

Horton Kirby Ground Water Treatment Works, Ray's Hill, Horton Kirby, Kent; A Historic Building Recording and Archaeological Watching Brief Report

Planning Application Ref: Permitted Development

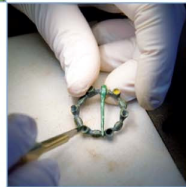
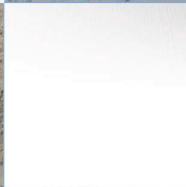
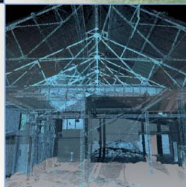
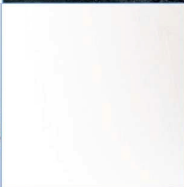
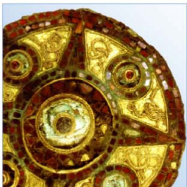
National Grid Reference Number: TQ 5584 6802

AOC Project No: 32047

GBM JV Project No: B047

Site Code: WRH11

Date: December 2011



ARCHAEOLOGY

HERITAGE

CONSERVATION

Contents

	Page
List of Illustrations	iii
List of Plates	iii
Summary	iv
1. Introduction.....	1
2. Planning Background	1
3. Geology and Topography	1
4. Archaeological And Historical Background.....	1
5. Strategy	2
6. Historic Building Record	3
7. Watching Brief Results	8
8. Finds.....	11
9. Conclusions.....	12
10. Publication and Archive Deposition	12
11. Bibliography.....	13
Appendix A – Context Register.....	22
Appendix B – OASIS Form	23

List of Illustrations

Figure 1: Site Location

Figure 2: Detailed Site/Tank Location Plan

Figure 3: Plan of Contact Tanks

Figure 4: Northwest and Southeast Elevation of the Contact Tanks

Figure 5: Northeast Facing Elevation of the Contact Tanks

Figure 6: Trench 1 and Trench 4: Plans and Sections

Figure 7: Trenches 2, 3 and 5: Plan (1:100) and Sample Sections (1:40)

List of Plates

Plate A. General Shot of Tanks Looking West

Plate B. General Shot of Tanks Looking South

Plate C. Northwest Elevation of Tanks Looking South

Plate D. Southeast Elevation of Tanks Looking North

Plate E. Detail of Sealed Opening Tank 5 Northwest Elevation Looking Southeast

Plate F. Detail of Sealed Opening Tank 1 Southeast Elevation Looking Northwest

Plate G. Detail of Bolted Attachments Tank 1 Southeast Elevation Looking Northwest

Plate H. Tank 1 Southeast Elevation Looking Northwest

Plate I. Tank 3 Detail of Sealed Opening Northwest Elevation Looking East

Plate J. Tank 2 Northwest Elevation Looking Southeast

Plate K. Tank 2 Southeast Elevation Looking Northwest

Plate L. Tank 5 Northwest Elevation Looking Southeast

Plate M. Tanks 4 & 5 Southeast Elevation Looking Northwest

Plate N. Detail of Valve Handle

Plate O. Eastern Kiosk Looking Northeast

Plate P. Northern Kiosk Looking South

Plate Q. Trench 1 Sample Section Looking Northeast

Plate R. Trench 2 Sample Section Looking Southwest

Plate S. Trench 3 Sample Section Looking Southeast

Plate T. Trench 4 Sample Section Looking Northwest

Plate U. Trench 5 Sample Section Looking Northeast

Summary

A programme of historic building recording and an archaeological watching brief was undertaken by AOC Archaeology Group, on behalf of Thames Water Ltd and commissioned by GBM JV, between the 24th November and 6th December 2011 at the site of Horton Kirby Ground Water Treatment Works, Ray's Hill, Horton Kirby, Kent. The archaeological investigation consisted of an English Heritage Level 2 record of five reused water treatment tanks, and the monitoring of the excavation of service runs and manholes by means of a watching brief.

The historic building recording identified five contact tanks which until recently had been used for the purpose of water treatment. Analysis identified that the five tanks had originally been used as Lancashire boilers during the early 20th century and converted to be used as contact tanks during the 1950s. The modifications required for their conversion were limited, with the tanks being installed in two specific phases. The five tanks appear to have potentially derived from up to three different sources.

The sequence of deposits identified during the watching brief are of limited archaeological significance, primarily representing the accumulation of undisturbed soil horizons overlying natural flinty gravel. The only human activity identified within the deposit sequence relates to limited occurrences of horizontal truncation of the upper soil horizon and deposition of made ground which probably occurred during the construction of the modern water treatment works. Prior to the 20th century the site appears to have been marginal ground unaffected by significant human activity.

No features or finds of archaeological interest were identified during the course of the watching brief

The results of the archaeological investigation will be summarised for inclusion in the Kent Archaeology Round-up and published via the Archaeological Data Service (ADS) website.

1. Introduction

- 1.1 This document presents the results of a programme of historic building recording and an archaeological watching brief undertaken at the site of Horton Kirby Ground Water Treatment Works, Ray's Hill, Horton Kirby, Kent.
- 1.2 The site is centred on National Grid Reference (NGR) TQ 5584 6802 (Figure 1), located immediately to the southwest of the village of Horton Kirby, with access to the site from the junction of Ray's Hill and The Street. The area that was the subject of the archaeological investigation was centrally located within the field containing the Ground Water Treatment Works, and lies approximately 20m to the southwest of the main water treatment building (Figure 2).

2. Planning Background

- 2.1 Due to the nature of the development all works have been undertaken as Permitted Development. The archaeological investigation has taken place in accordance with planning guidance PPS 5: Planning for the Historic Environment (DCLG 2010).
- 2.2 The proposed development will involve the dismantling and removal of five existing contact tanks followed by the construction of two new contact tanks and associated structures and service runs.
- 2.3 The site does not contain any Listed Buildings or Scheduled Monuments.
- 2.4 AOC Archaeology Group were commissioned by GBM JV, on behalf of Thames Water Ltd, to carry out the historic building recording and archaeological watching brief. The methodology was set out in a Written Scheme of Investigation (WSI) (Mott MacDonald 2011). This document detailed how the Level 2 historic building record of the five pre-existing contact tanks and watching brief on the excavation of service trenches would be undertaken.

3. Geology and Topography

- 3.1 The geology of the site consists of alluvium over a bedrock of undifferentiated chalk (Mott MacDonald 2011).
- 3.2 The site lies at approximately 30m Above Ordnance Datum (AOD) and is relatively flat; the surrounding landscape slopes very gradually downwards towards the River Darent, which bounds the site to the west and lies approximately 200m away from the area of archaeological investigation. Horton Kirby bounds the site to the northeast. The site is 1.2km south of Dartford (Mott MacDonald 2011).
- 3.3 No known geotechnical investigations have been undertaken on site.

4. Archaeological And Historical Background

- 4.1 The proposed development area is located in an area of high archaeological potential, particularly for Roman remains. A Scheduled Roman Villa and possible Iron Age settlement site is located 500m to the south at Franks Hall and the scheduled site of a Roman granary is located 400m to the north. The proposed development area is located close to, but outside, the medieval core of Horton Kirby and the scheduled remains of a medieval moat are located 150m to the south. Additionally, the site of an Anglo-Saxon cemetery is located 650m to the southeast of the site. There is potential for remains associated with Roman and medieval activity to survive within the alluvial deposits at the site (Mott MacDonald 2011).

- 4.2 The existing contact tanks on site comprise five early 20th century Lancashire boilers which were converted into contact tanks in the 1950s (Mott MacDonald 2011).

5. Strategy

5.1 Aims of the Investigation

5.1.1 The objective of archaeological mitigation was to determine the presence or absence of archaeological remains, and characterise (nature, date, complexity and extent) any deposits which are located.

5.1.2 The Level 2 building recording will seek to:

- Preserve, by record, the built heritage aspect of the five Lancashire boilers/contact tanks, which are proposed for removal;
- Understand the construction of the boilers and alterations which were made for their reuse as contact tanks.

5.1.3 The watching brief will seek to:

- To identify the nature and extent of any archaeological deposits within the development area.

5.2 Methodology

5.2.1 Site procedures were defined in the Written Scheme of Investigation (Mott MacDonald 2011). All work was carried out in accordance with national guidelines (English Heritage 2006, IfA 2008a, IfA 2008b).

