ROF RADWAY GREEN, CREWE, CHESHIRE

Standing Building Survey (Phase II)

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NON-TECHNICAL SUMMARY

SLR Consulting was commissioned to undertaken a HE [EH] Level 2 historic building survey on buildings that occupy the northern and central sections of the ROF Radway Green site. ROF Radway Green is located east of Crew and the M6 motorway. The survey included four building groups that comprise the Gauge Test Centre, the boiler house, the effluent treatment plant and buildings and structures that occupy the firing range. ROF Radway Green was operational by 1940 and has continued to manufacture small arms shells for the British Army and NATO member countries.

The historic building survey recorded where possible all buildings and structures both internally and externally. Based on historic plans supplied by the Client BAE Systems, several buildings and structures date to the initial phase of construction (c. 1940). Despite a great many changes occurring to the Radway Green site in the recent past, little change has occurred to the building stock.

1.0 INTRODUCTION

SLR Consulting was commissioned by BAE Systems Properties Ltd. (contact: Ian Swallow)[1] to undertake an historic building survey (including a contextual historic assessment of the site) at the Royal Ordnance Factory at Radway Green, near Crewe. This phase of work is the third such project that has been commissioned by the Client.

ROF Radway Green was one of forty-four large factory establishments engaged in the manufacture of munitions during World War II and is still operational, providing munitions for the British Army and NATO forces. Much of the original manufacturing process involved in the production of shells has remained unchanged; however, small calibre shell production is now conducted within a modern facility located within the central section of the site.

The buildings included in this survey include Gauge Test Centre (dating from 1941), the boiler house (constructed in 1983), the effluent treatment plant (dating from 1941) and buildings and structures that occupy the firing range (dating from 1941). With the exception of the Boiler House, the original building stock has, over the past 70 years or more been altered, rebuilt and repaired.

Using recent criteria implemented in National Planning Policy Framework (Chapter 12, paragraph 141) [NPPF] BAE Systems Properties Ltd has requested that an historic building survey of four buildings be undertaken prior to demolition. The survey will provide a greater understanding of the development history and use of each building, creating a preservation-by-record account. Fieldwork included a photographic survey of four buildings/building complexes (Labelled in this report Building Complexes 1 to 4) (**Plates 1 to 68**).

Based on a supplied Project Design (issued in November 2015) this report complies with English Heritage guidelines: *Managing Archaeological Projects 2nd Edition* (MAP 2), the *Management of Research Projects in the Historic Environment* (MoRPHE, 2006) and with the Chartered Institute for Archaeologists (CIFA) Standards and Guidance for the *Archaeological Investigation and Recording of Standing Buildings or Structures* (revised 2001). SLR Consulting is a Registered Organisation with the CIfA.

2.0 SITE DESCRIPTION AND LOCATION

The BAE Systems facility at Radway Green is classified as a light engineering 'live' site, manufacturing a series of small calibre projectiles. The factory has a complete integrated set of facilities to manufacture small arms and other ammunition to a calibre of 30mm. The site stands east of the M6 motorway and immediately south of the former North Staffordshire Railway [branch] (extending between Crewe and Kidsgrove).

The site originally occupied an area of approximately 135 acres - 54 hectares (**Figure 1**). However, in 1991, 10 hectares were allocated to create a civilian Business Park which was managed by Royal Ordnance Property Services Department. This 10

