

## Shooters Hill Greenwich, London

Archaeological Evaluation and Assessment of Results



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**Shooters Hill, Greenwich, London**

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# **Shooters Hill, Greenwich, London**

## **Archaeological Evaluation and Assessment of Results**

### **Summary**

In July 2007 Channel 4's 'Time Team' carried out an archaeological evaluation on four sites in the Shooters Hill area of London, at Eaglesfield Park (NGR 543800 176600), Oxleas Wood (543970 1763350), Oxleas Memorial Hospital (543500 176400) and Eltham Common (542800 176600). In addition, a possible bunker structure was investigated in a residential street at Ashridge Crescent, Eaglesfield (NGR 544198 177164).

The aim of the evaluation was to locate and assess any evidence for the survival of World War II defences, and to link these into the wider context of the defence of Britain and the 'Stop Lines'- specifically, 'Stop Line Central' which ran through the Shooters Hill area.

A geophysical survey was used in an attempt to help locate the remains on Eaglesfield Park and Eltham Common, but the results proved to be limited in usefulness due to high levels of disturbance, although some possible areas of archaeological activity were located.

Most features found during the evaluation proved to be of World War II date, and all five sites proved to have evidence of activity at this time. These included standing structural remains in Oxleas Wood (a probable air raid shelter) and Eltham Common (a spigot mortar base). The remnants of a barrage balloon tether were uncovered at Eaglesfield Park, and a possible anti-aircraft gun emplacement at Oxleas Memorial Hospital. Modern disturbance was encountered on all sites, due to continuing development since the war. Of particular significance may be a possible British Auxiliary Unit operations base within a residential area at Ashridge Crescent, Eaglesfield.

Also of great interest, however, was the discovery at Eaglesfield Park of a ditch containing large quantities of iron smithing slag, associated with Early Iron Age pottery, which is of high significance as a rare example of ironworking at this early date.

It is recommended that further analysis and publication is conducted on the Early Iron Age ironworking evidence. The evidence for World War II activity will be passed to the Lie of the Land project for incorporation in the overall project results.

## **Shooters Hill, Greenwich, London**

### **Archaeological Evaluation and Assessment of Results**

#### **Acknowledgements**

This programme of post-excavation and assessment work was commissioned and funded by Videotext Communications Ltd, and Wessex Archaeology would like to thank the staff at Videotext, and in particular Michael Douglas (Series Editor), Melinda Corkery (Production Manager), James Franklin (Assistant Producer), Ben Knappett (Researcher) and Emily Woodburn (Production Co-ordinator) for their considerable help during the recording and post-excavation work.

The geophysical survey was undertaken by John Gater, Ian Wilkins and Emma Wood of GSB Prospection. The field survey was undertaken by Henry Chapman, University of Birmingham, and landscape survey and map regression was undertaken by Stewart Ainsworth of English Heritage. The on-site recording was co-ordinated by Darren Baker with on-site finds processing by Laura Catlin, both of Wessex Archaeology.

The excavations were undertaken by Time Team's retained archaeologists, Phil Harding (Wessex Archaeology), Raksha Dave, Tracey Smith, Ian Powlesland and Matt Williams, with help from Scarlett Rose McGrail, Angie McCall, Rod Scott, Dave Saxby, Richard Hewett and Neville Constantine. Metal detecting was carried out by Steve Brooker and John Dunford.

The archive was collated and all post-excavation assessment and analysis undertaken by Wessex Archaeology. This report was compiled by Darren Baker, with a specialist report on the finds prepared by Lorraine Mephram and Patrice De Rijk (ironworking slag). The palaeo-environmental assessment was undertaken by Chris Stevens. The illustrations were prepared by Kenneth Lymer. The post-excavation project was managed on behalf of Wessex Archaeology by Lorraine Mephram.

The work benefited from discussion on site with Martin Brown, archaeological advisor to the Ministry of Defence (MoD); Andy Robertshaw, Royal Logistics Corps Museum, Camberley; Phil Harding and Helen Geake, Cambridge University.

# **Shooters Hill, Greenwich, London**

## **Archaeological Evaluation and Assessment of Results**

### **1 INTRODUCTION**

#### **1.1 Project Background**

1.1.1 Videotext Communications commissioned Wessex Archaeology to carry out an archaeological evaluation at Shooters Hill in London as part of the Channel 4 'Time Team' programme. The evaluation was carried out on a series of sites: Eaglesfield Park (NGR 543800 176600), Oxleas Wood (5439700 1763350), Oxleas Memorial Hospital (543500 176400) and Eltham Common (542800 176600). Oxleas Memorial Hospital is owned by Oxleas NHS Foundation Trust and is currently part of the hospital. The other three sites are owned and managed by Greenwich Council and are now used as public parks. The sites were brought to the attention of 'Time Team' by Andy Brockman, a community archaeologist from Greenwich.

1.1.2 In addition, a possible bunker structure was investigated in the back gardens of two private residences at Ashridge Crescent, Eaglesfield (NGR 544198 177164), which was brought to the attention of 'Time Team' during the evaluation by local residents.

#### **1.2 Topography and Geology**

1.2.1 The sites are all located in the Shooters Hill area, which is between 50 and 100m OD, and all are near to the A207 (**Figure 1**). Eaglesfield Park is located close to the crest of the hill and commands a good view of the surrounding landscape to the south-east along the line of the A207. Oxleas Wood is located near to the A207 opposite Eaglesfield Park. Oxleas Memorial Hospital and Eltham Common are close to the A207 on the opposite side of the hill to Sites 1 and 2.

1.2.2 The underlying geology of the area is London Clay with areas of Claygate member (British Geological Survey Sheet 271).

#### **1.3 Archaeological and Historical Background**

1.3.1 A Bronze Age barrow cemetery is recorded near Shrewsbury Lane and Mayplace Lane, located behind Eaglesfield Park; this suggests that there may have been a Bronze Age occupation or ritual centre in the area of Eaglesfield Park. There is otherwise little evidence of prehistoric activity in the Shooters Hill area.

1.3.2 The main archaeological feature of the area is the line of Roman Watling Street, once the main route from the Kent coast to Roman London, and which is now followed approximately by the route of the A207 (see **Figure 1**). This has been known since the early 18<sup>th</sup> century and is mentioned by

antiquarians Dr John Harris in 1719 and William Stukeley in 1722. The road was used as the southern boundary for a number of ancient parishes.

- 1.3.3 Shooters Hill is not mentioned in Domesday, although it was surrounded by Domesday manors, suggesting earlier extensive Anglo-Saxon occupation of the surrounding area. During the medieval period Shooters Hill was used as woodland pasture; efforts were made to maintain the old highway (Watling Street). The road and area later became a notorious haunt of thieves and highwaymen.

*Twentieth century military history*

- 1.3.4 In the 20<sup>th</sup> century Shooters Hill became a key point in the planned defence of London during World War II.
- 1.3.5 In 2003 Andy Brockman, a local archaeologist began consultations regarding an archaeological assessment project called Southside Underground (SOUND). This incorporates the 'Lie of the Land' project, the aim of which is to establish an archaeological research network in south-east London. The Shooters Hill element is hosted by the Woodlands Farm Trust, co-ordinated by Dave Smith, the Trust's Education Officer, and Andy Brockman, and the fieldwork is supported by the Centre for Continuing Education, Birkbeck College (University of London).
- 1.3.6 Preliminary desk-based assessments have been carried out by the Lie of the Land project; these include a large amount of research into the military history of the Shooters Hill area.
- 1.3.7 Once France had fallen to the Germans after the evacuation of Dunkirk in 1940, the threat of German invasion – code-named Operation Sealion – was imminent and real. To combat this threat a series of defensive 'Stop Lines' were established over the country. These consisted of a series of fortifications designed to slow down the advance of tanks and mechanised assaults. Shooters Hill is thought to have been a key strongpoint in Stop Line Central, the last defensive line before central London. If breached, British defenders would have had to fall back to Stop Line Inner, before fighting street by street in Whitehall and the capital.
- 1.3.8 Operation Sealion was postponed indefinitely after the German defeat in the Battle of Britain, although other threats in the form of the Blitz and a second invasion threat (code-named Operation Shark) meant that the defensive positions were maintained. As the war progressed, tactics also changed and defences moved from static pillboxes to hidden emplacements and ambush points.
- 1.3.9 The sites at Shooters Hill, for which information already exists, may show such changes in tactics. There is known to have been a barrage balloon tether at Eaglesfield Park, and also another feature which may have been an anti-aircraft (AA) gun emplacement. The bunker in Oxleas Wood is of unknown use. Other defences along the A207 include the spigot mortar at Eltham Common and a possible gun emplacement at Oxleas Memorial Hospital. There were also other military facilities near by such as the



Woolwich Arsenal, the Royal Artillery barracks and a World War II POW camp at Woodlands Farm.

## **2 AIMS AND OBJECTIVES**

- 2.1.1 A project design for the work was compiled by Videotext Communications (2007), providing full details of the research aims and methods. A brief summary is provided here.

### **2.2 Research Framework**

- 2.2.1 The relevant research framework is covered by *An Archaeological Research Framework for the Greater Thames Estuary* (Williams and Brown 1999). Information on World War II sites throughout the southern part of the Greater London region has been assembled through two projects: the 'Defence of Britain' project, which uses field evidence to provide information mainly on the anti-invasion defences; and the Monument Protection Programme's 'Twentieth Century Fortifications in England' project, which uses documentary sources and aerial photographs to establish what was built and what survives

### **2.3 Aims and Objectives**

- 2.3.1 Within this research framework, the aim of the evaluation was to determine the extent of World War II remains in the Shooters Hill area, through investigations at the four locations of Eaglesfield Park, Oxleas Wood, Eltham Common and Oxleas Memorial Hospital.
- 2.3.2 Specifically, the archaeological evaluation was designed to determine the nature of any World War II defensive structures and their function within the defences of London's 'Stop Line Central'.

## **3 METHODS**

### **3.1 Geophysical Survey**

- 3.1.1 Prior to the excavation of evaluation trenches, a geophysical survey was carried out across the Site using a combination of resistance and magnetic survey. The survey grid was set out by Dr Henry Chapman and tied in to the Ordnance Survey grid using a Trimble real time differential GPS system.

### **3.2 Evaluation Trenches**

- 3.2.1 Thirteen trenches of varying sizes were excavated, their locations determined to target responses from the geophysical survey and to elucidate the phasing and nature of the archaeological and historical remains, both in terms of buried archaeological deposits and as standing buildings.
- 3.2.2 The trenches were excavated using a combination of machine and hand digging. All machine trenches were excavated under constant archaeological

supervision and ceased at the identification of significant archaeological remains, or at natural geology if this was encountered first. When machine excavation had ceased all trenches were cleaned by hand and archaeological deposits investigated.

- 3.2.3 At various stages during excavation the deposits were scanned by a metal detector and signals marked in order to facilitate investigation. The excavated up-cast was scanned by metal detector.
- 3.2.4 All archaeological deposits were recorded using Wessex Archaeology's *pro forma* record sheets with a unique numbering system for individual contexts. Trenches were located using a Trimble Real Time Differential GPS survey system. All archaeological features and deposits were planned at a scale of 1:20 with sections drawn at 1:10. All principal strata and features were related to the Ordnance Survey datum.
- 3.2.5 A full photographic record of the investigations and individual features was maintained, utilising colour transparencies, black and white negatives (on 35mm film) and digital images. The photographic record illustrated both the detail and general context of the archaeology revealed and the Site as a whole.
- 3.2.6 At the completion of the work, all trenches were reinstated using the excavated soil.
- 3.2.7 A unique Site code (SHL 07) was issued by the Museum of London prior to the commencement of works. The work was carried out on the 10<sup>th</sup> – 13<sup>th</sup> July 2007. The archive and all artefacts were subsequently transported to the offices of Wessex Archaeology in Salisbury where they were processed and assessed for this report.