5.2.2 The historic building recording focused on the Level 2 recording of five water treatment contact tanks, whereas the watching brief concentrated on five trenches excavated to facilitate the instillation of new service runs and manholes (Figure 2).

5.2.3 Prior to commencing work a unique site code (**WRH11**) for the project this was used as the site identifier on all records.

5.2.4 The historic building record and archaeological watching brief was undertaken concurrently between 24th November and 6th December 2011.

5.2.5 Levels for each context were established based on data contained within the site engineer's specifications.

5.2.6 The historic building record and archaeological watching brief was conducted by the author under the overall management of Paul Mason, Project Manager. The site was monitored for GBM JV by Josh Williams and Maurice Hopper.

6. Historic Building Record

Description

- 6.1 The five historic contact tanks are located centrally within the modern water treatment works complex, which is surrounded by grassland associated with the Darenth river valley (Figure 2; Plates A and B).



Plate A. General Shot of Tanks Looking West



Plate B. General Shot of Tanks Looking South

- 6.2 The five tanks are uniformly positioned side by side, each separated by a distance of between 0.50m to 0.60m, with the long-axis of the group orientated northeast-southwest (Figure 3; Plates C and D). The tanks are linked in series by short sections of pipe work which adjoin adjacent tanks, alternating between the northwest and southeast elevations. In/out flow pipes are located on the southeast elevation of Tank 1 and the northwest elevation of Tank 5.



Plate C. Northwest Elevation of Tanks Looking South



Plate D. Southeast Elevation of Tanks Looking North

- 6.3 The tanks are supported by a foundation pad 16.10m long by up to 11.80m wide, rising 0.50m above ground level on the northeast side of the pad (Figures 4 and 5; Plate C). A small set of stairs on the northeast side provide access to the upper surface of the foundation pad. The southwest side of the foundation pad, below Tanks 1, 2 and 3, was made from shuttered concrete, whereas the northeast side of the pad, below Tanks 4 and 5, was of rendered red brick capped with a 0.10m concrete slab. Where the brickwork was visible the bricks measured 220mm by 110mm by 65mm, and were laid in stretcher courses using a cement mortar.
- 6.4 Built on top of the foundation pad were three parallel rows of tank supports, set at 3.20m intervals. The supports set the base of the tanks 0.60m above the upper surface of the foundation pad. Those

on the southwest side, supporting Tanks 1, 2 and 3, were made from shuttered concrete, with those on the northeast side, supporting Tanks 4 and 5, were made from rendered red brick. Observations made after the removal of the tanks identified that the design of the brick built supports incorporated a steel I-beam horizontally set within the brickwork.

- 6.5 The five tanks were, in general, all of a similar form, consisting of a cylindrical design sealed at both ends. Each tank was 9.10m in length by 2.50m in diameter, constructed from sections of steel rings 1.20m in length and steel end plates 2.60m in diameter to the southeast elevation and 2.30m in diameter to the northwest elevation (Figures 3, 4 and 5). All structural elements of the tanks had been riveted together and all external steel surfaces had been treated with a green anti-corrosion paint. A consistent feature shared by all five tanks were two large openings at each end, 0.80m in diameter to the northwest elevation and 0.95m in diameter to the southeast elevation, which had been sealed using welded plates (Plates E and F). The 0.45m diameter pipes linking the tanks had welded attachments to these plates. Other common features include the presence of bolted attachments set within oval frames at the southeast base of each tank (Plate G), and with the exception of Tank 2, the decorative use of rivets on the northwest and southeast elevations.



Plate E. Detail of Sealed Opening Tank 5
Northwest Elevation Looking Southeast



Plate F. Detail of Sealed Opening Tank 1
Southeast Elevation Looking Northwest



Plate G. Detail of Bolted Attachments Tank 1
Southeast Elevation Looking Northwest

- 6.6 Further analysis of the tanks revealed three different designs which were primarily differentiated by their southeast elevation (Figure 4). Tanks 1 and 3 were of the same design containing protruding rims to the large sealed openings, four vertically capped pipes on the roof of the tanks, six smaller openings on the upper elevation which had been capped and welded, plus a distinctive pattern of decorative rivets (Plate H). Apart from the standard paired rivet sequence, the rivet pattern incorporates a single circumference ring, with the bolted attachments framed by rivets and crowned by a pyramidal rivet set. Tank 3 contained two features which differentiated it from its twin: a

vertically set pipe and valve attached to the underside of its southeast elevation and the sealed holes in the plate set within the large northeast circular opening on the northwest elevation (Plate I).



Plate H. Tank 1 Southeast Elevation Looking Northwest



Plate I. Tank 3 Detail of Sealed Opening Northwest Elevation Looking East

- 6.7 Tank 2 was unique in its form, with the main distinction being the use of concave instead of flat end plates (Figures 3 and 4; Plates J and K). The design of Tank 2 did not incorporate any decorative rivet patterns, although it did possess two vertically capped rising pipes, while the southeast elevation contained protruding rims to the large sealed openings, three smaller capped and welded openings to the upper elevation, and a vertically set pipe and valve attached to the underside of the tank.



Plate J. Tank 2 Northwest Elevation Looking Southeast



Plate K. Tank 2 Southeast Elevation Looking Northwest

- 6.8 Tanks 4 and 5, the northeast most of the group, were of identical construction (Figures 3 and 4; Plates L and M). Four vertically capped pipes were located on the roof of the tank with the southeast elevation contained five smaller capped and welded openings to the upper elevation. The rivet pattern on the southeast elevation distinguished itself due to the single circumference ring of rivets around the large sealed opening and double circumference ring around the tank edge and bolted attachments. The two tanks were linked at the base of the southeast elevation by a 0.12m diameter pipe.

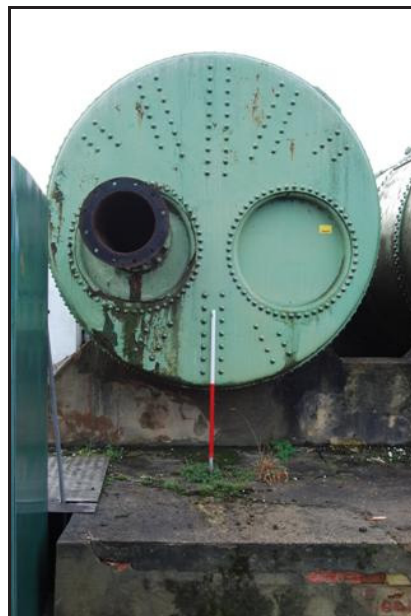


Plate L. Tank 5 Northwest Elevation Looking Southeast

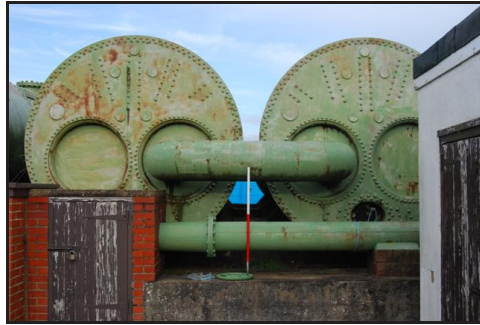


Plate M. Tanks 4 & 5 Southeast Elevation Looking Northwest

- 6.9 An additional feature identified during the survey was the detached circular valve handle lying adjacent to the tanks (Plate N). It too had been treated with the same green anti-corrosion paint as used on the tanks. The lettering 'GUEST & CRIMES' and 'ROTHERHAM' was moulded into the handle's design. The valve handle is thought to be associated with valves set below the southeast elevations of either Tank 2 or 3.



Plate N. Detail of Handle

- 6.10 Immediately surrounding the five tanks were five kiosks of varying design and age. The earliest kiosk design used rendered brick, with the later designs made of fibre glass (Plates O and P). These kiosks were used to house valves, monitoring and dosing equipment used in the treatment of ground water.