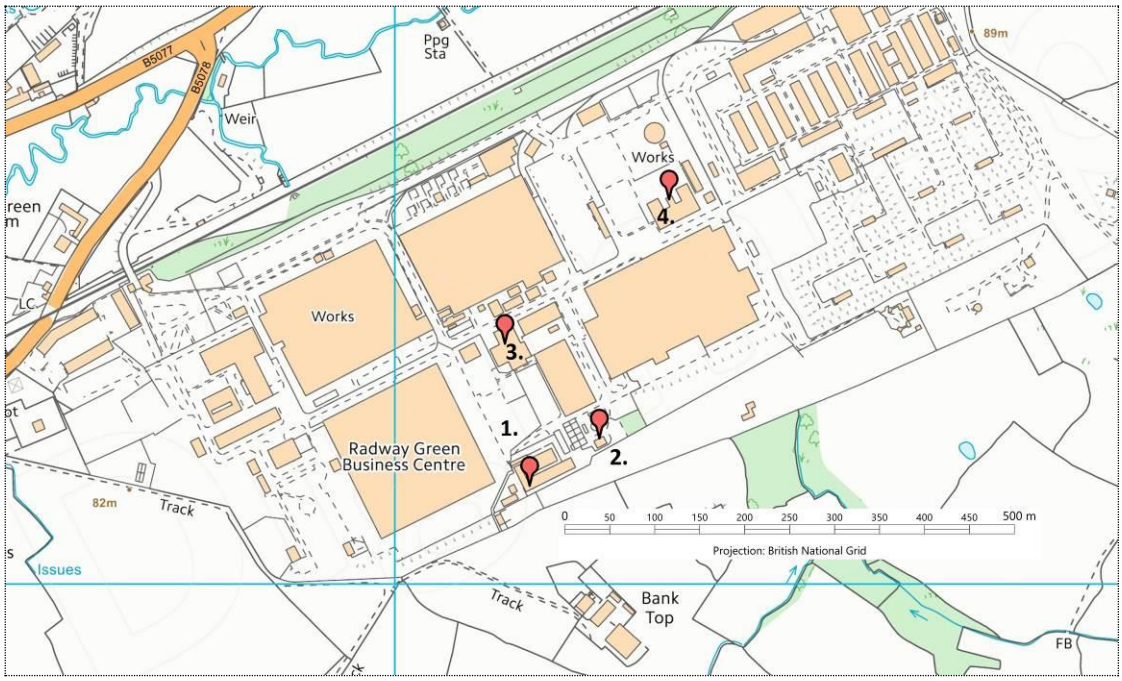
[1] SLR Consulting would like to thank Ian Swallow of BAE Systems for his invaluable assistance.

hectare site was eventually sold to Imex Properties in March 2000, who in turn sold the site to Ashtenne in 2003. The remaining 44 hectares is owned by BAE Systems.

In terms of topography, the site stands within an undulating landscape that rises to the east (towards the 'burning ground'). An unnamed stream runs under the site through a north-south culvert, emerging at an external car park, adjacent to the Crewe to Alsager road. At this point the tributary joins Valley Brook Stream, which itself eventually enters the River Weaver at Nantwich.

In terms of the geology and based on information supplied by the British Geological Survey (BGS), the area in which the Radway Green site stands is covered by Drift Deposits comprising predominantly glacial till and glacio-fluvial deposits (mainly sands and gravels). Alluvial deposition, in the form of fine silts and clays is associated with a nearby river channel that stands north of the site. The underlying solid geology comprises mudstone of the Wyche Mudstone Formation.

Figure 1:
Site location



3.0 HISTORICAL BACKGROUND

The Royal Ordnance Factory (ROF) at Radway Green has manufactured small arms ammunition for the British Army and NATO forces since 1940-1 and is located west of the village of Alsager in Cheshire. Prior to 1940 the site comprised enclosed hedged fields. The current site includes a series of large factory units, the majority constructed during 1940-41, following the outbreak of World War II.[2] Over the past 70 years, the site has undergone a number changes including alterations to existing buildings, the construction of a boiler house in 1983 and the production of a new facility in 2012.

[2] Based on supplied digital copies of original plans supplied by BAE Systems

3.1 Site development timeline[3]

Pre 1939 – Prior to construction of the factory site, the land was in use as arable farmland. The current site boundary follows existing historic field boundaries.

1939 - 1940 - Royal Ordnance Factory Radway Green was constructed to produce small arms ammunition and medium calibre shells and cases for British Forces. Much of the early expertise of the site was from personnel who had transferred from the Woolwich Arsenal. A large housing estate for factory workers was built in nearby Alsager. It is within this period that the Gauge Test Centre, western elements of the effluent treatment plant and buildings and structures that occupy the firing range were constructed (see this report).

1942 - Peak production had been reached with some 15,000 employees working a three-shift day, seven days per week producing c. 15 million 0.303" calibre rounds of ammunition and c. 1 million 20mm calibre cannon cases and shells per week.

1945 – Following the end of World War II, the workforce was reduced to 1,500 and production was transferred to the manufacture of refrigerators, gas and electric cookers.