## **4 RESULTS**

### **4.1 Introduction**

- 4.1.1 Details of individual excavated contexts and features, the full geophysical report (GSB 2007), and details of artefactual and environmental assessments, are retained in the project archive. Summaries of the excavated sequences can be found in **Appendix 1**.

### **4.2 Geophysical Survey**

- 4.2.1 Two of the four sites (Eaglesfield Park and Eltham Common) were surveyed, using magnetic and GPR surveys.
- 4.2.2 The results from Eltham Common (**Figure 2**) contained a high amount of magnetic disturbance and Trench 9 was located over the area of increased response (anomaly A), although nothing clearly archaeological was identified. The GPR results for this area were only slightly better and identified three possible areas of activity possibly related to the spigot

mortar (anomalies 1-3) although these could equally well be related to modern landscaping of the common

- 4.2.3 The magnetic results for Eaglesfield Park (**Figure 3A**) identified the Early Iron Age ditch subsequently excavated in Trenches 3 and 10 (anomaly B). The survey also identified magnetic responses from the areas of Trenches 2, 4 and 7 in which World War II remains were located, and similar anomalies may show other areas of activity. Other anomalies in the results can be put down to modern activity in the form of the pond (now play area) and the iron fence surrounding this.
- 4.2.4 Three GPR surveys were undertaken in Eaglesfield Park (**Figure 3B**), one (A) located over the area of the park shelter, which identified features originally thought to have been associated with the barrage balloon tether but subsequently revealed as being more modern. A second area (B) showed no clear features. The third area surveyed (C) found a high response level from the area of the balloon tether, with one potential anchorage point (anomaly 6), although no clear pattern can be identified.

### 4.3 Archaeological Evaluation

- 4.3.1 Nine trenches were opened at Eaglesfield Park, one in Oxleas Wood, one at Oxleas Memorial Hospital, and two at Eltham Common. The evaluation results are presented by site below.

#### *Eaglesfield Park (Trenches 1, 2, 3, 4, 5, 7, 10, 11 and 12; **Figures 1, 4-6**)*

- 4.3.2 A number of trenches were opened in Eaglesfield Park with the hope of locating the tethers for a barrage balloon and a possible anti-aircraft gun emplacement. Most of the trenches were hand dug due to proximity to trees. Several trenches contained archaeology; only Trench 5 proved blank, and Trenches 1 and 11 produced only post-war evidence. Three trenches (2, 4 and 7) contained World War II remains.

#### Prehistoric

- 4.3.3 The earliest, and quite unexpected archaeological remains comprised a ditch (306) located first in Trench 3 and subsequently picked up in Trench 10 and visible on the geophysical resistivity results as Feature B (**Figures 3A and 4**). The ditch has a north-west to south-east alignment. The original width is unknown as it continued under the north-east corner of Trench 3. Three fills were identified in Trench 3, (303), (305) and (307) (**Plate 1**), of which only the upper fill (303) contained datable material. This fill produced a large quantity of ironworking slag (62.8kg), associated with sherds of Early Iron Age pottery (see below, **Finds**).
- 4.3.4 In Trench 10 the ditch (1004) ran for 0.7m but again the width is unknown; it contained only a single fill (1003). No dateable evidence was recovered from this fill, which appeared to have formed from the erosion of the ditch sides.

#### World War II remains

- 4.3.5 The World War II remains located at Eaglesfield Park consisted of concrete plinths and an iron cable. The cable was located in Trench 4 (**Figure 5**), just below the topsoil (**Plate 2**). This was a multi-stranded iron cable extending across the trench and continuing under the north-eastern edge of the trench. It is considered to be part of a tether cable for the barrage balloon thought to have been located in this area.
- 4.3.6 Trenches 2 and 7 each contained a concrete plinth (**Figure 6**). One corner of a plinth (205) was located in Trench 2 (**Plate 4**), made from concrete consistent with a World War II date. The plinth also featured a set of iron bars set into the concrete; these are thought to be the anchoring points for a barrage balloon. The plinth was located in layer (203) which is thought to have formed part of the 1940s ground surface.
- 4.3.7 A similar feature (703) was found in Trench 7 (**Plate 3**). This, however, is likely to be the main balloon tether point, with plinth (205) acting as one of several satellite tether points. Plinth (703), within cut (707), was constructed from the same concrete material as (205) and appeared to be square or rectangular in shape. The plinth also featured a copper lightning conductor, increasing the possibility that this was the main tether/winch point for the barrage balloon.
- 4.3.8 Trench 7 also contained a linear feature (705) running approximately north-east to south-west alongside the main tether point. This feature contained a single fill (706); no firm dating evidence was recovered, but the trench did contain large amounts of concrete similar to the plinth material and is probably contemporaneous with, or slightly later than the plinth.
- 4.3.9 It was hoped that another of the satellite tethers would be located in Trench 5, but this proved not to be the case.

#### Post-war

- 4.3.10 Trenches 1, 11 and 12 contained only post-war deposits – tarmac in Trench 1, a park shelter in Trench 11, and a land drain in Trench 12.

#### *Oxleas Wood (Trench 6; **Figure 7**)*

- 4.3.11 Trench 6 was designed to explore a possible bunker or pill box that survived as a standing structure. This consisted of an L-shaped concrete structure (605) with two entrances, one facing south and the other west. This structure was covered by a series of mounds (602), (603) and (608), probably serving the joint purpose of helping to protect the main structure and also to camouflage it. When the section of Trench 6 was cleaned back to the wall of the structure, two flanged pipes were revealed, (609) and (610). It was originally thought that these pipes were used for electrics or for communications, but further investigation showed that this was unlikely, and that the pipes were more probably associated with the construction of the embankment covering the structure.
- 4.3.12 The latest additions to the structure were two brick-built walls (606 and 607) around the entrances, possibly acting as blast walls (**Front cover & Plate**

5). The date of these walls is uncertain since they were in a different material to the rest of the concrete structure, and it is possible that they were added after the initial construction. Another undatable feature was the possible remains of a cobbled surface outside the entrance to the structure.

- 4.3.13 The interior of the structure had no notable features other than a line of possible nail holes that may have been used to support a bench. These were positioned along the longer, western wall of the shelter (**Plate 6**). It is likely that each of the two entrances originally held some sort of door since there is a ventilation hole in the roof; this would not have been a necessary addition if the entrances were as they now survive. The presence of closable doors would also have provided an additional defence against shrapnel.

*Oxleas Memorial Hospital (Trench 13; **Figure 8**)*

- 4.3.14 Trench 13 was opened within the grounds of Oxleas Memorial Hospital, next to the A207 in the entrance to one of the car parks. This trench was located in order to investigate the remains of a concrete plinth.
- 4.3.15 This plinth (1301) proved to be composed of the same type of concrete as the balloon tethers located at Eaglesfield Park, and was therefore concluded to be broadly contemporaneous with the latter structures. The plinth was approximately 11.5m by 2.5m and was positioned with a good view up the A207. The only visible feature was a drain cover at the northern end of the plinth.
- 4.3.16 There is some evidence for a vertical defensive wall projecting up from the plinth, and the use of the structure is therefore unknown, although the likelihood is that it was associated with either a pillbox or perhaps an anti-aircraft gun battery.

*Eltham Common (Trenches 8 and 9; **Figure 9**)*

- 4.3.17 Two trenches were opened at Eltham Common. Trench 8 was opened in order to examine how much remained of the static spigot mortar emplacement known to be on this site. The spigot mortar (803) was shown to survive well, with the central mortar 'thimble' intact, including the main metal pin or pivot for the mortar (Clifford 2003), the plate of which was stamped with a crown and crow's foot, showing it was regarded as ordnance ([http://www.portsdown-tunnels.org.uk/invasion\\_defences/spigot\\_mortar.html](http://www.portsdown-tunnels.org.uk/invasion_defences/spigot_mortar.html)) (**Plate 9**). Most of the surrounding emplacement was also intact, including the firing pit surrounding the 'thimble', complete with corrugated tin riveting.
- 4.3.18 Two layers of demolition rubble/backfill were identified, one within the main structure of the emplacement (801) and one around the outside (802). It is possible that the latter deposit may have been associated with the construction of the emplacement rather than its abandonment. Deposit (801) was not completely excavated due to the presence of asbestos. Military gauge barbed wire was found within this deposit. Corrugated iron revetting seen surrounding the spigot mortar, and the shape of the excavated area on the plan (**Figure 9**), could suggest the presence of features within the

structure such as ammunition stores, an entrance way or crew shelters (**Plate 8**).

- 4.3.19 The emplacement had not remained completely undisturbed and a modern pipe trench was found across the southern half of the structure.
- 4.3.20 Trench 9 (**Figure 1**) was located on a set of geophysical anomalies that were thought to have been related to the spigot mortar site close by. It was hoped that the trench would reveal a possible trench network associated with the mortar site. This proved not to be the case and the trench revealed a deposit of made ground and dumps of modern material. Coincidentally, the dump contained a 1914-18 sweetheart brooch (see below, **Finds**).

*Bunker at 22-23 Ashridge Crescent (**Figure 10**)*

- 4.3.21 The bunker structure at Ashridge Crescent consists of two underground rooms spread across two back gardens. The bunker has two entrances, one in each of the gardens, one at the front and one at the rear of the structure. When viewed from the front the bunker is currently very well disguised as a garden rockery (**Plate 10**); the main entrance (**Plate 11**) could have been disguised as a shed or outhouse.
- 4.3.22 Access to the bunker was only gained into one room, through 22 Ashridge Crescent, but this room was complete with ventilation and lighting, and contained a wealth of material. This included what seem to be circuit breakers and possibly the remains of a switchboard, and there were also a number of Bakelite electrical fittings (**Plates 12-14**). A drain is also present in the stairwell. The design of this room is thought to be mirrored in the garden of No. 23. The range of fittings, particularly electrical, is more than would be expected in an ordinary air raid shelter.

## **5 FINDS**

- 5.1.1 Finds were recovered from 12 of the 13 trenches excavated (**Table 1**; no finds were recovered from Trench 13, excavated at Oxleas Memorial Hospital). Most finds came from Eaglesfield Park, with smaller quantities recovered from Oxleas Wood and Eltham Common. The overwhelming majority of the finds were of modern date (19<sup>th</sup>/20<sup>th</sup> century), and are not discussed in any detail here (full details are held in the project database).

### **5.2 Iron Age finds**

- 5.2.1 In Trench 3, however, one ditch (306) produced a group of Iron Age material from two of its fills (lower fill 304; upper fill 303). This group comprises a large quantity of ironworking slag (just under 63kg), a small collection of pottery (60 sherds), worked flint (five flakes), burnt, unworked flint (1.25kg), and undiagnostic fired clay (five pieces).

*Pottery*

- 5.2.2 Within this group, the only closely datable material is the pottery. The 60 sherds recovered are relatively small and abraded (mean sherd weight is 4g),

but are considered to provide a reliable date for the infilling of the ditch. Fabrics are sandy, with variable proportions (rare to sparse) of crushed, burnt flint and organic inclusions. One sherd is burnt. Diagnostic sherds are limited to two rims, from vessels of uncertain form, and a carinated body sherd. The latter sherd, combined with the range of fabrics, indicates a date in the Early Iron Age (*c.* 700-400 BC); this small assemblage falls within the post-Deverel-Rimbury ceramic tradition of southern England.

- 5.2.3 The Early Iron Age date is of interest given the presence of a significant quantity of ironworking slag. Several iron production sites from this period are known in England (e.g. Fitzpatrick 1995). They are mostly interpreted as bowl furnaces or slag tapping furnaces. The slag from Shooters Hill was formed in a small pit (diameter *c.* 0.4 m) which could represent a bowl furnace.