Plate O. Eastern Kiosk Looking Northeast



Plate P. Northern Kiosk Looking South

History of Use

- 6.11 It is clear that the group of tanks which are the subject of this report have experienced several phases of use during their life span. Their form indicates that all five tanks were originally designed as Lancashire boilers for the purposes of heating water to create steam for powering steam engines. When they were no longer required in this role, they were transported to the Horton Kirby site for conversion into water treatment tanks. This conversion consisted of several aspects, incorporating the sealing up of the four large and several smaller openings in each tank by means of inserting a welded steel plate, plus the capping of any existing pipes protruding from the roof or base of the tank. Once in position, each tank had a pipe welded to one of its large sealed openings in order to link it to the adjacent tank.
- 6.12 The tanks were brought to site in two distinct phases. Tanks 1, 2 and 3 were installed on site as part of the first phase, resting upon shuttered concrete supports and foundation pad. Tanks 4 and 5 were installed in a second phase of operations where the rendered brick base and supports were constructed over the earlier shuttered concrete foundation and supports. Another feature which confirms this phasing is the sealed holes in the plate set within the large northeast circular opening on the northwest elevation of Tank 3 (Plate I). These sealed holes demonstrate that an in/out flow pipe was once bolted onto Tank 3 completing a series containing just three tanks. Tanks 4 and 5 must have been added later to improve the water treatment process.

7 Watching Brief Results

7.1 Trench 1

- 7.1.1 Surface of Trench = 26.23m AOD

Level (OD)	Depth BGL	Context Number	Description
26.23-26.03m	0.00m	(100)	Made ground/topsoil. Soft, dark brown, clayey silt.
26.03-25.75m	0.20m	(101)	Made ground. Firm, brown, clayey silt, mixed flinty gravel.
25.75-25.15m	0.48m	(102)	Soil horizon. Firm, mid brown, clayey silt.
25.15-24.75m (NFE)	1.08- 1.48m	(103)	Gravel horizon. Loose, brown, clayey silt flinty gravel

- 7.1.2 Trench 1 was located in the central area of the site, orientated northwest-southeast and measured 10.50m by 7.50m (Figures 2 and 6; Plate Q).



Plate Q. Trench 1 Sample Section Looking Northeast

7.1.3 The earliest deposit encountered was a loose, brown, natural silty flinty gravel (103) identified at a height of 25.15m AOD. Natural gravel (103) was overlain by a firm, mid brown, clayey silt soil horizon (102), 0.60m thick. Above context (102) was a layer of firm, brown, clayey silt made ground (101) which contained frequent flint and measured up to 0.30m thick. The layer as a whole appeared highly disturbed. Sealing the sequence was a soft, dark brown, clayey silt organic made ground deposit (100) 0.20m thick, which was interpreted as a horizon of imported topsoil.

7.1.4 No features or finds of archaeological interest were identified in Trench 1.

7.2 Trench 2

7.2.1 Surface of Trench = 26.38m AOD

Level (OD)	Depth BGL	Context Number	Description
26.38-26.03m	0.00m	(200)	Made ground/topsoil. Soft, dark brown, clayey silt.
26.03-25.68m	0.35m	(201)	Soil horizon. Firm, mid-dark brown, clayey silt.
25.68-24.94m (NFE)	0.65- 1.09m	(202)	Gravel horizon. Loose, brown, clayey silt flinty gravel

7.2.2 Trench 2 was located in the southeast area of the site, orientated northwest-southeast and measured 2.10m by 1.30m (Figures 2 and 7; Plate R).



Plate R. Trench 2 Sample Section Looking Southwest

7.2.3 The earliest deposit identified in Trench 2 was a loose, brown, natural silty flinty gravel (202) recorded at a height of 25.68m AOD. Overlying natural gravel (202) was a firm, mid to dark brown, clayey silt soil horizon (201), 0.35m thick. Sealing the sequence was a soft, dark brown, clayey silt deposit (200) thought to be an imported topsoil horizon. Context (200) was 0.30m thick.

7.2.4 No features or finds of archaeological interest were identified in Trench 2.

7.3 Trench 3

7.3.1 Surface of Trench = 26.24m AOD

Level (OD)	Depth BGL	Context Number	Description
26.24-25.84m	0.00m	(300)	Topsoil. Soft, dark brown, clayey silt.
25.84-25.44m	0.40m	(301)	Subsoil. Hard, mid brown, clayey silt.
25.44-24.86m (NFE)	0.80- 1.38m	(302)	Gravel horizon. Loose, brown, clayey silt flinty gravel

7.3.2 Trench 3 was located in the central southern area of the site, orientated northwest-southeast and measured 2.10m by 1.30m (Figures 2 and 7; Plate S).



Plate S. Trench 3 Sample Section Looking Southeast

7.3.3 The earliest deposit observed was a loose, brown, natural silty flinty gravel (302) recorded at a height of 25.44m AOD. Immediately above the natural gravel (302) was a hard, mid brown, clayey silt subsoil horizon (301), 0.40m thick. Sealing the sequence was a soft, dark brown, clayey silt topsoil deposit (300), 0.40m thick.

7.3.4 No features or finds of archaeological interest were identified in Trench 3.

7.4 Trench 4

7.4.1 Surface of Trench = 26.06m AOD

Level (OD)	Depth BGL	Context Number	Description
26.06-25.70m	0.00m	(400)	Topsoil. Soft, dark brown, clayey silt.
25.70-25.34m	0.36m	(401)	Subsoil. Firm, mid brown, clayey silt.
25.34-24.94m (NFE)	0.72- 1.12m	(402)	Gravel horizon. Loose, brown, clayey silt flinty gravel

7.4.2 Trench 4 was located in the northern area of the site and measured 2.30m by 2.30m (Figures 2 and 6; Plate T).



Plate T. Trench 4 Sample Section Looking Northwest

7.4.3 The earliest deposit recorded in Trench 4 was a loose, brown, natural silty flinty gravel (402) recorded at a height of 25.34m AOD. The natural gravel (402) was overlain by a firm, mid brown,

clayey silt subsoil horizon (401), 0.35m thick. Sealing the sequence was a soft, dark brown, clayey silt topsoil deposit (400), 0.35m thick.

7.4.4 No features or finds of archaeological interest were identified in Trench 4.

7.5 Trench 5

7.5.1 Surface of Trench = 26.28m AOD

Level (OD)	Depth BGL	Context Number	Description
26.28-25.78m	0.00m	(500)	Made Ground/Topsoil. Soft, dark brown, clayey silt.
25.78-25.64m	0.50m	(501)	Soil Horizon. Firm, dark brown, clayey silt.
25.64-25.12m	0.64m	(502)	Soil Horizon. Firm, mid brown, clayey silt.
25.12-24.80m	1.16m	(503)	Clay Horizon. Firm, reddish brown, sandy clay.
24.80-24.35m (NFE)	1.48- 1.93m	(504)	Gravel Horizon. Loose, brown, clayey silt flinty gravel

7.5.2 Trench 5 was located in the central southern area, orientated northwest-southeast of the site and measured 10m by 1m (Figures 2 and 7; Plate U).



Plate U. Trench 5 Sample Section Looking Northeast

7.5.3 The earliest deposit encountered in the trench was a loose, brown, natural silty flinty gravel (504) recorded at a height of 24.80m AOD. At the northern end of Trench 5 the natural gravel (504) was overlain by a firm, mid brown, sandy clay horizon (503), 0.30m thick, for a distance of 3.40m. Located above clay horizon (503) and occupying the full area of the trench was a firm, mid brown, clayey silt soil horizon (502), 0.50m thick. Overlying soil horizon (502), restricted to a distance of 2.90m in the northern end of Trench 5 was layer of firm, dark brown, clayey silt material (501) interpreted as a buried topsoil deposit measuring up to 0.15m thick. Sealing the sequence was a soft, dark brown, clayey silt imported topsoil deposit (500), 0.50m thick.