1948 - Production later switched back to large scale ammunition manufacture to meet the demands of the Korean War.

1953 - Production conversions took place in order to cater for the Armed Forces change from 0.303" calibre to 7.62mm calibre small arms ammunition.

1956 - Production conversions took place to cater for the Armed Forces change from 20mm to 30mm calibre cannon shells and cases.

1962 - Work commenced on enlarging the so-called 'Coin Store' and the production of coin blanks prior to the opening of the new Royal Mint in South Wales (early 1970's). During this period coin blanks were produced for decimal coinage (in full circulation by 1972).

1974 - 1979 – C-Block was fully refurbished and a new small arms ammunition manufacturing and filling facility was installed. A new building to house blank ammunition manufacturing was also built, together with a new garage repair shop and oil stores. Machinery and plant to produce the new 5.56mm calibre small arms ammunition was installed.

1979 - 1981 - The **S**mall **A**rms **A**mmunition **L**oading **F**actory (SALF) area was progressively closed down and the plant and personnel transferred to the new small arms facility in C-Block.

1983 – As part of the modernisation of the site, a purpose-built Boiler House was constructed within the central section of the site (see this report)

1985 - The Royal Ordnance Factories (ROF) became known as "Royal Ordnance"; part of the Conservative Government's privatisation scheme. At this time, the workforce numbered around 1,800 employees.

[3] Adapted from a report made by W. S. Amison (2007) and used in the second Radway Green report

1987 - Royal Ordnance became a privately owned company, forming part of British Aerospace.

1988 - The Burning Ground facility was redesigned and relocated within the south-east section of the site.

1990 – Further residential development occurred around Alsager. Workforce numbered approximately 1600 employees.

1991 - 1992 – An extensive site rationalisation programme took place with 25 acres of the site being transferred to Royal Ordnance Property Services Department (PSD) to manage as a Business Park. Several buildings were closed and vacated, including A Block, J Block, Administration Building, a Laboratory, H Block Personnel, F Block, Drawing Office/Design Centre/Canteen, Exhibition Room, Ministry of Defence Police Houses, Vehicle garages and further offices.

1993 - Site Rationalisation continued. By April the workforce had been reduced to 500 employees. The Boiler House (constructed in 1983) and the Gauge Test Centre are decommissioned – see this report.

1995 - 1996 - Site rationalisation continued and the medium calibre facility in B-Block was reduced in capacity and transferred to D Block. B Block was vacated and the land and buildings handed over to BAE's Property Services Department.

1999 - The number of employees on site had been reduced to 430. British Aerospace (BAE) and Marconi Electronic Systems (MES) merged and became known as BAE Systems.

2000 - The Business Park was sold to Imex Properties. Royal Ordnance and Marconi Land and Naval Systems merged to become known as Royal Ordnance Defence.

2001 – Brass foundry and rolling mill closed; brass production was outsourced. The Royal Ordnance site at Nottingham was closed and manufacturing was transferred to Radway Green.

2002 – Majority of the plant machinery from the foundry and rolling mill was removed from the site and sold. Lead melting furnaces and the lead extrusion press from C-Block Bullet area were removed from site and outsourced. The Royal Ordnance site at Blackburn closed and the manufacture of warheads and primer components was transferred to Radway Green. Transfer involved the installation of production machinery including: Centreless Grinders, CNC Lathes, Machining Centre, Co-ordinate Measuring Machines, Ultrasonic Cleaners, Off-Hand Grinders.

2004 – The name of the site changed from ROF Radway Green to BAE Systems, Land Systems, Munitions & Ordnance, Radway Green.

2009 – Work commenced on the demolition of a canteen and large factory building and the construction of a new facility.

In its recent past the site has produced the following munitions calibres:

- .280 British - (small amounts for developmental purposes in 1950s) - [production ended circa 1956]
- .303 British - (ball, tracer, incendiary) - [production ended in 1973]

- .38 S&W - [production ended in 1960s]
- 4.6x30mm for the Heckler & Koch MP7
- 5.56x45 mm - (standard FMJ, tracer and blank ammunition)
- 7.62x51 mm - (standard FMJ and tracer ammunition)
- 9mm NATO - (standard FMJ, commencing during WW2 and still in production)

The ammunition currently manufactured at Radway Green is NATO certified. Within the grounds of the Radway Green is a firing range where ammunition is regularly tested.