### *Slag*

#### Introduction

- 5.2.4 A sample of approximately 50% of the slag recovered from Early Iron Age ditch (306), coming from fills (303) and (304), was examined for the purposes of this assessment. The slag was examined macroscopically and tested on magnetism. In total, 755 pieces of slag and slag-like fragments, with a total weight of 35,268g, were studied. In addition, three environmental samples taken from ditch (306) were found to contain relatively high quantities of angular plate hammer scale, although some spherical slag was also seen in the flot. This report summarises the results of the assessment; the full slag assessment report is held in the project archive.
- 5.2.5 The Early Iron Age slag can macroscopically be subdivided into the categories of production slag, smithing slag and slag that can be assigned either to the production process, smithing or reheating. In addition, small pieces of iron ore and fragments of clay lining from the smelting furnace and/or smithing hearth were recognised (**Table 2**).

#### Types of slag

- 5.2.6 *Iron ore:* A few small, brownish-red fragments were identified as iron ore. The ore is slightly magnetic and therefore probably roasted, as iron ore (except for Magnetite) is not usually magnetic. The reddish colour might also point to roasted ore. The ore is possibly iron stone, an ore with a yellowish to red colour, and could come from a small deposit in the neighbourhood of Shooters Hill, or could have been brought from a more distant place; further analysis of the ore might give some clue as to its provenance.
- 5.2.7 *Production slag:* Most commonly, the iron production slag fragments found at Shooters Hill show vertical and diagonal flowing structures (PBf) and horizontal flowing structures (PFI). The slag flowed over and around, occasionally very large, pieces of wood or charcoal, which subsequently burned or charred away. In this way rectangular imprints of various sizes were formed. About 80% of the slag fragments show such imprints. At the side(s) of approximately 10% of fragments the negative imprint of the

furnace wall and/or furnace bottom can be seen and some of them have actual parts of this wall or bottom attached.

- 5.2.8 Circa 93% of the slag pieces are not magnetic, and a further 5% are partly (lightly) magnetic. More than 70% of the production slag pieces weigh less than 100 g and almost 85% weigh less than 150 g (**Figure 11A**). Such small pieces do not reveal many details except for flowing structures and charcoal imprints. Hence, it is not always possible to assign these pieces to their exact formation process. They were categorised as either PRh (production or reheating) or SRh (smithing or reheating), depending on the number of characteristic features that point to production or smithing.
- 5.2.9 *Reheating slag*: This is not easy to recognise. Its form is often planoconvex, the result of the temperature distribution in the smithing hearth. The slag solidifies in the transition zone between high and low temperatures, at c 1000-1100 °C. As reheating is actually a form of smithing, the slag from this process resembles smithing slag. However, there are some differences: the slag tends to be larger as more slag is set free during reheating than at smithing; and reheating slag is usually partly magnetic. None of the 140 slag fragments (6312 g) can be assigned to the reheating process with certainty; most could be fragments of production or smithing slag. It is notable, however, that proportionally many slag pieces are (partly lightly) magnetic, indicating that several fragments might derive from primary or secondary smithing (**Figure 11B**).
- 5.2.10 *Smithing slag*: Planoconvex slag is rare amongst the Shooters Hill slag. In total, eleven pieces of slag had this shape. Two more or less complete ones measured 44 x 48 x 22 mm and 32 x 37 x 19 mm respectively. This is quite small, as planoconvex slag usually has a diameter between 50 and 100 mm (de Rijk 2002, 48). Most of the slag pieces are not magnetic and only four of them are (partly) magnetic.
- 5.2.11 One irregular shaped slag was identified as a possible smithing slag lump (SSI). Smithing slag lumps usually are the result of the reaction between clay of the hearth lining and charcoal ash.

#### The furnace

- 5.2.12 Most of the slag found at Shooters Hill is production slag. Only a small percentage (c. 2%) is smithing slag. If we discard the (uncertain) reheating slag, the ratio of production slag to smithing slag is 43:1 by number and 60:1 by weight. It therefore can be assumed that at some stage in the Early Iron Age, the production of iron was a main activity at Shooters Hill.
- 5.2.13 The large slag fragments can be used to reconstruct the furnace type used. The slag gives the overall impression that an early kind of slagpit furnace was used. The vertical and diagonal flowing structures and the imprints of wood and charcoal are characteristic for this type of furnace.
- 5.2.14 Up to the end of the 20<sup>th</sup> century, theories concerning the early iron industry in Britain considered the small, non-tapping 'bowl' furnace to be characteristic for this period (e.g. Clough 1992, 179). Experiments with



‘bowl’ furnaces and the study of the thermodynamic requirements of the bloomery process point out that at most only a small quantity of iron (a few hundred grammes) could have been produced in this kind of furnace (Clough 1992, 182). It is therefore assumed that ‘bowl’ furnaces actually had a clay superstructure and consequently were a kind of shaft furnace.

- 5.2.15 The furnace type proposed for Shooters Hill, the slagpit furnace, consists of a pit and a clay shaft set on top of it. Prior to smelting, the slagpit is filled with wood or straw. The filling prevents the charge in the shaft, consisting of alternate layers of charcoal and iron ore, from falling into the pit. During the production process the slag flows through the voids in the filling to the bottom of the slagpit. The heat of the viscous slag chars the organic filling and the slag eventually replaces it. The imprints in the slag are made when the slag solidifies before the organic filling or charcoal is fully charred away. The slagpit furnace is well-known throughout Central and Northern Europe and also in Africa in a pre-Roman to Migration period context (Bielenin 1983, 47 ff.; Tylecote 1981, 22).
- 5.2.16 The shape and dimensions of the slagpit can vary. The slag from Shooters Hill points to a rather shallow slagpit with a diameter of 0.30-0.45m and a depth of *c.* 0.15m. The pit would have been slightly tapered to the (flat) bottom and its sides were possibly coated with clay. The internal diameter of the shaft would have been several centimetres wider than the slagpit.

#### Early iron production

- 5.2.17 In Britain, the earliest iron production furnace found, ‘bowl’ furnace F247 in Brooklands, Surrey, can be dated to the 5<sup>th</sup> century BC (Clough 1992, 180). Slag from Cannings Cross (*c.* 400-250 BC) also points to iron production; from the accessory furnaces, however, only shallow pits remained. The best example of an iron production site with furnaces was probably found in Kestor, near Chagford in Devon and is dated after 400 BC (Tylecote 1962, 195).
- 5.2.18 Ironworking, on the other hand, is known from earlier sites. Evidence for ironworking in the form of hammerscale was found at Hartshill Copse, West Berkshire, a Late Bronze Age settlement, securely dated to the 10<sup>th</sup> century BC (Collard *et al.* 2006, 112 ff.). Other sites include Hog Cliff Hill in Dorset, Boscombe Down East in Wiltshire and Down Farm, Cranborne Chase, in Dorset (Collard *et al.* 2006, 412). Their dates, however, are less secure. Contemporaneous iron production furnaces have not been found until now. The significance of the substantial amount of iron production slag found at Shooters Hill, with a date from associated pottery of *c.* 700-400 BC, therefore cannot be underestimated.
- 5.2.19 The furnace type used at Shooters Hill shows that the roots of the slagpit furnace may not lie in Poland or South Germany (Gassmann 1989, 207). Here, the eldest examples of this kind of furnace are found hitherto, dating back into the 3<sup>rd</sup> and 2<sup>nd</sup> centuries BC. The slag from Shooters Hill could proof that slagpit furnaces belong to the earliest type of iron production furnace. This furnace type possibly developed from the copper- and bronze industry.

### **5.3 Military finds**

- 5.3.1 Military remains included a 1914 – 18 sweetheart brooch/cap badge for the 6<sup>th</sup> Battalion, the City of London Regiment; this was found in a dumped context (902) around the spigot mortar emplacement at Eltham Common. The battalion was formed originally as the 2<sup>nd</sup> London Rifle Volunteer Corps in 1860 and consisted mainly of newspaper and printing employees. The title of the 6<sup>th</sup> (City of London) Battalion, the London Regiment (Refiles) was assumed in 1908. The Battalion saw action in World War I in France and Belgium; they were transferred to the Royal Engineers in 1935 as 31 Anti Aircraft Battalion ([http://www.fovantbadges.com/ad\\_sa.htm](http://www.fovantbadges.com/ad_sa.htm)).
- 5.3.2 Other finds included a belt slider from Eaglesfield Park (Trench 1 topsoil), a Royal Artillery uniform button featuring a shield with three cannons, and an Institute of Civil Engineers button, both found at Eltham Common (Trench 9 topsoil).

### **5.4 Potential and recommendations**

- 5.4.1 It is recommended that the ironworking evidence from Trench 3 is subjected to detailed metallurgical analysis and publication, in order to determine the precise technological significance of the material and its context. Details of the pottery from this trench should also be published in order to support the dating of the site.
- 5.4.2 Other finds, relating to the World War II and later deposits excavated, do not warrant any further comment; they may be discarded prior to archive deposition, although selected finds, such as the sweetheart brooch and military buttons, could be retained. Any discard policy will be agreed with the recipient Museum prior to archive deposition.

## **6 PALAEO-ENVIRONMENTAL EVIDENCE**

### **6.1 Introduction**

- 6.1.1 Three samples were taken from a dump of charcoal/slag within Early Iron Age ditch (306) in Trench 3.
- 6.1.2 The bulk samples were processed by standard flotation methods; the flot retained on a 0.5mm mesh, residues fractionated into 5.6mm, 2mm and 1mm fractions and dried. The coarse fractions (>5.6mm) were sorted, weighed and discarded. Flots were scanned under a x10 – x40 stereobinocular microscope and the presence of charred remains quantified (**Table 3**). Preliminary identifications of dominant or important taxa are noted below, following the nomenclature of Stace (1997). The residues were tested with a magnet and the presence of hammerscale noted.
- 6.1.3 The flots were around 100 to 200ml. There were high numbers of fine roots, but no modern seeds. The level of roots is indicative of pedological processes and the possibility of stratigraphic movement, reworking and/or contamination by later intrusive elements.

## **6.2 Charred plant remains**

- 6.2.1 All of the samples produced some charred cereal remains mainly of emmer wheat (*Triticum dicoccum*); from fill (303), five glume bases and one spikelet, from fill (304), seven glumes of emmer and one spikelet fork; while fill (305) produced one glume of spelt wheat (*Triticum spelta*) and a single probable glume of emmer. The sample from (304) produced three cereal grains, although all were too poorly preserved for identification.
- 6.2.2 All of the samples also produced limited evidence for weed seeds; single seeds of cleavers (*Galium aparine*) from (303), fat-hen (*Chenopodium album*) and vetches/wild pea (*Vicia/ Lathyrus* sp.) from (304) and a small grass seed from (305).
- 6.2.3 Hulled wheats are likely to have been stored on settlements in spikelet form; the grain being separated from the glumes by further processing which would have taken place as and when more clean grain was required. The glume waste is likely to have then been thrown on the hearth accounting for their presence on many prehistoric and Roman sites. As such, the finding of glumes is highly indicative of proximity to and the level of settlement.
- 6.2.4 The dominance of emmer wheat during the Iron Age is seen for sites in Kent and Essex (Stevens forthcoming; Giorgi forthcoming; Murphy 1991) at a time when spelt wheat often dominates assemblages in other parts of England. It is notable that emmer was still common in the Romano-British period, at least from samples from the Lea Valley (Ritchie forthcoming), at a time when it is largely absent from south-east London (Gray 2002).

## **6.3 Charcoal**

- 6.3.1 Charcoal was noted from the flots in the bulk samples. Most of the charcoal could be seen to be ring-porous and so most probably of oak (*Quercus* sp.). Ditch fill (304) contained most of the charcoal and probably the main dump of material.

## **6.4 Potential and recommendations**

### *Charred plant remains*

- 6.4.1 Charred plant remains can be related to settlement activity and have the potential to reveal the range of crops and how crops were generally processed. Given the low number of remains recovered such potential is limited, beyond demonstrating the cultivation of emmer. However, given that archaeobotanical information for this area is generally poor the remains have some importance.