7.5.4 No features or finds of archaeological interest were identified in Trench 5.

8 Finds

8.1 No finds were collected during the course of the watching brief.

9 Conclusions

- 9.1 The programme of historic building recording identified a group of five contact tanks which until recently had been used for the purpose of water treatment. Analysis of the tanks identified that all five had originally been designed as Lancashire boilers believed to be in use during the early 20th century. The identification of the manufacturer's markings of 'GUEST & CRIMES' or 'ROTHERHAM', indicate that one or more of the boilers, or mechanical elements of, are likely to have derived from this company.
- 9.2 In the 1950s the boilers had been relocated to the Horton Kirby and only required limited work in order to convert them into contact tanks. The modifications were restricted to the capping and sealing of the previous openings on the boilers, followed by the attachment of pipes to link the five tanks in series. Study of the foundations and supports on which the tanks were resting indicate the tanks were installed in two separate phases. Tanks 1, 2 and 3 were installed initially on shuttered concrete supports, incorporating two different designs of tank, implying that the boilers may have originated from two different sources. The first three tanks may have been installed for a reasonable period prior to the installation of the last two tanks, as weld marks on Tank 3 indicate it was initially modified to take an in/out flow pipe. This in/out flow pipe was later replaced by a link pipe when Tanks 4 and 5 were installed. Tanks 4 and 5 were installed on rendered brick bases rather than shuttered concrete bases, with both tanks probably originating from the same source as they were both of the same design.
- 9.3 The watching brief recorded undisturbed natural flinty gravel deposits in all five trenches, between a height of 24.80m AOD and 25.68m AOD. These values are indicative of the general level topography across the site. The only variation observed associated with the natural deposit was the occurrence of a limited spread of clay in Trench 5 which is also interpreted as being part of the natural deposit horizon.
- 9.4 Overlying the geology was a fairly uniform sequence of deposits. The earliest of these appears to be a mid brown, clayey silt soil horizon occurring at a similar level. Where undisturbed deposit sequences were observed in Trenches 3 and 4, there is strong evidence to suggest this soil horizon is the pre-existing subsoil horizon across the site. *In-situ* topsoil deposits were recognised in Trenches 3 and 4, whereas in Trench 1, 2 and 5 made ground or imported topsoil contexts were observed overlying the subsoil horizon implying that a restricted phase of horizontal truncation had occurred in specific locations across the site. This is supported by the survival of a limited horizon of buried topsoil sealed beneath the made ground. Material contained in the made ground indicates the horizontal truncation was modern in origin.
- 9.5 No features or finds of archaeological interest were identified during the course of the watching brief. Prior to the 20th century the site appears to have been marginal ground unaffected by significant human activity.

10 Publication and Archive Deposition

- 10.1 Due to the nature of the results of the archaeological investigation, publication is expected to be limited to a summary in the Kent Archaeology Round-up and publication via the Archaeological Data Service (ADS) (Appendix B).
- 10.2 On completion of the project, the archive, consisting of paper records, drawings, digital and black and white photographs, will be deposited with an appropriate local museum.

11 Bibliography

Department Communities and Local Government (2010). *Planning Policy Statement 5: Planning and the Historic Environment* (Published by The Stationary Office).

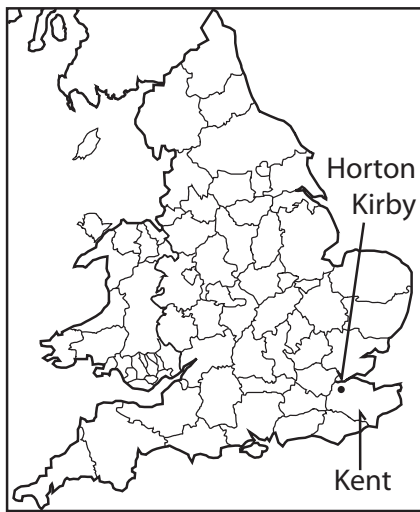
English Heritage (2006). *Understanding Historic Buildings. A Guide to Good Recording Practice*.

Institute for Archaeologists (2008a). *Standards and Guidance for Archaeological Watching Briefs*.

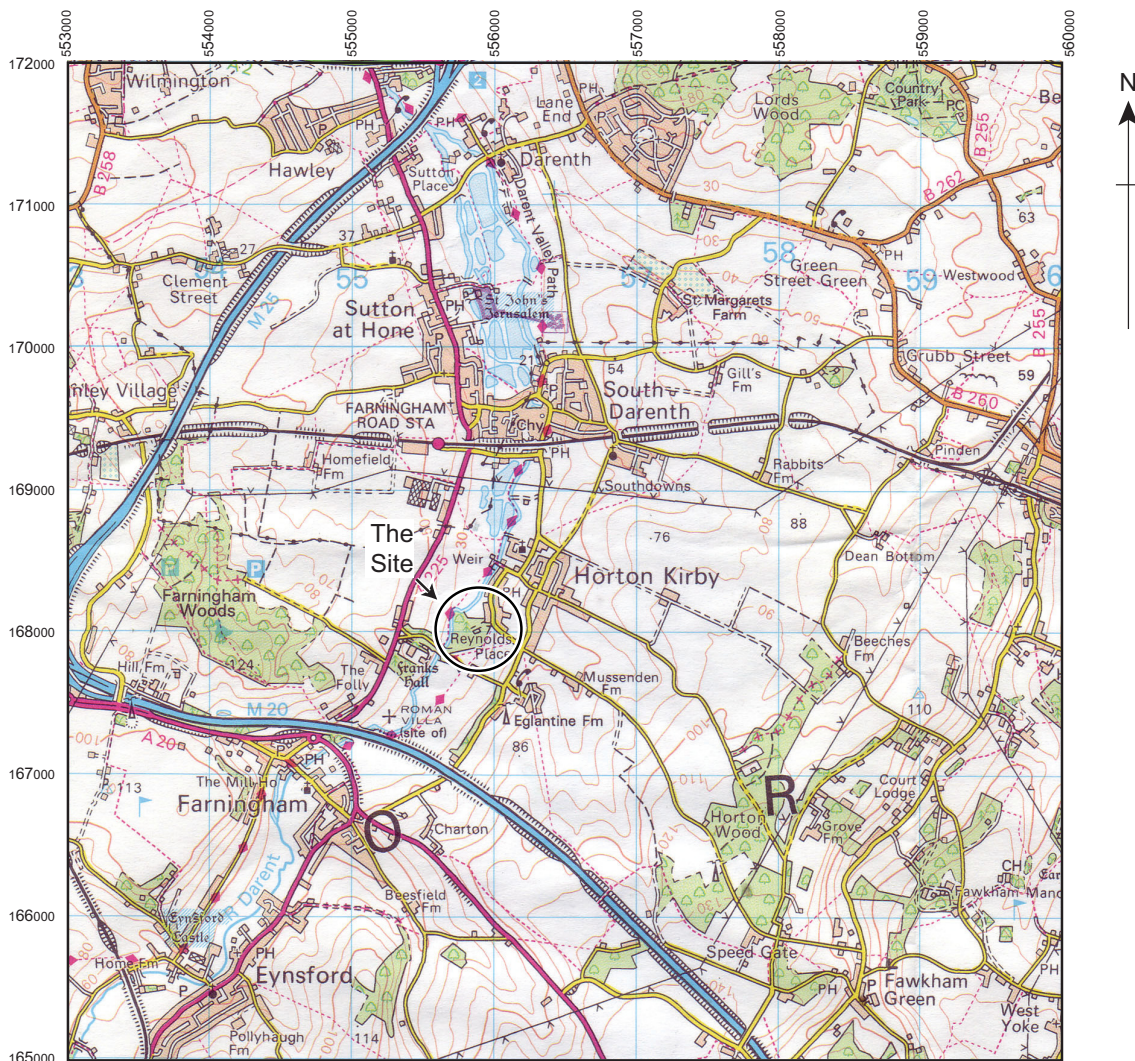
Institute for Archaeologists (2008b). *Standards and Guidance for Archaeological Investigation and Recording of Standing Buildings and Structures*.

Mott MacDonald (2011). *Horton Kirby CT. Archaeological Written Scheme of Investigation*.