4.0 MAP REGRESSION

For this section of the report, five historic maps were consulted. The earliest detailed map within the Ordnance Survey series (Scale 1:2500), dates to 1882 and shows the area to be enclosed meadow/pasture (**Figure 2**). Flowing north-south through the central section of the site is a stream that was later culverted prior to the construction of the site. The stream also marks a parish boundary. To the north of the site is the Crewe Branch of the North Staffordshire railway line.

Shown within Figure 3 and extending from the railway line (and similar to that of nearby ROF Featherstone) are a series of railway sidings used to off-load raw materials and load munitions. The map is not of a specified date but it was more likely published sometime after 1943. The area of the site shown in Figure 3 has remained the same to the present day.

Due to the sensitive nature of the site in terms of national security, following World War II and the advent of the Cold War (between 1947 and 1992), the factory is not marked in **Figures 4 and 5**; indeed in Figure 3, the area of the factory is left blank and Figure 4 shows the original field system that was present prior to the ROF factory site – shown as enclosed fields. Following the end of the Cold War, the site and individual buildings are present on maps after 1994 (**Figure 6**).

Figure 2:
1st Edition Ordnance Survey Sheet section of 1882 (scale 1:10560)

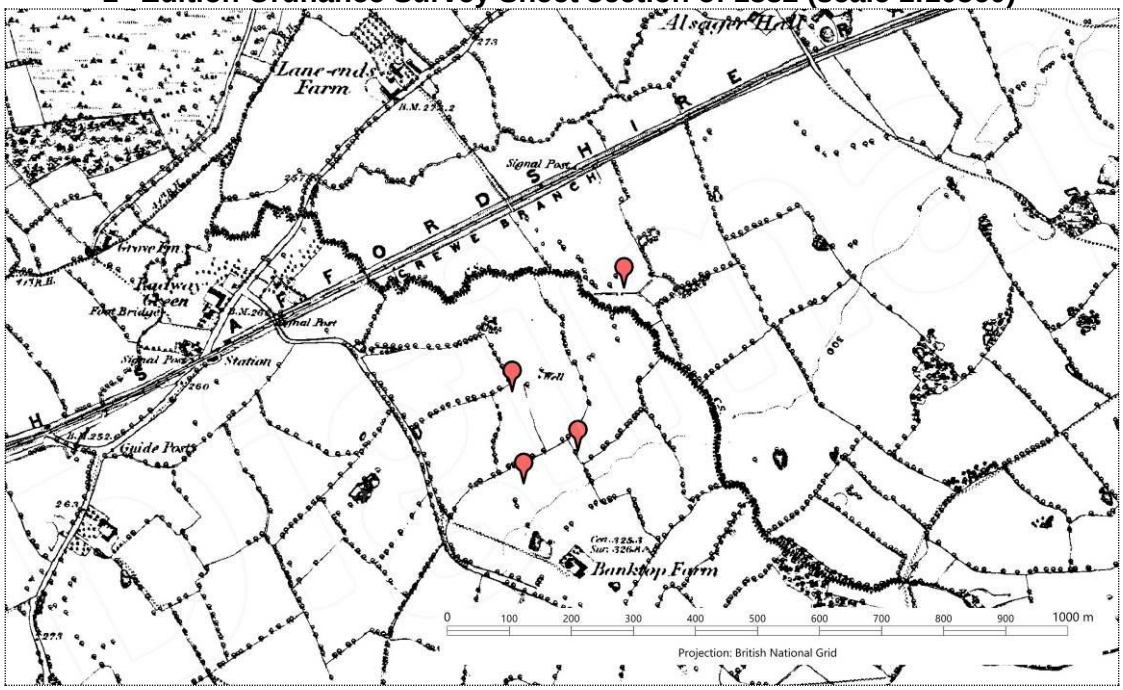


Figure 3: 4th Edition Ordnance Survey sheet section of an unspecified dated map of the 1940s (scale 1:2500)