### *Charcoal*

- 6.4.2 The charcoal has the potential to reveal the selection of wood resources for iron working, although most of the assemblage on preliminary assessment appeared to be composed of oak. Given that only a sample from a single feature is available such potential is limited.

- 6.4.3 As all identifications have been carried out in full no further work is proposed.

## **7 DISCUSSION**

### **7.1 Introduction**

- 7.1.1 The investigation of military remains from the World War I and World War II has only relatively recently become an archaeological concern and has been mainly facilitated through projects such as the Defence of Britain Project, first launched in 1995, and by the Fortress Study Group (English Heritage 2000, 2). There are several reasons behind this surge of interest in wartime archaeology. The first is the ever decreasing pool of living memory (Osborne 2004, 9), and there is a real risk of losing information (English Heritage 2000, 1).
- 7.1.2 In addition, much of the archival evidence relating to some types of structure were deliberately destroyed (Videotext Communications 2007), which means that some structures do not exist on paper. Although this was the desired effect in the 1940s for security reasons it now means that these sites now only survive in the archaeological record.
- 7.1.3 Even the physical evidence is decaying though erosion by the elements or purposeful demolition, to make way for farmland after the war and subsequently for the development of brown field sites (Foot 2006, xxxiv). This is compounded by the fact that most of the defensive structures of World War II were only meant to last 'for the duration', producing a fragmentary record (English Heritage 2000, 1).
- 7.1.4 The recording of World War II defences is therefore vital if we are to gain any understanding of the circumstances of their construction and use. It is in this context that the results of the 'Time Team' evaluation can be viewed.

### **7.2 Barrage Balloon**

- 7.2.1 The trenches at Eaglesfield Park revealed the location of one of the many barrage balloons scattered throughout London and the rest of the country to prevent low-level bombing by the German Air Force. These were fixed positions with large concrete tethers, two of which were found during the evaluation. Trench 7 revealed the location of the central tether point and Trench 2 located one of the satellite points. There would originally have been more of these satellite points around the central point to help stabilise the balloon and keep it in place.
- 7.2.2 This feature of the landscape would benefit the local civilians and also the military - by stopping the Luftwaffe making low level bombing runs the balloons reduced the accuracy of the German bombs, making targets harder to hit. It is also a feature that would dominate the landscape when deployed.
- 7.2.3 No evidence was found for the possible anti-aircraft gun emplacement thought to have existed at Eaglesfield Park.

### **7.3 Oxleas Wood**

- 7.3.1 The structure in Oxleas Wood was originally thought to be a bunker or pill box associated with the defences of Stop Line Central. This turned out not to be the case once the structure had been cleared. The flanged pipes, originally thought to have been used for electrics or communications in a bunker structure, in fact appeared to be structural.
- 7.3.2 There is also little evidence for the structure being a pill box, since it was obvious that there were no loopholes present, which would have been a key feature of the structure's use as a gun emplacement. Though the basic L shape has been used in pill box design, for example type 14a (Osborne 2004, 262, 270), the structure in Oxleas Wood not only lacks loopholes but also has too many entrances and in the wrong locations.
- 7.3.3 An alternative function for the structure could have been as an air raid shelter. With no obvious offensive capability it must have served as a local defence. This is supported by the evidence of a possible bench as an internal fixture along the western wall of the structure. The possible remains of a cobbled surface also support this, suggesting that it was used regularly.
- 7.3.4 The location of a Heavy Anti-Aircraft battery (HAA) at Eltham at NGR 543800 174200 (Dobson 2001, 573) would also support the interpretation as a shelter. The proximity of the battery to this location would have led to increased shelling during a bombing raid, creating a lot of shrapnel and falling debris and as such a shelter in this location would perhaps have been necessary.

### **7.4 Oxleas Memorial Hospital**

- 7.4.1 Remains uncovered at Oxleas Memorial Hospital consisted of a large, solid concrete platform. The use of the structure is uncertain though it was suggested that it may have been an anti-tank gun emplacement. This suggestion is based on the sheer size of the structure, which is longer than a standard type 28 pill box (roughly 6m square; ([http://en.wikipedia.org/wiki/British\\_hardened\\_field\\_defences\\_of\\_World\\_War\\_II](http://en.wikipedia.org/wiki/British_hardened_field_defences_of_World_War_II))). If this was originally an anti-tank emplacement it is possible that the shield wall was removed shortly after the war to allow for redevelopment.
- 7.4.2 An example of the remains of a pill box can be seen on the exterior wall of the Bull Hotel further up the A207 on the opposite side of the road about 66 yards away (**Figure 1 and 8, Plate 7**). The pub wall shows a scar where a pill box was built to help defend the crest of the hill. This was probable pulled down shortly after the war.
- 7.4.3 Whether it was designed for standard machine guns or an anti-tank gun, the position has a clear view up the A207 (at that time one of the main roads into London) to the crest of the hill and would have provided an ideal firing position. This, combined with the pill box at the Bull Hotel, located further

up the hill, would have created an ambush at the crest of the hill, in which enemy units would have been caught in cross fire from the two positions.

## **7.5 Spigot Mortar**

- 7.5.1 The emplacement located in Eltham Common was identified as a static spigot mortar, based on other surviving examples such as those at Wendens Ambo, Essex (Osborne 2004, 80) and Elvetham Heath near Fleet, Hampshire ([http://en.wikipedia.org/wiki/Image:Spigot\\_mortar\\_emplacement%2C\\_Elvetham\\_Heath.JPG](http://en.wikipedia.org/wiki/Image:Spigot_mortar_emplacement%2C_Elvetham_Heath.JPG)).
- 7.5.2 The form of these spigot mortars appears to be fairly uniform although there is some variation. The basic description of these emplacements is as an “unroofed emplacement, often concrete but sometimes a revetted earthwork, with a central concrete pedestal (or ‘thimble’) for the fire of the spigot mortar (Blacker Bombard) anti tank and anti personal weapon used predominantly by the Home Guard” (Foot 2006, 18).
- 7.5.3 This fits well with the physical remains at Eltham Common, although the latter example appears to be unique since it features a 13-sided ‘thimble’ (Osborne 2004, 263). Much of the emplacement at Eltham Common still survives, including iron revetting, from possible ammunition stores.
- 7.5.4 Again, the location of the mortar emplacement fits well into the defensive landscape with a clear field of vision up the A207. The position is on the downslope of the hill, making the position hard to identify for oncoming armour. The spigot mortar was not produced until 1941 (Osborne 2004, 79), and as such this is not likely to have been one of the original defences put in place after Dunkirk, although it does show the presence of a continued threat and is evidence of the continuing efforts to counter a German invasion.

## **7.6 22-23 Ashridge Crescent**

- 7.6.1 One of the more intriguing discoveries of the evaluation was the location of an underground bunker located in the back gardens of 22 and 23 Ashridge Crescent. However, the bunker does not conform to any known examples.
- 7.6.2 The bunker is located at the foot of the gardens and from the front is well disguised as a rockery in both gardens. The main entrance to the bunker appears to be in located in the garden of number 23 and looks as though it could have been disguised as a shed or outhouse.
- 7.6.3 The one room examined, at No. 22, contained a range of electrical equipment, more than would be expected in a standard air raid shelter – these included circuit breakers, the remains of a possible switchboard, and a number of Bakelite fittings.
- 7.6.4 If this was not an air raid shelter, an alternative suggestion is that this bunker might represent part of the final stage of the anti-invasion defences, a British Auxiliary unit site, designed as a resistance movement against the German

invaders (English Heritage 2000, 12). These units comprised small groups of men specially trained and heavily armed with orders to carry out a guerrilla war against the occupying forces (Osborne 2004, 88). The units were based in underground operational bases (OBs), which were usually hidden in woods or rural areas. They featured a main entrance and also an escape route (Osborne 2004, 88). As well as the OBs there were also radio communication facilities known as zero stations, which were used for communication between units and the HQ (Osborne 2004, 88).

7.6.5 The form that these structures took is essentially the same as an underground Nissen hut ([http://www.subbrit.org.uk/sb-sites/sites/h/hollingbourne\\_zero\\_station/index.shtml](http://www.subbrit.org.uk/sb-sites/sites/h/hollingbourne_zero_station/index.shtml)). Although this does not follow the design found at Ashridge Crescent, most of the OBs and zero stations that have been found so far have been in rural locations (Osborne 2004, 88). This being the case, it is possible that urban examples took other forms.

7.6.6 It is also very unlikely that a major city like London would not have several of these units located in various places across the city. The location of the bunker in Ashridge Crescent would have been ideal, being close to main roads, but also quiet enough to escape notice from the enemy. The possible escape route would have been facing gardens with a nearby recreation ground.

## 7.7 Conclusions

7.7.1 All the evidence uncovered during the evaluation points to a focal point in World War II military activity and elements of civilian defence. The shelter in Oxleas Wood, and the barrage balloon tether nearby in Eaglesfield Park, suggest that Shooters Hill was an area that experienced a lot of activity during the blitz.

7.7.2 The military elements on Shooters Hill all point to a strategy of defence against what was thought to be a very imminent attack from mainland Europe. The A207 would have been one of the main routes into London for any invading force and the defences at Shooter Hill represent a response to this threat. The barrage balloon, spigot mortar and the possible anti-tank gun emplacement would have formed part of Stop Line Central. Each position is located in a prime firing location and hidden from view to allow a surprise attack. These positions would probably have been close to a series of anti-tank barriers in the road, now gone but known about from other stop line positions. The general aim would have been to try to force the enemy off the main roads on to unknown ground where they would become easier targets for ground troops.

7.7.3 Shooters Hill also has possible remains of what would have proved to have been the last line of defence for Britain in the event of a successful occupation by the Germans. If the structure in Ashridge Crescent was an Auxiliary Unit OB or Zero Station, and it must be admitted that the evidence for this is slim, this could be the most significant discovery made during the evaluation.

## **8 RECOMMENDATIONS**

- 8.1.1 A short summary of the overall results of the evaluation will be submitted to the *Transactions of the London & Middlesex Archaeological Society (LAMAS)* for inclusion in the annual round-up of archaeology for 2007, following the submission of this report.
- 8.1.2 The Early Iron Age remains from Eaglesfield Park warrant further analysis and publication. Metallurgical analysis of the ironworking slag will be carried out by David Dungworth (English Heritage), who will prepare a technical report on the results of the analysis, and will discuss these results in the context of other evidence for ironworking at this early date. Details of the archaeological context of the ironworking evidence will be provided (a short text summary accompanied by a location plan and one ditch section drawing). The dating evidence for the ditch (pottery) will be summarised, using evidence gathered as part of this assessment stage, and one or two diagnostic sherds will be illustrated. The report will be submitted to *LAMAS*.
- 8.1.3 The evidence for World War II activity will be passed to the Lie of the Land project, for incorporation in the overall results of that project.

## **9 ARCHIVE**

- 9.1.1 The project archive, which includes all finds, written, drawn and photographic records relating directly to the investigations undertaken, is currently held at the offices of Wessex Archaeology under the site code SHL07 and Wessex Archaeology project code 65308. The archive will in due course be handed over to the Museum of London; relevant details will be copied to the Lie of the Land project.