HORTON KIRBY GROUND WATER TREATMENT WORKS, RAY'S HILL, HORTON KIRBY, KENT:
A HISTORIC BUILDING RECORD AND ARCHAEOLOGICAL WATCHING BRIEF REPORT



Approximate Site Location
Within England & Wales



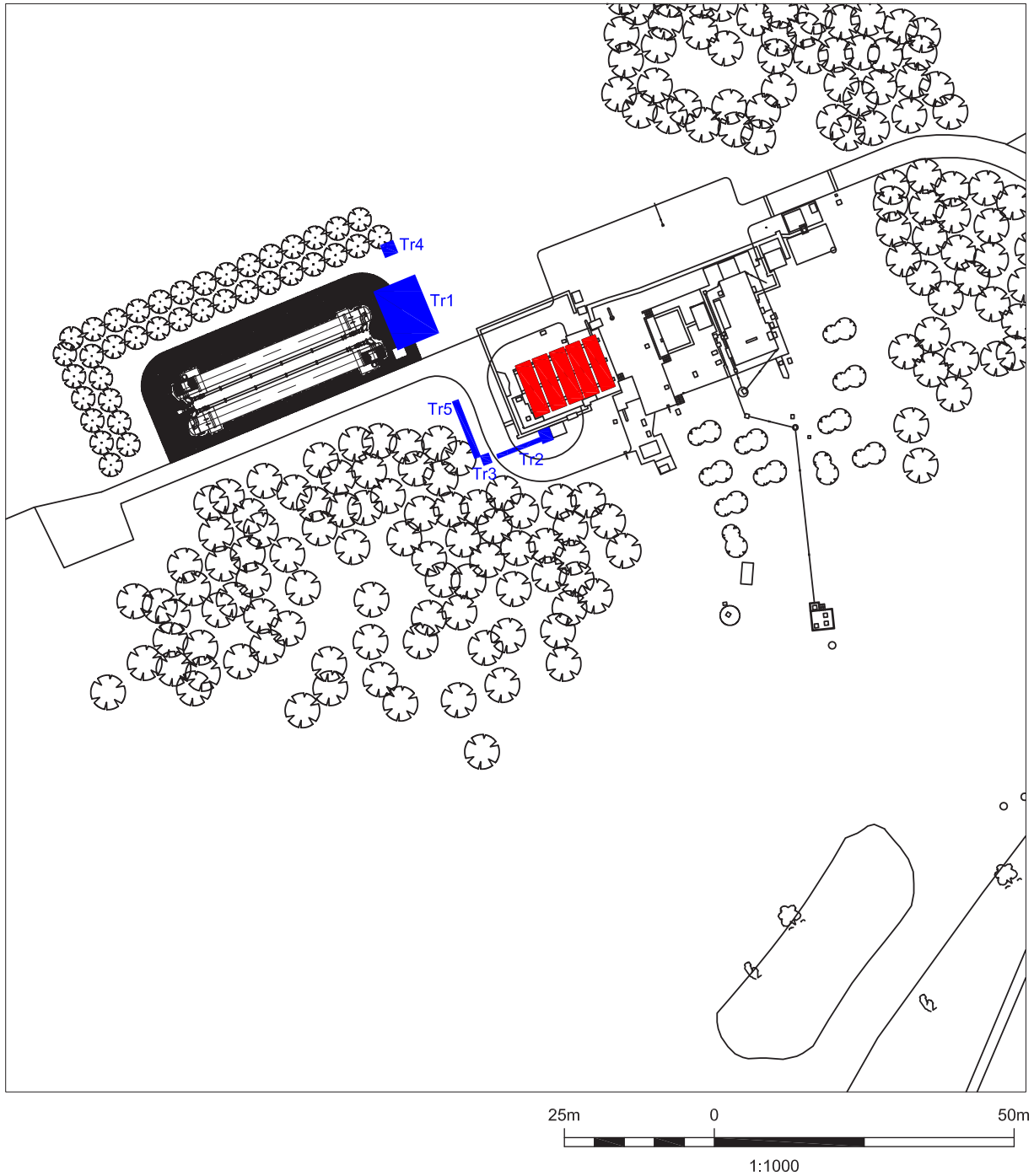
Based on the Ordnance Survey's 1:50 000 Landranger map of 2004 with the permission of the Controller of Her Majesty's Stationery Office, © Crown Copyright. Licence No. AL 100023757

500m 0 2 km

1:50 000

Figure 1: Site Location

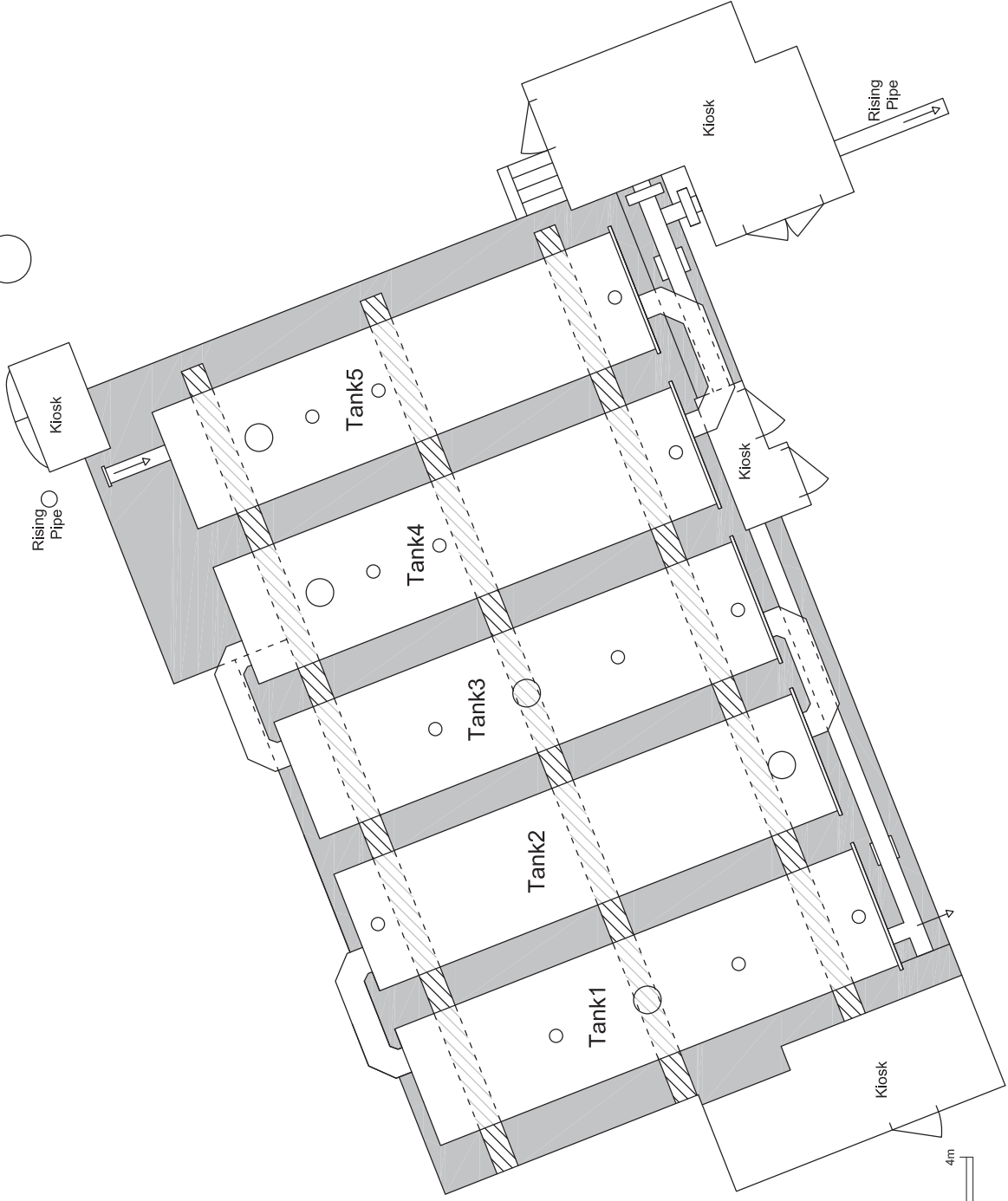
HORTON KIRBY GROUND WATER TREATMENT WORKS, RAY'S HILL, HORTON KIRBY, KENT:
A HISTORIC BUILDING RECORD AND ARCHAEOLOGICAL WATCHING BRIEF REPORT



- Tanks
- Archaeological Watching Brief Areas

Figure 2: Detailed Site / Watching Brief Areas / Tank Location Plan

HORTON KIRBY GROUND WATER TREATMENT WORKS, RAY'S HILL, HORTON KIRBY, KENT:
 A HISTORIC BUILDING RECORD AND ARCHAEOLOGICAL WATCHING BRIEF REPORT