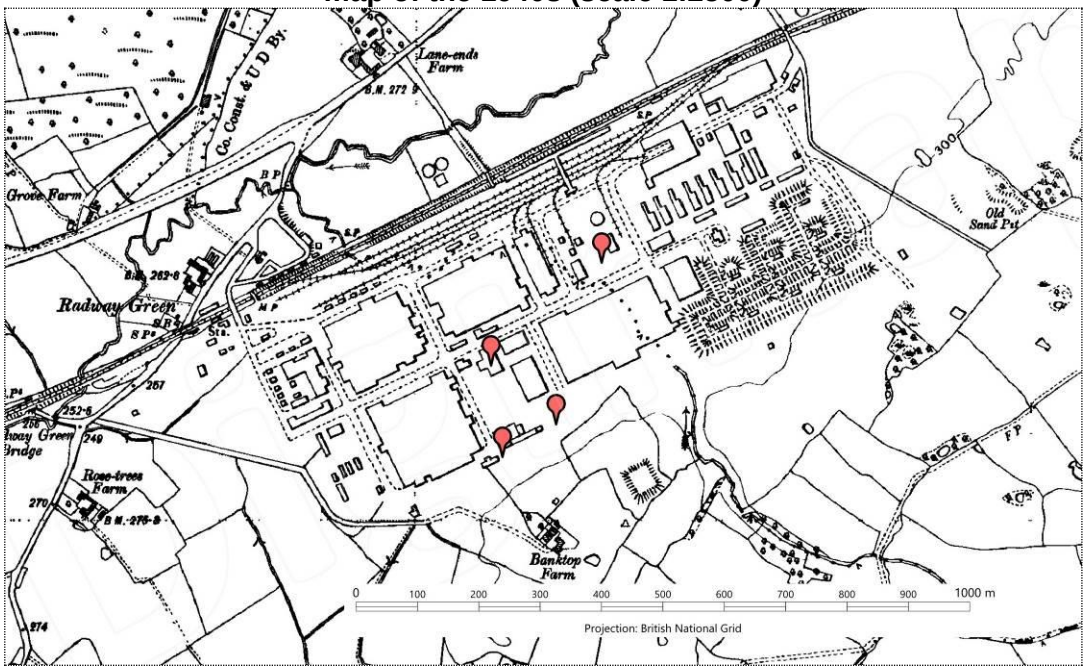


Figure 4:
National Grid Ordnance Survey Sheet section of 1954 (scale 1:2500)

Figure 5:
National Grid Ordnance Survey Sheet section of 1967 (scale 1:2500)