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**Table 1: All finds by material type and trench (number / weight in grammes)**

|                                                                                      | EAGLESFIELD PARK |         |             |        |       |         |       |        |         |      | OX.<br>WOOD | ELTHAM<br>COMMON |             |  |
|--------------------------------------------------------------------------------------|------------------|---------|-------------|--------|-------|---------|-------|--------|---------|------|-------------|------------------|-------------|--|
| Material                                                                             | Tr 1             | Tr 2    | Tr 3        | Tr 4   | Tr 5  | Tr 7    | Tr 10 | Tr 11  | Tr 12   | Tr 6 | Tr 8        | Tr 9             | TOTAL       |  |
| Pottery                                                                              | 3/13             | 8/29    | 62/247      | 4/18   | 5/13  | 13/46   | -     | 20/173 | 11/281  | -    | 12/120      | 13/507           | 151/1447    |  |
| Ceramic Building Mat.                                                                | 2/22             | 12/2948 | 2/38        | 5/75   | 7/505 | 18/3898 | -     | 6/273  | 8/1046  | 1/26 | 3/90        | -                | 64/8921     |  |
| Fired Clay                                                                           | 1/7              | -       | 5/55        | -      | -     | -       | -     | -      | -       | -    | -           | -                | 6/62        |  |
| Clay Pipe                                                                            | -                | 4/9     | 3/4         | -      | 2/2   | 2/6     | -     | 1/3    | -       | 1/10 | 1/1         | 5/17             | 19/52       |  |
| Glass                                                                                | 5/26             | 21/210  | 1/3         | 27/137 | 2/7   | 25/270  | -     | 19/400 | -       | 1/52 | 14/814      | 3/97             | 118/2016    |  |
| Stone                                                                                | -                | 1/1     | -           | -      | -     | 1/14    | -     | -      | -       | -    | -           | -                | 2/15        |  |
| Flint                                                                                | -                | -       | 5/43        | -      | -     | -       | -     | -      | -       | -    | -           | -                | 5/43        |  |
| Burnt Flint                                                                          | -                | -       | 68/1275     | -      | -     | -       | 1/34  | 1/9    | 6/98    | -    | -           | -                | 76/1416     |  |
| Slag                                                                                 | 3/27             | 2/4     | 1129/62,755 | 3/26   | 1/1   | -       | 3/120 | 1/207  | 18/3274 | -    | -           | -                | 1160/66,414 |  |
| Metalwork<br><i>Copper Alloy</i><br><i>Iron</i><br><i>Lead</i><br><i>Other Metal</i> | 3                | 11      | 4           | 34     | 15    | 11      | -     | 11     | 7       | -    | 7           | 15               | 118         |  |
|                                                                                      | 2                | 2       | 3           | 2      | 1     | 2       | -     | 2      | 1       | -    | 3           | 6                | 24          |  |
|                                                                                      | 1                | 5       | -           | 32     | 12    | 5       | -     | 9      | 6       | -    | 4           | 3                | 77          |  |
|                                                                                      | -                | 4       | 1           | -      | 2     | 2       | -     | -      | -       | -    | -           | 3                | 12          |  |
|                                                                                      | -                | -       | -           | -      | -     | 2       | -     | -      | -       | -    | -           | 3                | 5           |  |
| Animal Bone                                                                          | -                | -       | -           | 1/3    | 1/3   | -       | -     | -      | -       | -    | 6/139       | 1/10             | 9/155       |  |

**Table 2: Slag from Iron Age ditch (306) per category by number (n) and weight (g) in grammes (excluding hammerscale from environmental samples)**

| Type         | n          | g             | n%           | g%           |
|--------------|------------|---------------|--------------|--------------|
| Ore          | 30         | 90            | 4,0          | 0,2          |
| PBf          | 518        | 26,952        | 68,6         | 76,4         |
| PFl          | 2          | 269           | 0,3          | 0,8          |
| PRh          | 121        | 5,277         | 16,0         | 15,0         |
| SRh          | 19         | 1,035         | 2,5          | 2,9          |
| SHb          | 11         | 408           | 1,5          | 1,2          |
| SSl          | 1          | 44            | 0,1          | 0,1          |
| Hw           | 53         | 1,193         | 7,0          | 3,4          |
| <i>total</i> | <i>755</i> | <i>35,268</i> | <i>100,0</i> | <i>100,0</i> |

PBf: Production Bowl furnace. PRh: Production or Reheating slag. SRh: Smithing or Reheating slag. SHb: Smithing Hearth bottom. Hw: Clay lining from furnace or hearth. Pfl: Production slag with horizontal flowing structures. SSl: Smithing Slag lumps.

**Table 3: Assessment of the charred plant remains and charcoal**

| Feature type/no | Context | Sample | size<br>litres | flot<br>ml | size          | Grain | Chaff | seeds<br>charred | Charcoal<br>4/2 mm | Other | Residue<br>Charcoal<br>>5.6mm |
|-----------------|---------|--------|----------------|------------|---------------|-------|-------|------------------|--------------------|-------|-------------------------------|
| Trench 3        |         |        |                |            |               |       |       |                  |                    |       |                               |
| Ditch 306       | 303     | 1      | 10             | 200        | <sup>60</sup> | -     | B     | C                | 3/15ml             | -     | -                             |
|                 | 304     | 2      | 15             | 150        | <sup>50</sup> | C     | B     | C                | 8/20ml             | -     | -                             |
|                 | 305     | 3      | 10             | 80         | <sup>40</sup> | -     | C     | C                | 4/4ml              | -     | -                             |

KEY: A\*\* = exceptional, A\* = 30+ items, A = ≥10 items, B = 9 - 5 items, C = < 5 items. NOTE: <sup>1</sup>flot is total, but flot in superscript = % of rooty material.

## APPENDIX 1: Trench Summaries

KEY: bgl – below ground level. nfe – not fully excavated. n/ex – not excavated

|                            |             |                                                                                                                                                                                         |                     |                   |
|----------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------|
| Trench 1                   |             |                                                                                                                                                                                         | Type:               | Hand Dug Test Pit |
| Dimensions: 1.50m x 1.50 m |             | Max. depth: 0.45m                                                                                                                                                                       | Ground level: m aOD |                   |
| context                    | Description |                                                                                                                                                                                         |                     | depth (bgl)       |
| 101                        | Topsoil     | Mid brown silty sand current topsoil and turf.                                                                                                                                          |                     | 0-0.11m           |
| 102                        | Layer       | Dark grey-black sandy silt with abundant fragments of tarmac and clinker. Loose compaction. A dump of modern material. Common gravels, <70mm, poorly sorted. Some root activity present |                     | 0.14-0.28m        |
| 103                        | Layer       | Mid orange, sandy silt with common gravels, <70mm, subrounded, poorly sorted. This layer is likely to be the 1940s surface level.                                                       |                     | 0.11-0.14m        |
| 104                        | Cut         | Irregular cut filled with (102). Is most likely associated with general excavation works and landscaping than to be an actual feature.                                                  |                     | 0.44m deep        |
| 105                        | Layer       | Natural – orange sandy gravels.                                                                                                                                                         |                     | 0.44m +           |

| Trench 2                  |             |                                                                                                                                            | Type: | Machine Excavated   |            |
|---------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------|------------|
| Dimensions: 1.50m x 1.50m |             | Max. depth: 0.54m                                                                                                                          |       | Ground level: m aOD |            |
| context                   | Description |                                                                                                                                            |       | depth (bgl)         |            |
| 201                       | Topsoil     | Mid brown silty sand current topsoil and turf.                                                                                             |       |                     | 0-0.10m    |
| 202                       | Layer       | Rubble layer just below topsoil. Mid-light brown, silty sand. Common gravels, <40mm subrounded. Contains modern materials, CBM, glass etc. |       |                     | 0.10-0.36m |
| 203                       | Layer       | Mid orange, sandy silt with common gravels, <50mm, subrounded, poorly sorted. This layer is likely to be the 1940s surface level.          |       |                     | 0.36-0.54m |
| 204                       | Layer       | Natural – orange sandy gravels with patches of loose white sand.                                                                           |       |                     | 0.54m +    |
| 205                       | Structure   | Barrage Balloon tether point – concrete with iron fittings.                                                                                |       |                     | 0.54m      |
| 206                       | Cut         | Cut for [205]. Arbitrary number allocated.                                                                                                 |       |                     | 0.54m      |

| Trench 3                  |             |                                                                                                                                                                                                             | Type: | Hand dug test pit   |            |
|---------------------------|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------|------------|
| Dimensions: 1.60m x 1.60m |             | Max. depth: 0.79m                                                                                                                                                                                           |       | Ground level: m aOD |            |
| context                   | description |                                                                                                                                                                                                             |       | depth (bgl)         |            |
| 301                       | Topsoil     | Mid brown silty sand current topsoil and turf.                                                                                                                                                              |       |                     | 0-0.13m    |
| 302                       | Layer       | Rubble layer just below topsoil. Mid-light brown, silty sand. Common gravels, <40mm subrounded. Contains modern materials, CBM, glass etc.                                                                  |       |                     | 0.13-0.42m |
| 303                       | Fill        | Upper fill of Late Bronze Age / Early Iron Age ditch. Dark grey-brown, silty sand. Rare gravels, subrounded, <70mm. Contains pottery, slag and burnt flint suggesting industrial activity on a large scale. |       |                     | 0.42-0.68m |
| 304                       | Fill        | See (303) – separate number allocated for sampling purpose to assess possibility of dump of material versus <i>in situ</i> burning/activity.                                                                |       |                     | N/A        |
| 305                       | Fill        | Lower fill of Late Bronze Age / Early Iron Age ditch. Dark reddish brown, silty clay.                                                                                                                       |       |                     | 0.68-0.73m |
| 306                       | Cut         | Cut of Late Bronze Age / Early Iron Age ditch. Same as 1004. Shallow ditch with rounded flat base and concave sides                                                                                         |       |                     | 0.79m      |
| 307                       | Fill        | Primary fill of Late Bronze Age / Early Iron Age ditch. Orange-yellow, sandy clay.                                                                                                                          |       |                     | 0.73-0.79m |
| 308                       | Natural     | Natural – orange sandy gravels.                                                                                                                                                                             |       |                     | 0.42m +    |

| Trench 4                  |             |                                                                                                                                            | Type: | Hand dug test pit   |            |
|---------------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------|------------|
| Dimensions: 1.60m x 1.60m |             | Max. depth: 0.26m                                                                                                                          |       | Ground level: m aOD |            |
| context                   | Description |                                                                                                                                            |       | depth (bgl)         |            |
| 401                       | Topsoil     | Mid brown silty sand current topsoil and turf.                                                                                             |       |                     | 0-0.13m    |
| 402                       | Layer       | Light grey-brown, sandy silt. Loose compaction. Abundant gravels <60mm subrounded. Contains residual modern debris, glass, CBM, iron, etc. |       |                     | 0.13-0.26m |
| 403                       | Laver       | Natural – orange sandy gravels.                                                                                                            |       |                     | 0.26m +    |

| Trench 5                  |             |                                                                                                                                                          | Type: | Hand dug test pit   |            |
|---------------------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------|------------|
| Dimensions: 1.60m x 1.60m |             | Max. depth: 0.34m                                                                                                                                        |       | Ground level: m aOD |            |
| context                   | Description |                                                                                                                                                          |       | depth (bgl)         |            |
| 501                       | Topsoil     | Mid brown silty sand current topsoil and turf.                                                                                                           |       |                     | 0-0.14m    |
| 502                       | Subsoil     | Slightly sandy silt, grey-brown. Medium to loose compaction. Rare gravels <30mm subrounded. Some root disturbance.                                       |       |                     | 0.14-0.19m |
| 503                       | Layer       | Mid-light grey-brown, silty sand. Heavily compacted. Abundant gravels <70mm subrounded, randomly sorted. Contains modern material, CBM, iron, glass etc. |       |                     | 0.19-0.32m |
| 504                       | Layer       | Interface layer just above natural – a mix of (503) & (505).                                                                                             |       |                     | 0.32-0.36m |
| 505                       | Laver       | Natural – orange sandy gravels.                                                                                                                          |       |                     | 0.36m +    |