- Concrete Base
- Concrete Strut
- Concrete Strut Under Tank



Figure 3: Plan of Contact Tanks

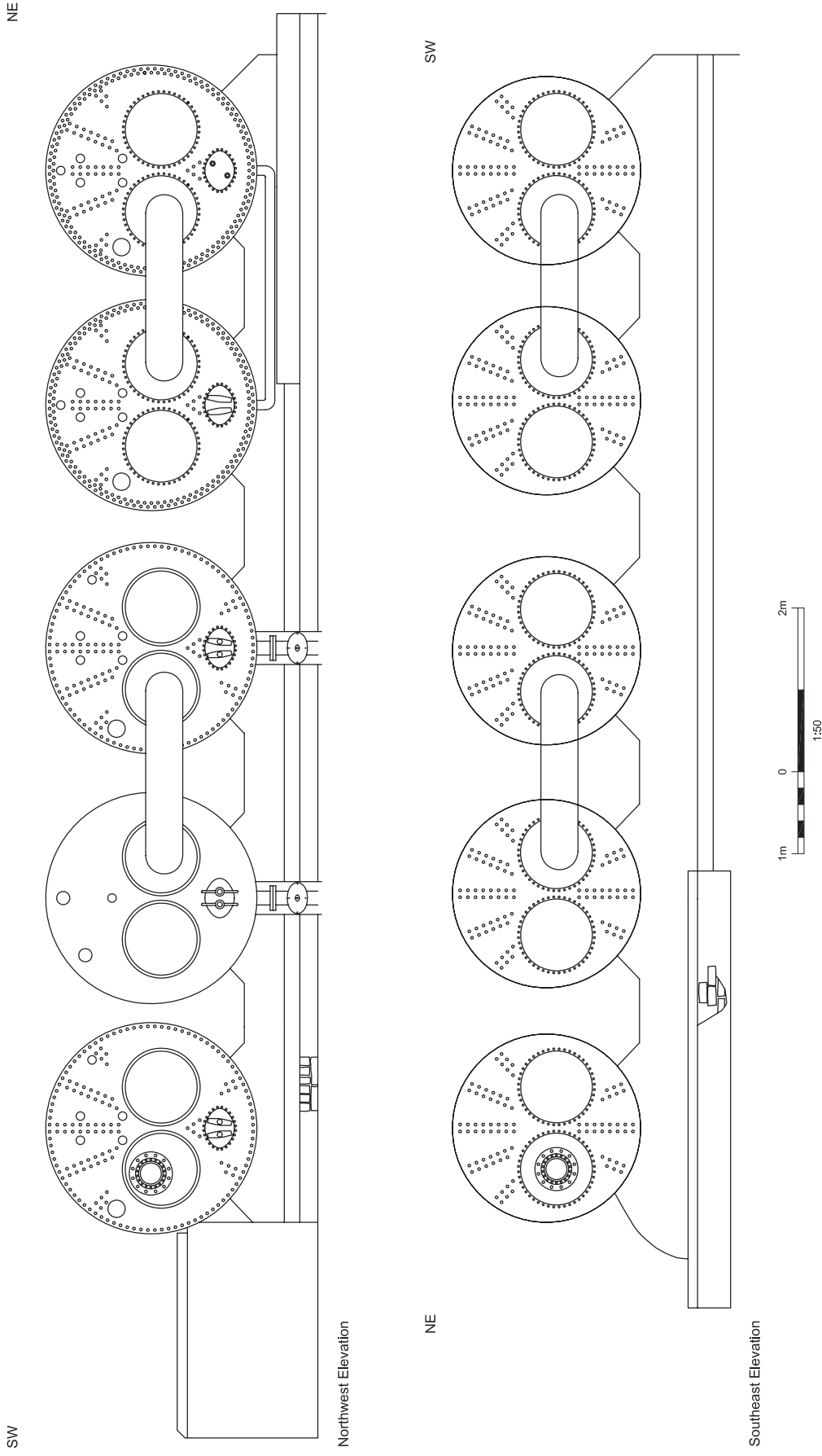


Figure 4: Northwest and Southeast Elevation of the Contact Tanks

HORTON KIRBY GROUND WATER TREATMENT WORKS, RAY'S HILL, HORTON KIRBY, KENT:
A HISTORIC BUILDING RECORD AND ARCHAEOLOGICAL WATCHING BRIEF REPORT

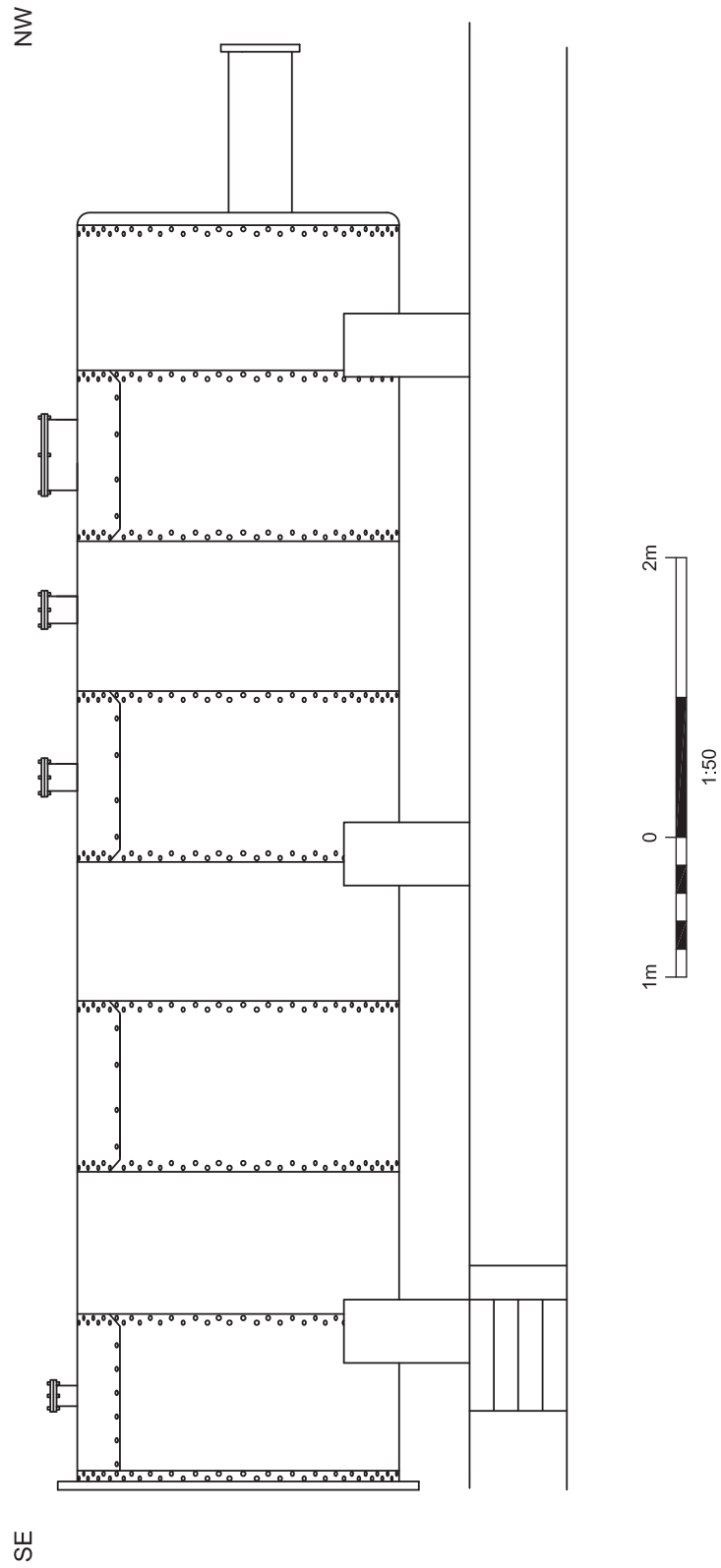


Figure 5: Northeast Facing Elevation of the Contact Tanks

HORTON KIRBY GROUND WATER TREATMENT WORKS, RAY'S HILL, HORTON KIRBY, KENT:
A HISTORIC BUILDING RECORD AND ARCHAEOLOGICAL WATCHING BRIEF REPORT