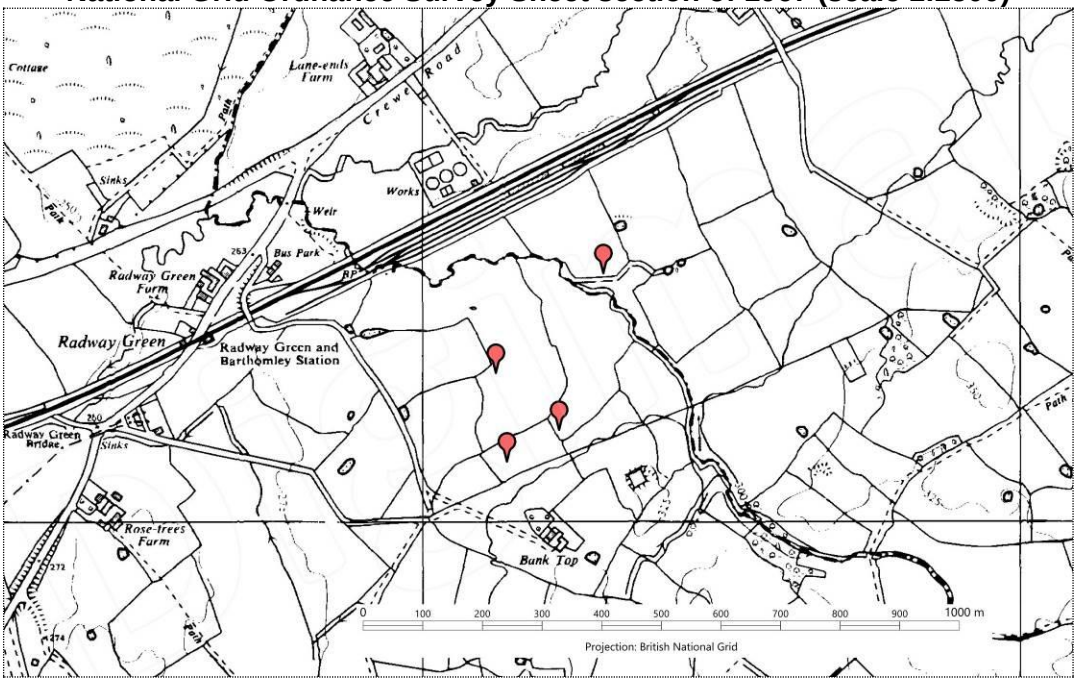
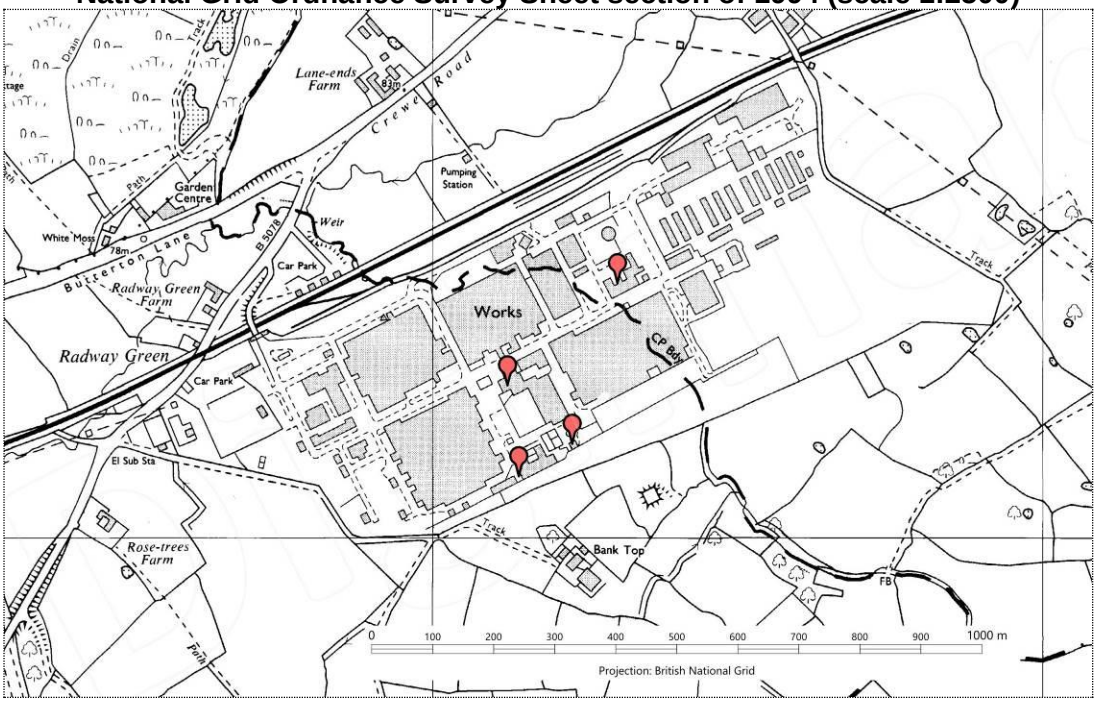


Figure 6:
National Grid Ordnance Survey Sheet section of 1994 (scale 1:2500)



5.0 RATIONALE OF THE PROJECT

BAE Systems intend to demolish four buildings/building complexes; three of these date from the site's earliest phase (c. 1940-41), whilst the Boiler House dates from 1983. At the request of the Client, SLR Consulting has produced a Written Scheme of Investigation and risk assessment. Based on the history and development of the site, it is deemed necessary that prior to any remedial programme involving demolition a HE (EH) Level 2 historic building survey should be undertaken.

6.0 METHODOLOGY

This phase of work includes a digital photographic record of all the building stock and their settings. Based on correspondence with the Client, up to four buildings/building complexes require this degree of recording, including the Gauge Test Centre, the boiler house, the effluent treatment plant and buildings and structures that occupy the firing range. All buildings recorded occupy the central and southern sections of the site.