| Trench 6              |             |                                                                                 | Type: | Machine/Hand cleared |
|-----------------------|-------------|---------------------------------------------------------------------------------|-------|----------------------|
| Dimensions: 2.2m x 2m |             | Max. depth: m                                                                   |       | Ground level: m aOD  |
| context               | Description |                                                                                 |       | depth (bgl)          |
| 601                   | Topsoil     | Mid brown silty sand current topsoil and turf.                                  |       |                      |
| 602                   | Layer       | Material built up against sides of shelter.                                     |       |                      |
| 603                   | Layer       | Material built up against sides of shelter.                                     |       |                      |
| 604                   | Layer       | Natural – orange sandy gravels.                                                 |       |                      |
| 605                   | Structure   | Air Raid shelter.                                                               |       |                      |
| 606                   | Structure   | Later brick built blast wall at front entrance to shelter.                      |       |                      |
| 607                   | Structure   | Later brick built blast wall at side entrance to shelter.                       |       |                      |
| 608                   | Layer       | Mound over shelter.                                                             |       |                      |
| 609                   | Structure   | Flanged pipe; thought to be associated with construction of mound over shelter. |       |                      |
| 610                   | Structure   | Flanged pipe; thought to be associated with construction of mound over shelter. |       |                      |

| Trench 7            |             |                                                                                                                                                      | Type:               | Hand dug test pit |
|---------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------|
| Dimensions: 2m x 2m |             | Max. depth: 0.69m                                                                                                                                    | Ground level: m aOD |                   |
| context             | description |                                                                                                                                                      |                     | depth (bgl)       |
| 701                 | Topsoil     | Mid brown silty sand current topsoil and turf.                                                                                                       |                     | 0-0.13m           |
| 702                 | Layer       | Mid orange, sandy silt with common gravels, <60mm, subrounded, poorly sorted. This layer is likely to be the 1940s surface level.                    |                     | 0.13-0.24m        |
| 703                 | Structure   | Barrage balloon anchoring point/winching point – surrounded by at least 14 tethering points (like [205]). Still has copper lightning conductor rods. |                     | 0.64m             |
| 704                 | Fill        | Backfill around (703).                                                                                                                               |                     | 0.22-0.44m        |
| 705                 | Cut         | Cut of possible trench.                                                                                                                              |                     | 0.68m             |

|     |              |                                 |            |
|-----|--------------|---------------------------------|------------|
| 706 | <i>Fill</i>  | Fill of possible trench.        | 0.45-0.68m |
| 707 | <i>Cut</i>   | Cut of (703).                   | 0.65m      |
| 708 | <i>Layer</i> | Natural – orange sandy gravels. | 0.24m +    |

| Trench 8              |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Type:               | Hand-cleared |
|-----------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|--------------|
| Dimensions: 5m x 3.5m |             | Max. depth:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Ground level: m aOD |              |
| context               | description |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                     | depth (bgl)  |
| 801                   | Fill        | Backfilled rubble within spigot mortar emplacement – contains asbestos so not completely excavated.                                                                                                                                                                                                                                                                                                                                                                                                                 |                     |              |
| 802                   | Fill        | Soil and demolition rubble built up around spigot mortar – ground surface and above.                                                                                                                                                                                                                                                                                                                                                                                                                                |                     |              |
| 803                   | Structure   | Spigot Mortar Emplacement – Corrugated tin sheet sides joined together by rivets, held upright by angled iron supports. Concrete base poured after supports and sheets were put in place. Spigot mortar plinth in centre is concrete with steel mesh reinforcing. Stainless steel spigot in-situ on top of plinth. A possible munitions store area lies on the western side (brick lined with tin missing). Entrance lies on the north side, tin lined with a concrete base sloping slightly downhill to the north. |                     |              |
| 804                   | Cut         | Cut of modern pipe trench.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |              |
| 805                   | Fill        | Fill of modern pipe trench.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                     |              |

| Trench 9                |             |                                                                                                                                                                                                                                                     | Type: | Machine Excavated   |         |
|-------------------------|-------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------|---------|
| Dimensions: 15.25m x 2m |             | Max. depth: 0.67m                                                                                                                                                                                                                                   |       | Ground level: m aOD |         |
| context                 | description |                                                                                                                                                                                                                                                     |       | depth (bgl)         |         |
| 901                     | Topsoil     | Mid brown silty sand current topsoil and turf.                                                                                                                                                                                                      |       |                     | 0-0.30m |
| 902                     | Layer       | Made ground – Mid-dark brown, silty sand, medium to loose compaction. Mix of topsoil derived material and anthropogenic dump material i.e. contains modern rubbish including CBM, iron <i>etc.</i> Lowest level of excavation; natural not reached. |       |                     | 0.30m + |

| Trench 10                |             |                                                                                                    | Type:               | Hand dug test pit |
|--------------------------|-------------|----------------------------------------------------------------------------------------------------|---------------------|-------------------|
| Dimensions: 4.5m x 2.25m |             | Max. depth:m                                                                                       | Ground level: m aOD |                   |
| context                  | Description |                                                                                                    |                     | depth (bgl)       |
| 1001                     | Topsoil     | Mid brown silty sand current topsoil and turf.                                                     |                     | 0-0.11m           |
| 1002                     | Layer       | Mid orange-grey, sandy silt with flint pebbles.                                                    |                     | 0.11-.036m        |
| 1003                     | Fill        | Fill of ditch. Mid-brown yellow, silty clay with charcoal flecks. Rare gravels, <40mm, subrounded. |                     | 0.36-0.54m        |
| 1004                     | Cut         | Cut of ditch terminus, same ditch as 306.                                                          |                     | 0.54m             |
| 1005                     | Laver       | Natural.                                                                                           |                     | 0.36m +           |

| Trench 11           |             |                                                                                                                                 | Type:               | Hand dug test pit |            |
|---------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------|-------------------|------------|
| Dimensions: 1m x 1m |             | Max. depth: m                                                                                                                   | Ground level: m aOD |                   |            |
| context             | Description |                                                                                                                                 |                     | depth (bgl)       |            |
| 1101                | Topsoil     | Mid brown silty sand current topsoil and turf.                                                                                  |                     |                   | 0-0.07m    |
| 1102                | Subsoil     | Mixed mid brown-grey silty sand. Contains sparse gravels, <40mm, subrounded. Minor rooting extends through from overlying 1101. |                     |                   | 0.07-0.29m |

|      |                  |                                                                                                                                                       |            |
|------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| 1103 | <i>Structure</i> | Structure of park shelter (not air raid shelter). Brick structure plus part of floor or foundation layer.                                             | 0.11m      |
| 1104 | <i>Layer</i>     | Black, silty clay charcoal rich layer found in E part of trench below 1102. Possible associated with <i>in-situ</i> burning or demolition of shelter. | 0.29-0.36m |
| 1105 | <i>Layer</i>     | Grey-black, silty clay layer found below 1104. Contains some CBM. Likely to be associated with park shelter.                                          | 0.36-0.46m |
| 1106 | <i>Cut</i>       | Cut of posthole – possible associated with park shelter.                                                                                              | 0.58m      |
| 1107 | <i>Fill</i>      | Fill of posthole. Grey-black, silty clay, medium compaction. Similar to 1105 so may be part of same deposition event.                                 | 0.46-0.58m |
| 1108 | <i>Layer</i>     | Lowest excavated layer. Mid yellow grey layer with black staining, clayey.                                                                            | 0.46m +    |

|                            |                    |                                                                                                                                  |                            |                    |
|----------------------------|--------------------|----------------------------------------------------------------------------------------------------------------------------------|----------------------------|--------------------|
| <b>Trench 12</b>           |                    |                                                                                                                                  | <b>Type:</b>               | Hand dug test pit  |
| <b>Dimensions:</b> 2m x 2m |                    | <b>Max. depth:</b> m                                                                                                             | <b>Ground level:</b> m aOD |                    |
| <b>context</b>             | <b>description</b> |                                                                                                                                  |                            | <b>depth (bgl)</b> |
| 1201                       | <i>Topsoil</i>     | Mid brown silty sand topsoil and turf.                                                                                           |                            | 0-0.14m            |
| 1202                       | <i>Fill</i>        | Dark grey, silty sand with common gravels, <40mm, subrounded. Contains modern debris. Contains ceramic pipe running roughly E-W. |                            | 0.14-0.34m         |
| 1203                       | <i>Layer</i>       | Mid orange-grey silty sand with common gravels, <60mm, subrounded.                                                               |                            | 0.34-0.45m         |
| 1204                       | <i>Layer</i>       | Natural – mid orange sand with gravels.                                                                                          |                            | 0.45m +            |
| 1205                       | <i>Cut</i>         | Cut of land drain – arbitrary number allocated in absence of obvious cut. Filled with 1202.                                      |                            | N/A                |

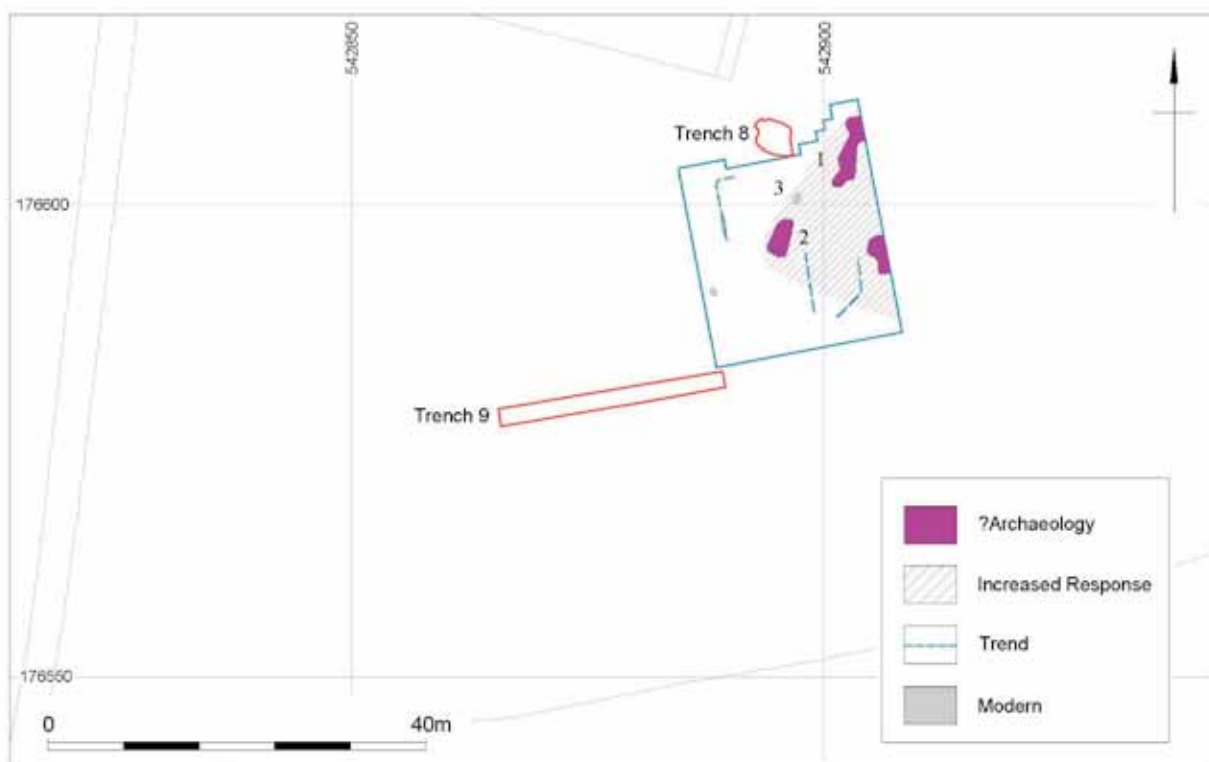
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|-------------------------------|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------|
| <b>Trench 13</b>              |                    |                                                                                                                                                                                                                                                  | <b>Type:</b>               | Hand-cleared extant remains |
| <b>Dimensions:</b> 11.5m x 3m |                    | <b>Max. depth:</b> m                                                                                                                                                                                                                             | <b>Ground level:</b> m aOD |                             |
| <b>context</b>                | <b>description</b> |                                                                                                                                                                                                                                                  |                            | <b>depth (bgl)</b>          |
| 1301                          | <i>Structure</i>   | Extant remains of concrete plinth located at the entrance to the hospital. Believed to be either a shelter or a pill box. More likely the former as there is evidence of a pill box having been directly across the road on the side of the pub. |                            | N/A                         |