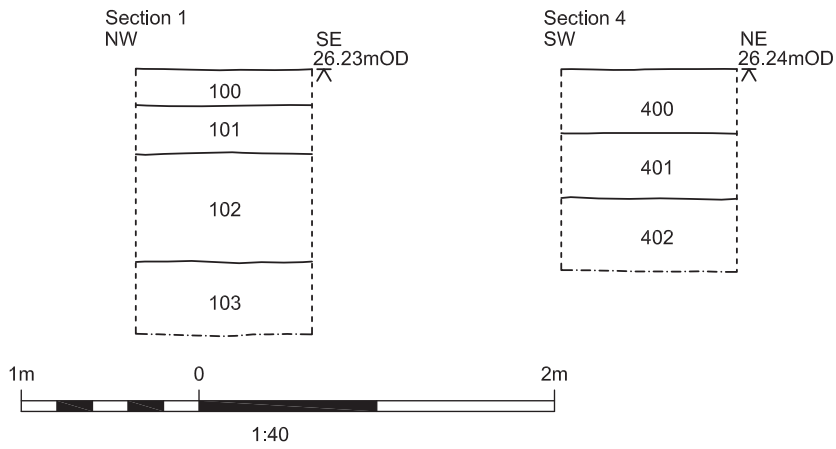
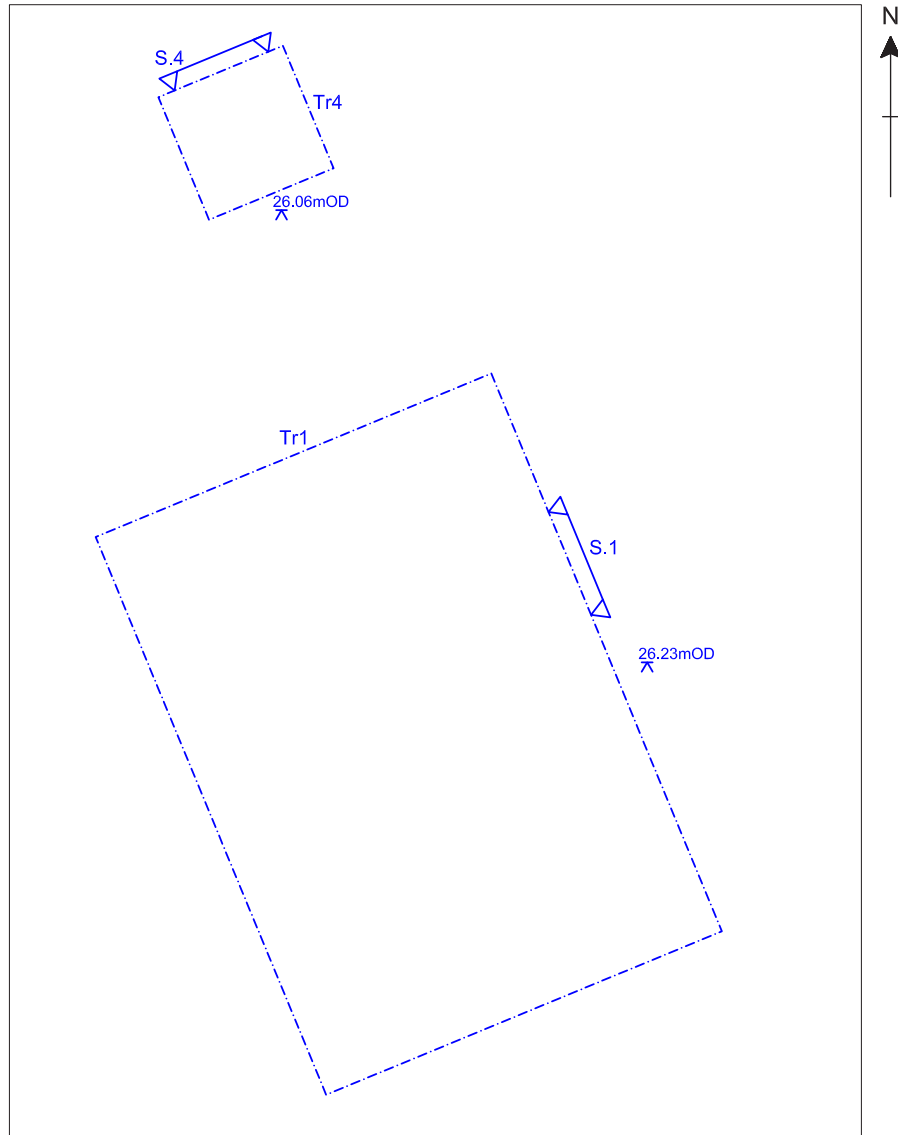
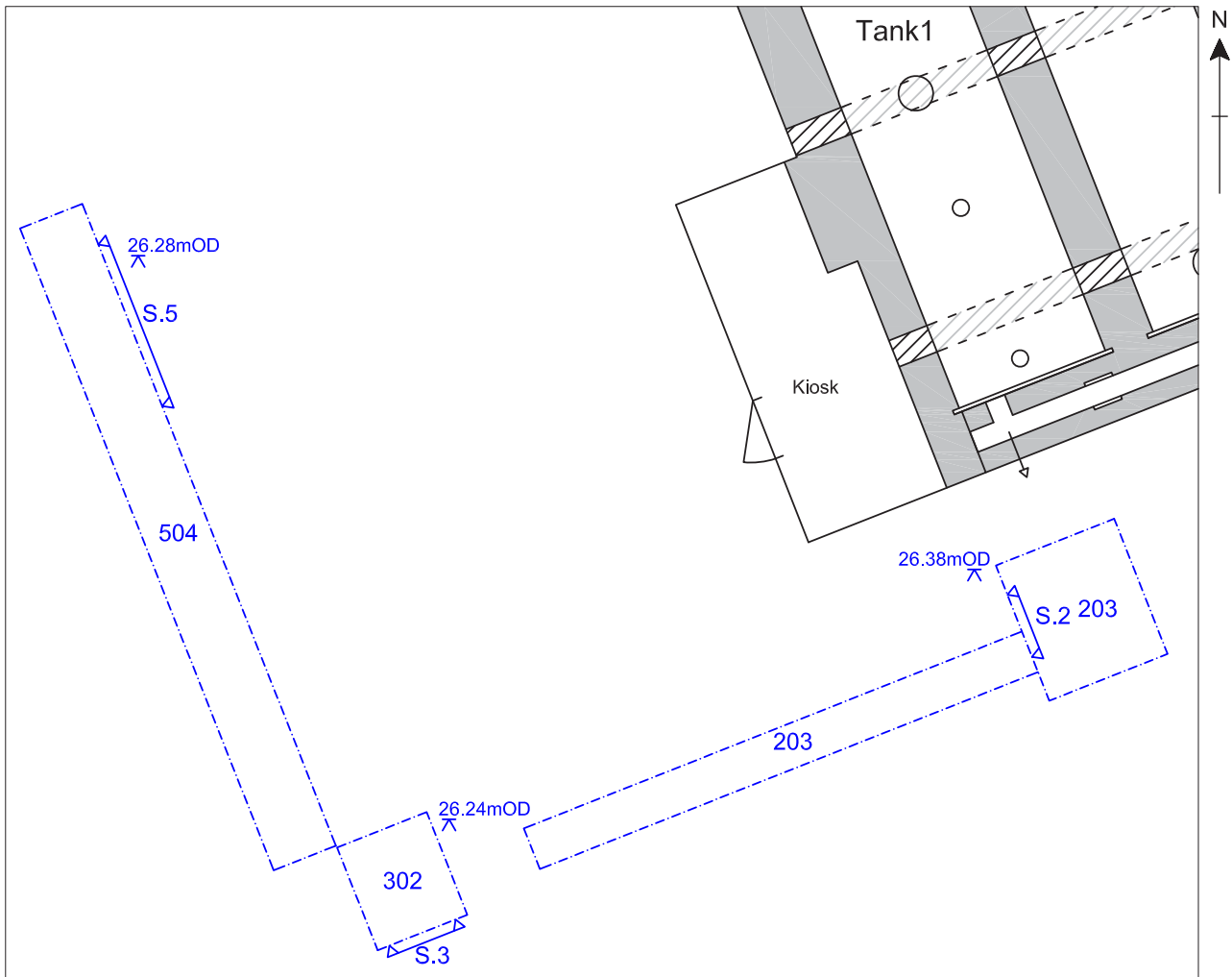