Using English Heritage's *Understanding Historic Buildings: A guide to good recording practice* (2006):

A Level 2 is an analytical record, and will comprise an introductory description followed by a systematic account of the buildings origins, development and use. The record will include an account on which the evidence is based, allowing the validity of the record to be re-examined in detail. It will also include photographic records that may be required to illustrate the building's appearance and structure and support an historical analysis.[4]

The sections/elevations and the setting of each building was photographed, using high-resolution digital photography (5mb and above). An audit of the fixtures and fittings within each building was also created. Each building was given a unique record number and a digital archive referred to this numbering system (based on an established ROF building code system [as currently being used by BAE Systems – Buildings A to Z). It should be noted that access to some buildings within the Firing Range was not possible owing to issues concerning national security.

The written element of this report provides a description and analysis of each of the buildings' age, fabric, form, character, development (phasing) and methods/ techniques of construction. All sources are fully referenced. As part of the programme of work SLR also undertook a limited desk-based assessment in order to place the building into their historic and archaeological context (see Section 3.0).

Accompanying the imagery within this report was a plan showing the direction of each image published. Those images not published in the report will be filed by [digital] description within the file name.

[4] To use: drawings 1, and sometimes 2-7; photography 1, 2, 4; written record 1-3, 6 (EH 2006, 14).

7.0 THE HISTORIC BUILDING SURVEY

The survey was undertaken in May/June 2016 and included the recording of four buildings/building complexes. Inspection of each building/building complex reveals that three of the buildings were constructed using a variety of materials that were in use elsewhere on the site during the initial construction phase (c. 1941).

7.1 The Firing Range (1)[5]

The firing range stands on an elevated position within the south-west section of the site. The range comprises six buildings (labelled a to f), three of which form a rectangular group of building that include two indoor and one outdoor firing range, along with an arsenal and reception building. To the west of the firing range are three further buildings (**Figure 7**). All buildings within this complex date from the earliest phase of the site (c. 1941); however, over their history many have been refurbished and wall sections rebuilt.

The main access into the firing range complex is via a double-door into a reception area (Building d). This single-storey brick constructed building also includes an open-air firing range that is enclosed by a continuous brick wall. The three buildings that stand outside the main firing range complex (Building a to c) are considered ancillary buildings, several of which may be used for storage, the other for power supply and water (**Plates 2 to 6**); the precise use though of each building is unknown. To the rear of the reception building and the adjoining open-air firing range is a small irregular-shaped courtyard. Much of the fixtures and fittings, including the door and window casements date to the earliest phase of construction, although some windows and the double doors in Building d have been replaced.

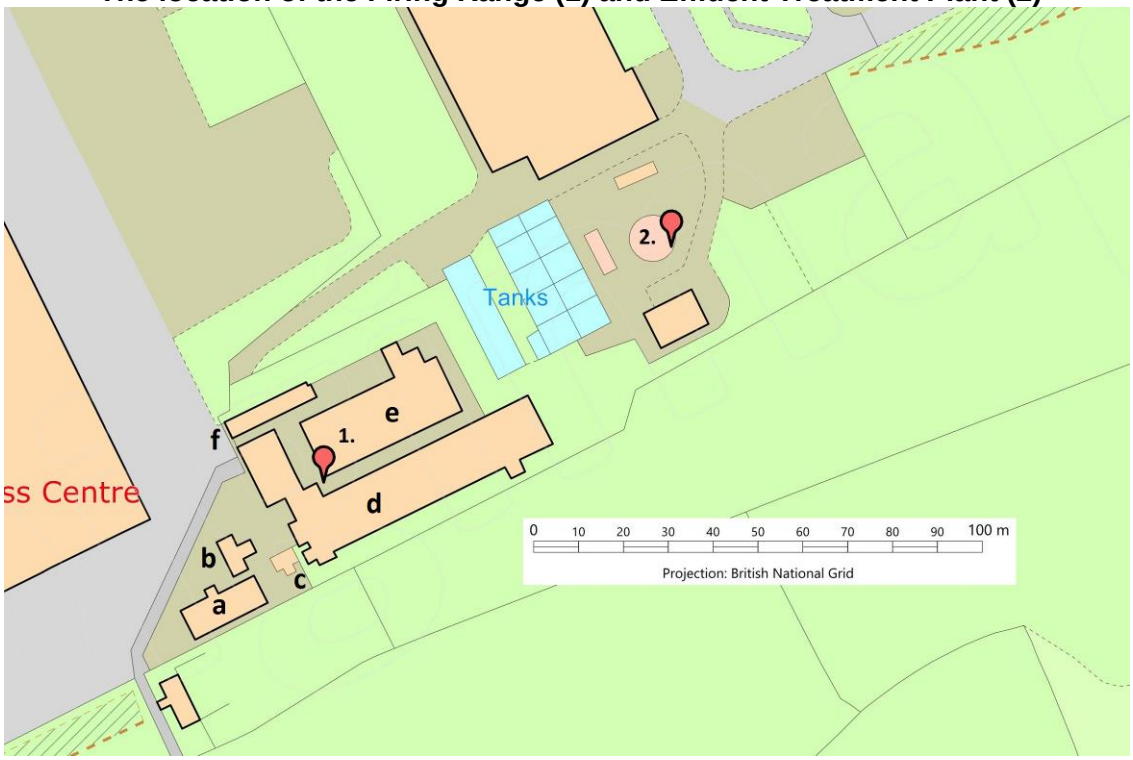
Access to the firing ranges is via the courtyard (to the rear of Building d). The two enclosed firing ranges, each measuring c. 35 m in length are within one building (Building e) (**Plate 8**). This single-storey building is constructed of brick and is rectangular in plan (**Plate 9**). Over its c. 75 year history, the firing range walls have been extensively repaired with a variety of brick types (**Plate 10**).