A. Ground Penetrating Radar Survey



B. Resistivity Survey

 Evaluation trench

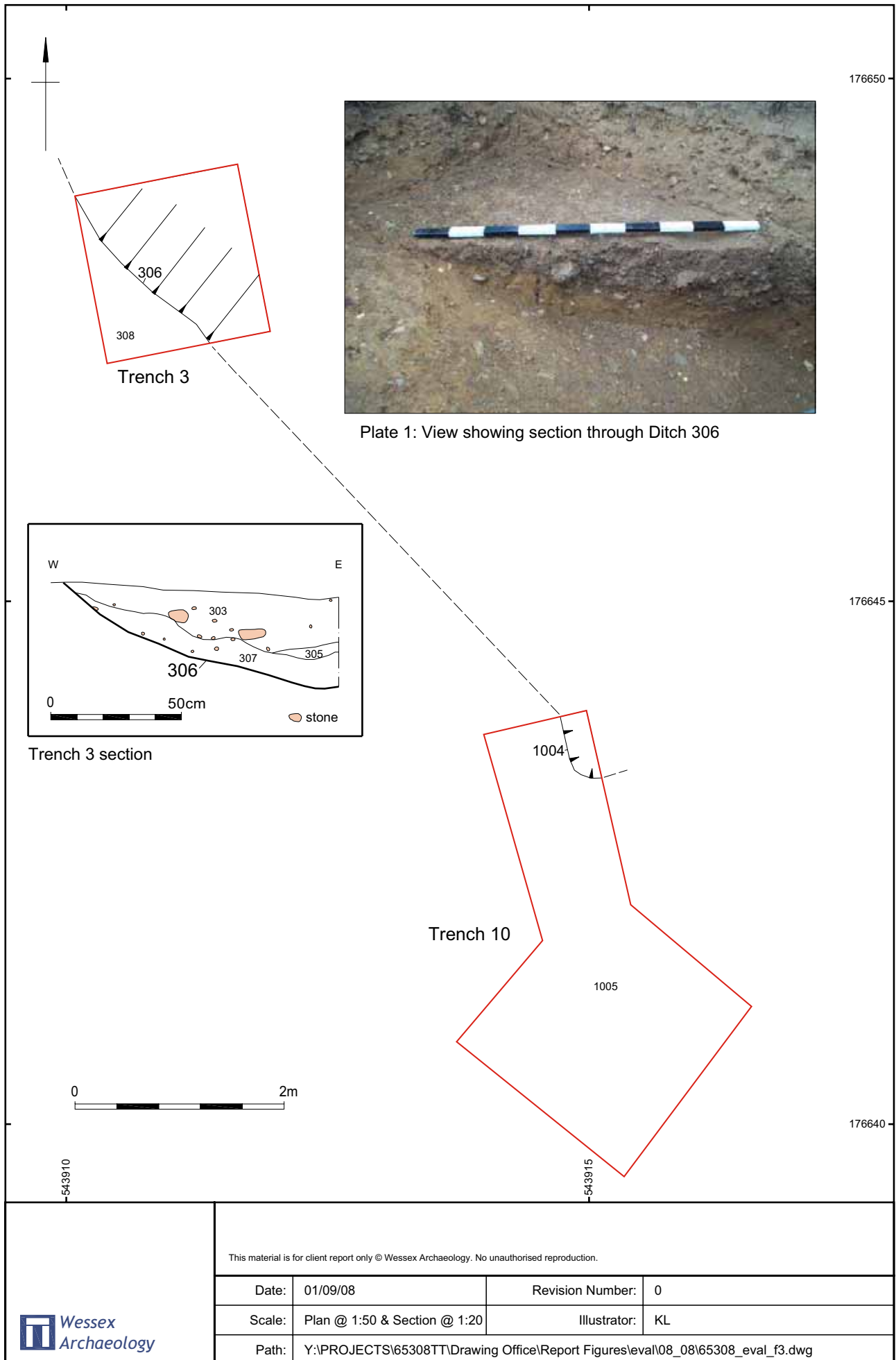
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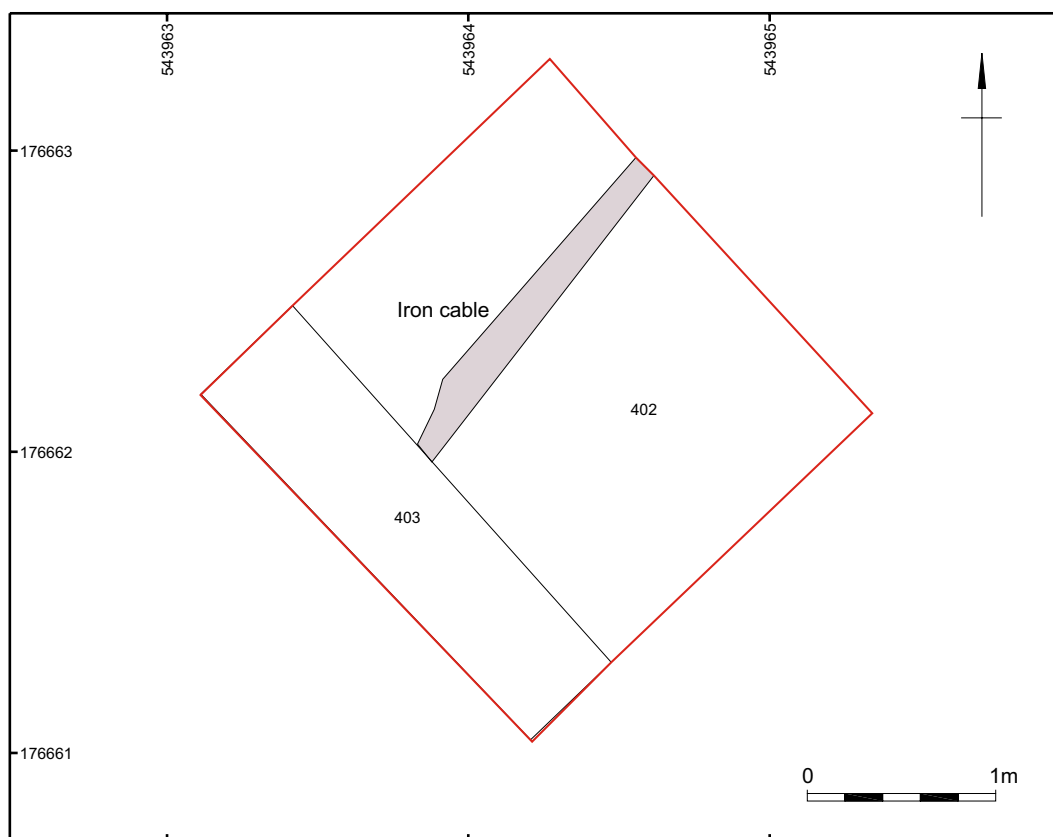






Trenches 3 and 10: plan and photograph

Figure 4



Trench 4 plan

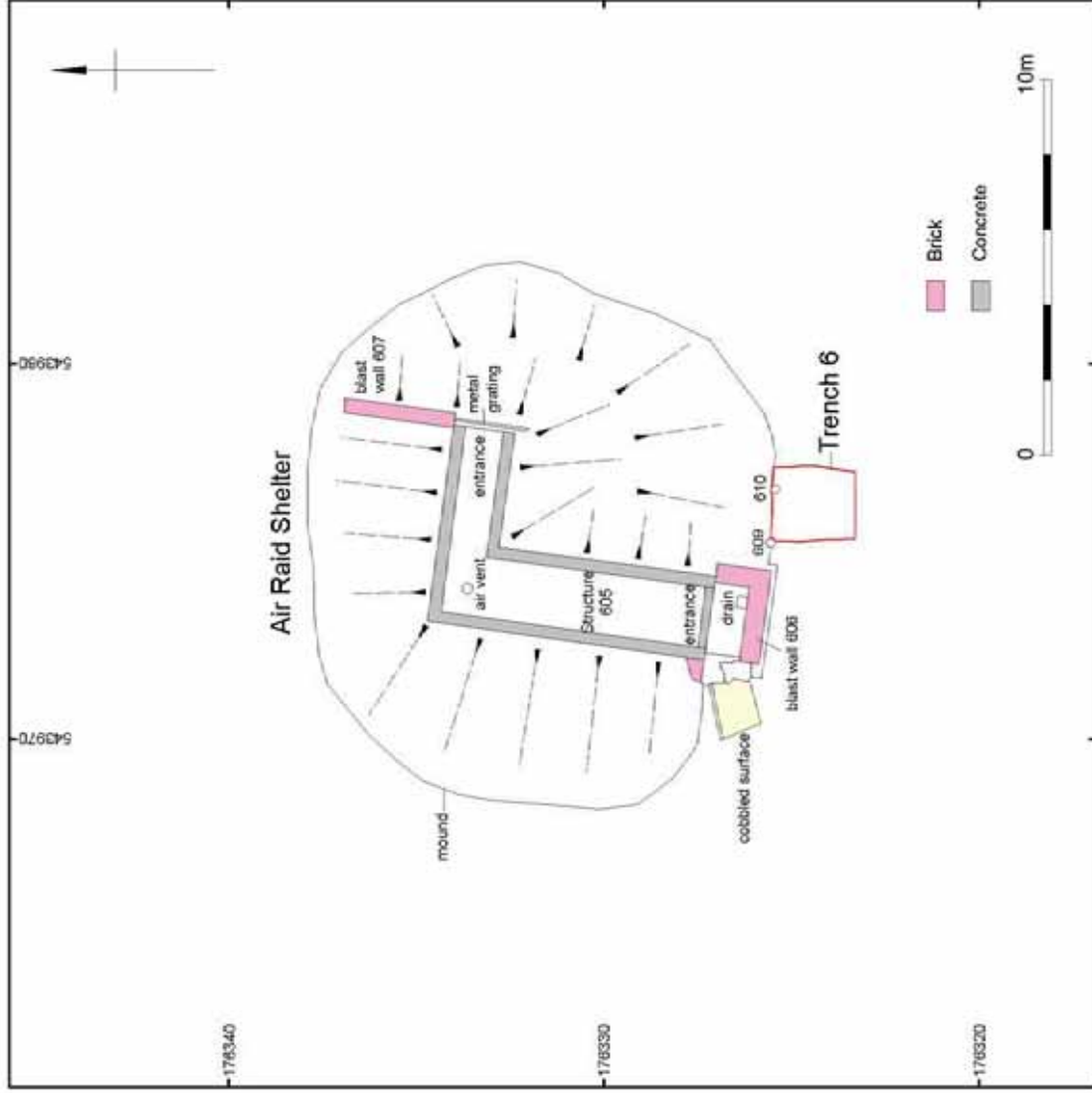


Plate 2: View showing location of iron cable

|                                                                                     |                                                                                             |                                                                                |                    |
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Trenches 2, 5 and 7: Plan and photographs