Figure 6: Trench 1 and 4: Plans and Sections

HORTON KIRBY GROUND WATER TREATMENT WORKS, RAY'S HILL, HORTON KIRBY, KENT:
 A HISTORIC BUILDING RECORD AND ARCHAEOLOGICAL WATCHING BRIEF REPORT



□ Archaeological Watching Brief Areas

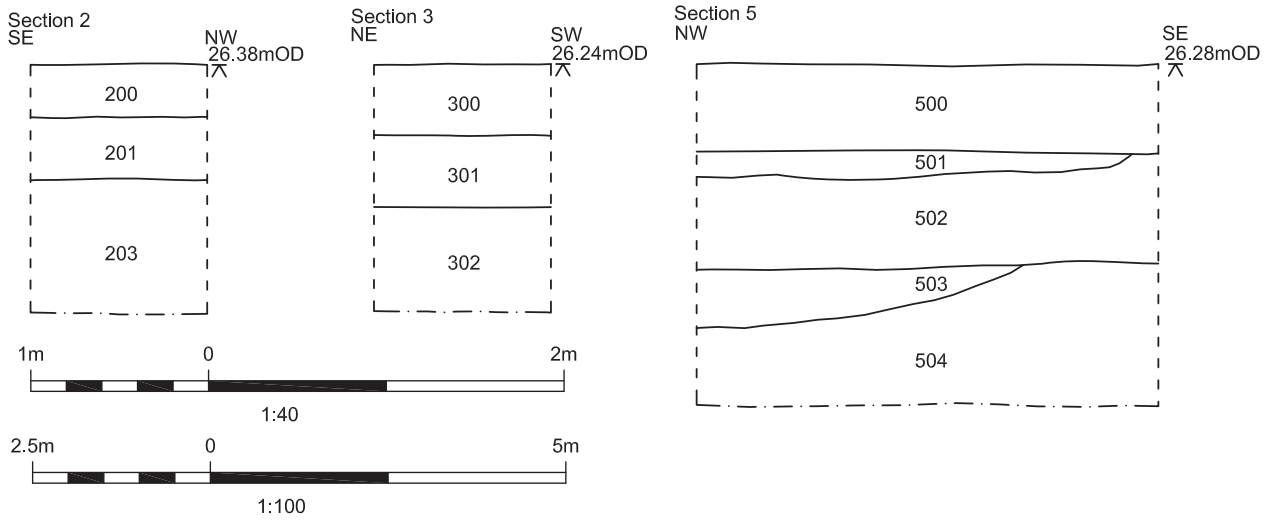


Figure 7: Trenches 2,3 and 5: Plan (1:100) and Sample Sections (1:40)

Appendices

Appendix A – Context Register

Context No.	Context Description	Length	Width	Depth
100	Imported Topsoil	10.50m	7.50m	0.20m
101	Made Ground	10.50m	7.50m	0.28m
102	Soil Horizon	10.50m	7.50m	0.60m
103	Gravel Horizon	10.50m	7.50m	0.40m+
200	Imported Topsoil	2.10m	1.30m	0.3m
201	Soil Horizon	2.10m	1.30m	0.35m
202	Gravel Horizon	2.10m	1.30m	0.74m+
300	Topsoil	1.60m	1.40m	0.40m
301	Subsoil	1.60m	1.40m	0.40m
302	Gravel Horizon	1.60m	1.40m	0.58m+
400	Topsoil	2.30m	2.30m	0.36m
401	Subsoil	2.30m	2.30m	0.36m
402	Gravel Horizon	2.30m	2.30m	0.40m+
500	Imported Topsoil	10.00m	1.00m	0.50m
501	Buried Topsoil	2.90m	1.00m	0.14m
502	Subsoil	10.00m	1.00m	0.52m
503	Clay Horizon	3.40m	0.30m	0.32m
504	Gravel Horizon	10.00m	1.00m	0.45m+

Appendix B – OASIS Form

OASIS ID: aocarcha1-115753

Project details

Project name Horton Kirby Water Treatment Plant, Kent

Short description of the project A programme of Historic Building Recording and an archaeological watching brief was undertaken by AOC Archaeology Group at the site of Horton Kirby Ground Water Treatment Works, Ray's Hill, Horton Kirby, Kent. The archaeological investigation consisted of a Level 2 Record of five reused water treatment tanks, and the monitoring of the excavation of service runs and manholes by means of a watching brief. The historic building recording identified a group of five contact tanks which until recently had been used for the purpose of water treatment. Analysis identified that the five tanks had originally been used as Lancashire boilers during the early 20th century and converted to be used as contact tanks during the 1950s. The modifications required for their conversion were limited, with the tanks being installed in two specific phases. The five tanks appear to have potentially derived from up to three different sources. The sequence of deposits identified during the watching brief are of limited archaeological significance, primarily representing the accumulation of undisturbed soil horizons overlying natural flinty gravel. The only human activity identified within the deposit sequence relates to limited occurrences of horizontal truncation of the upper soil horizon and deposition of made ground which probably occurred during the construction of the modern water treatment works. Prior to the 20th century the site appears to have been marginal ground unaffected by significant human activity. No features or finds of archaeological interest were identified during the course of the watching brief

Project dates Start: 24-11-2011 End: 06-12-2011

Previous/future work No / No

Any project codes associated reference WRH11 - Sitecode

Any project codes associated reference 32047 - Contracting Unit No.

Type of project Building Recording

Site status None

Current Land use Transport and Utilities 3 - Utilities

Methods & 'Measured Survey','Photographic Survey'
techniques

Prompt Direction from Local Planning Authority - PPS

Project location

Country England

Site location KENT DARTFORD DARENTH Horton Kirby Water Treatmant Works, Ray's Hill,
Horton Kirby, Kent

Postcode DA4 9DA

Site coordinates TQ 5584 6802 51.3892667509 0.240040730055 51 23 21 N 000 14 24 E Point

Height OD / Depth Min: 24.80m Max: 25.68m

Project creators

Name of AOC Archaeology
Organisation

Project brief GBM JV
originator

Project design Mott MacDonald
originator

Project Paul Mason
director/manager

Project supervisor Chris Clarke

Type of Developer
sponsor/funding
body

Name of Thames Water
sponsor/funding
body

Project archives

Physical Archive No
Exists?

Digital Archive ID WRH11

Digital Contents 'Stratigraphic'

Digital Media 'Images raster / digital photography'
available

Digital Archive notes To be held AOC until suitable recipient museum can be found.

Paper Archive ID WRH11

Paper Contents 'Stratigraphic'

Paper Media 'Context sheet','Matrices','Plan','Report','Section'
available

Paper Archive notes To be held AOC until suitable recipient museum can be found.

Project bibliography 1

Publication type Grey literature (unpublished document/manuscript)

Title Horton Kirby CT. Archaeological Written Scheme of Investigation

Author(s)/Editor(s) Hopper, M.

Date 2011

Issuer or publisher GBM JV

Place of issue or Cambridge
publication

Description A4 text, 1 illustration, 26 pages

**Project
bibliography 2**

Publication type Grey literature (unpublished document/manuscript)

Title HORTON KIRBY GROUND WATER TREATMENT WORKS, RAY'S HILL,
HORTON KIRBY, KENT: A HISTORIC BUILDING RECORD AND
ARCHAEOLOGICAL WATCHING BRIEF REPORT

Author(s)/Editor(s) Clarke, C.

Date 2011

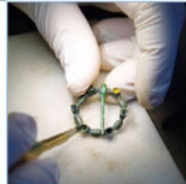
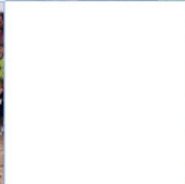
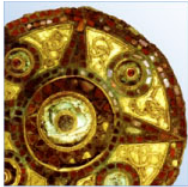
Issuer or publisher AOC Archaeology

Place of issue or London
publication

Description A4 text, 6 illustrations, 27 pages bound between plastic covers

Entered by Chris Clarke (chris.clarke@aocarchaeology.com)

Entered on 13 December 2011



AOC
Archaeology
Group

AOC Archaeology Group, Unit 7, St Margarets Business Centre, Moor Mead Road, Twickenham TW1 1JS
tel: 020 8843 7380 | fax: 020 8892 0549 | e-mail: london@aocarchaeology.com

www.aocarchaeology.com