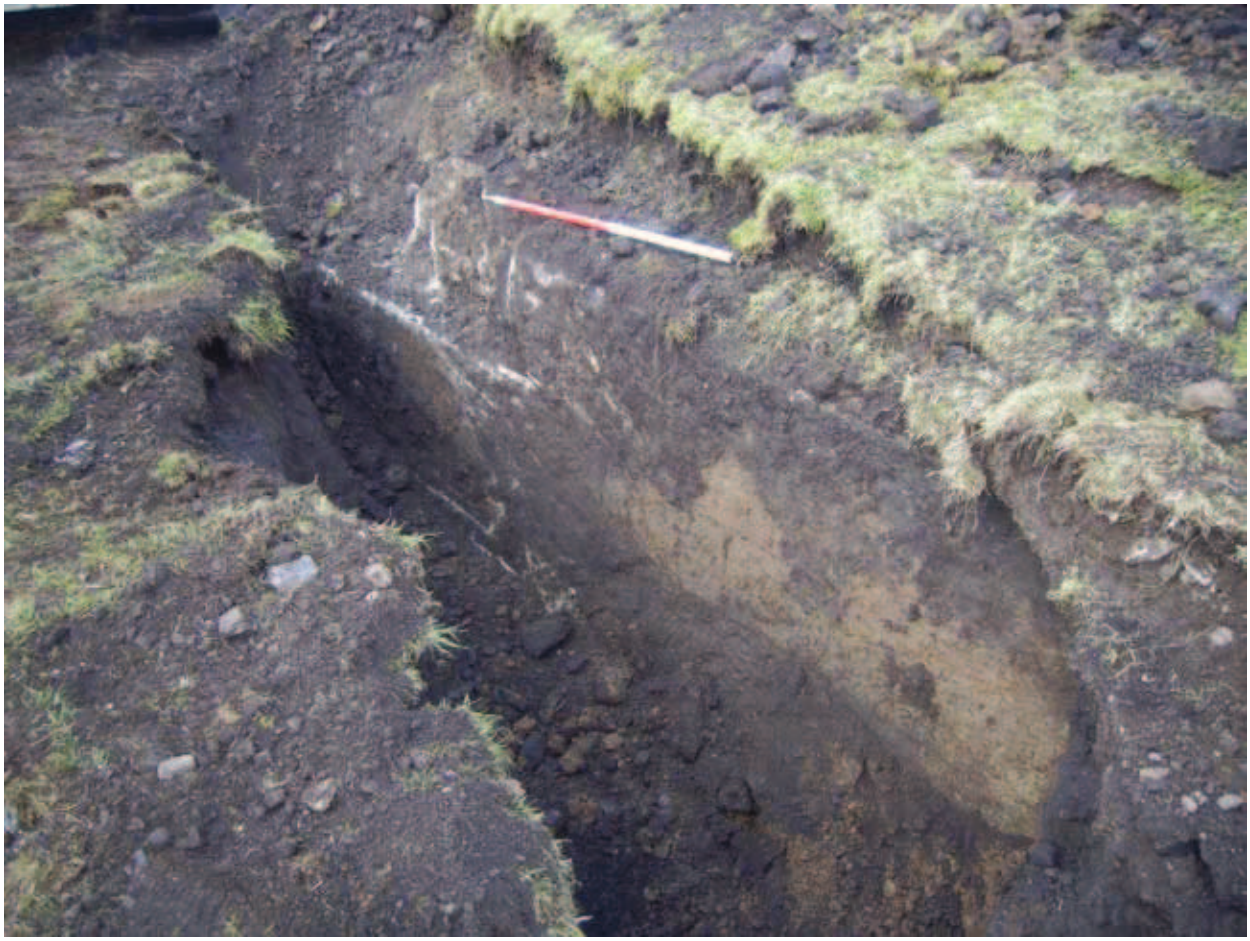

Plate 9: Wall 114

Plate 10: Section 102

Plate 11: Section 104

Plate 12: Section 105

Plate 13: Section 107

Plate 14: Deposits below road bridge

Plate 15: Pipe trench within White Rock car park

Plate 16: Pipe trench along the A4217

Plate 17: Excavation of access chamber adjacent to the A4217

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