Trench 6 and Air Raid Shelter plan

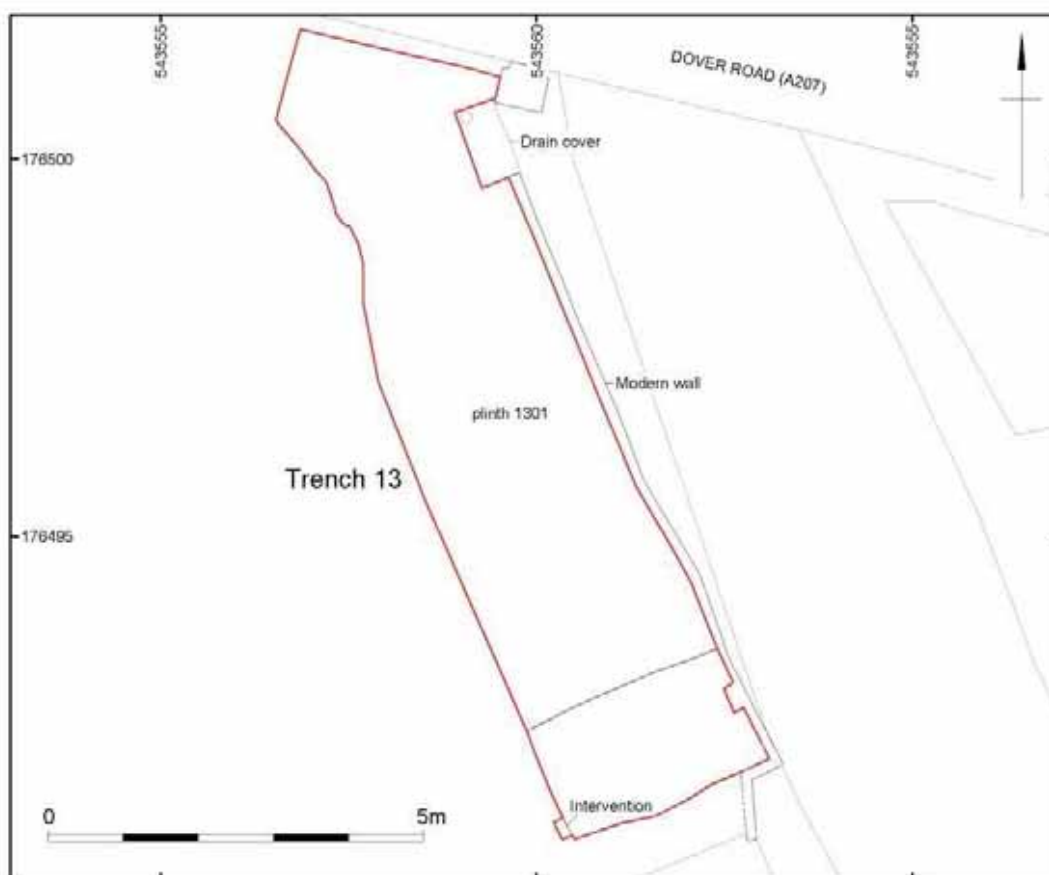


Plate 5: Air Raid Shelter, view from south



Plate 6: View of possible nail holes in wall inside shelter

|  |                                                                                             |  |        |                                                                                 |                  |    |
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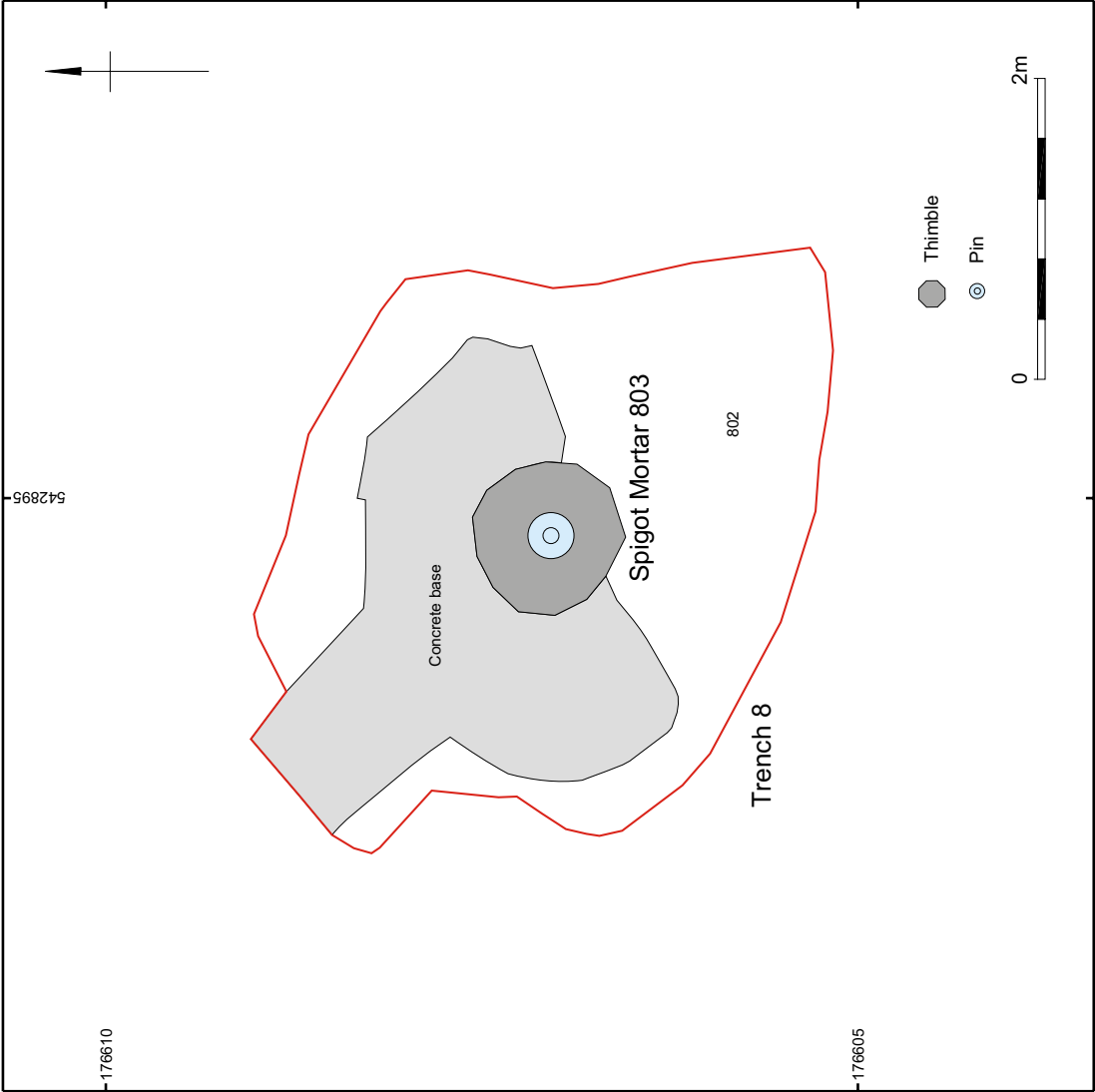
Trench 13 plan



Plate 7: View of the Bull Hotel showing scar from pill box

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Trench 8 plan



Plate 8: Spigot Mortar view from south



Plate 9: Detail of 'thimble'

|  |                                                                                                    |        |                                                                               |                  |    |
|--|----------------------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------|------------------|----|
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Trench 8: plan and photographs

Figure 9



Plate 10: Outside of bunker disguised as a rockery



Plate 11: Main entrance to bunker



Plate 12: Possible circuit breakers in bunker

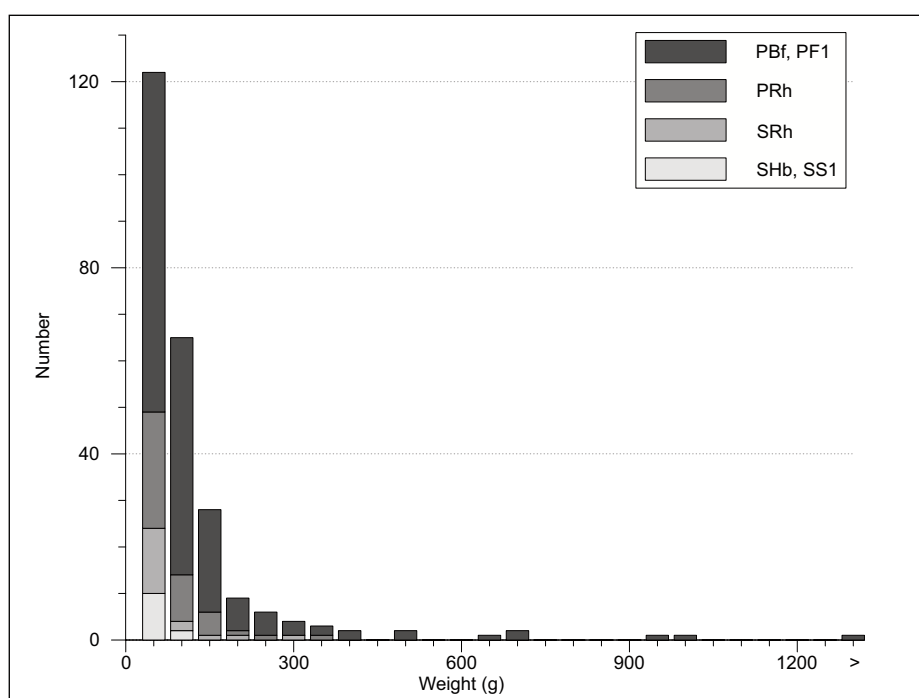


Plate 13: Bunker switch board

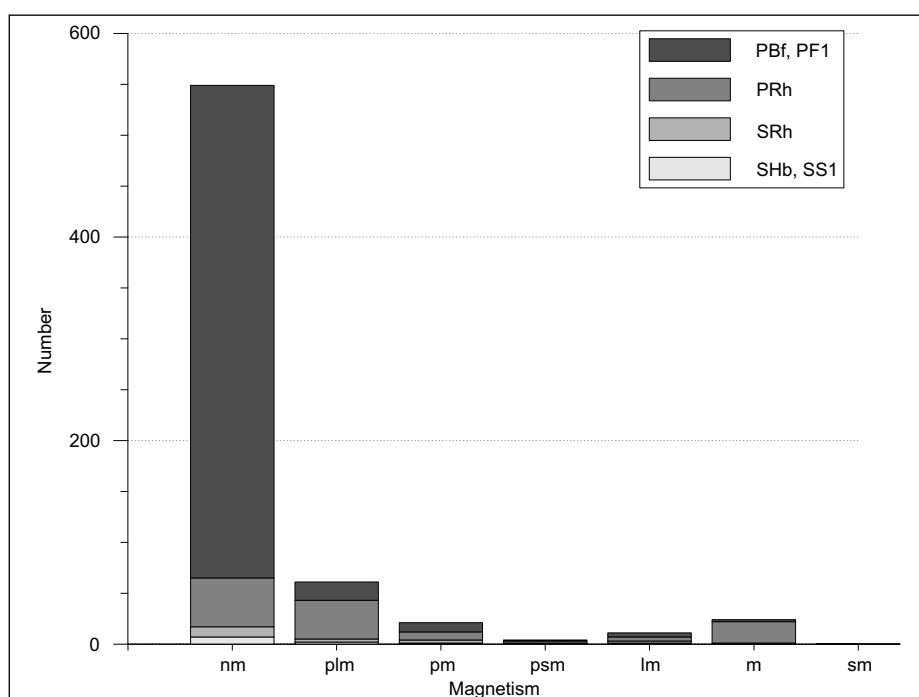


Plate 14: Bunker electrical fitting

|                                                                                       |                                                                                                        |                                                                                                |  |                           |  |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|--|---------------------------|--|
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|                                                                                       |                                                                                                        | <p>Scale: n/a</p>                                                                              |  | <p>Layout: KL</p>         |  |
|                                                                                       |                                                                                                        | <p>Path: Y:\PROJECTS\65308\T1\Drawing Office\Report Figures\eval08_08\65308_eval_Fig10.cdr</p> |  |                           |  |



A. Slag categories subdivided into weight classes



B. Magnetism of slag fragments per category

|                                                                                     |                                                                                             |                                                                                   |                    |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|--------------------|
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|                                                                                     | Date:                                                                                       | 04/09/08                                                                          | Revision Number: 0 |
|                                                                                     | Scale:                                                                                      | n/a                                                                               | Layout: KL         |
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