Located within the north of the site are two further buildings, one appears to be a makeshift shed (of unknown use), constructed of corrugated sheeting [and probably a timber frame] (**Plate 11**), the other building is the brick-constructed armoury (**Plate 12**). This single-storey rectangular in plan building delineates the norther boundary of the firing range complex. Although no access was permitted internally to the armoury, the external south-facing elevation shows several blocked doors and a window, using different brick types (**Plate 12**).

The brickwork throughout this range of buildings has a similar bonding material and brick style, comprising a header-stretcher design (**Plate 13**).

[5] Many parts of this complex could not be accessed due to National security conditions including the armoury and two of the three firing ranges.

Figure 7:
The location of the Firing Range (1) and Effluent Treatment Plant (2)



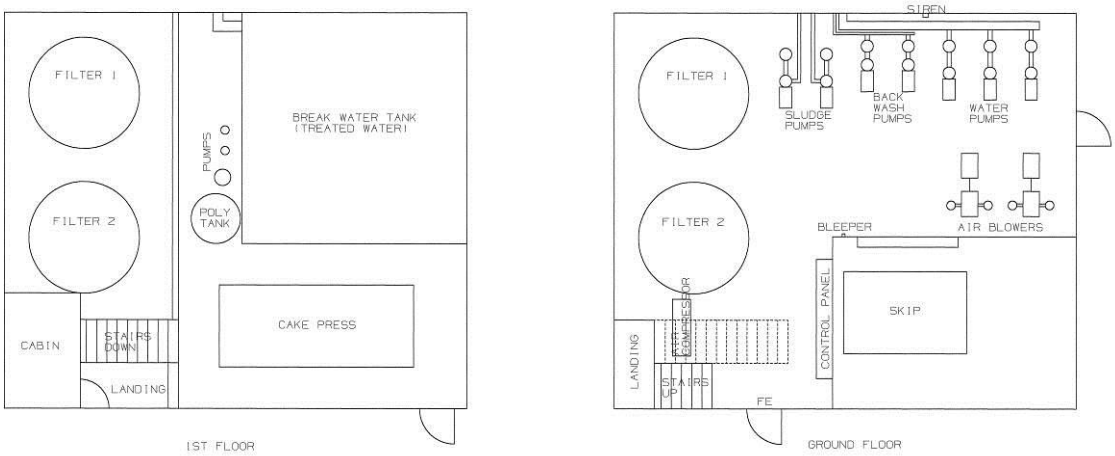
7.2 Effluent Treatment Plant (2)

The effluent treatment plant stands within the northern section of the site, east of the firing range. This facility services all the buildings within the Radway Green site. The plant comprises four elements: the current in-use treatment building (**Plate 14**) and three sets of outdoor treatment tanks, all of which are out of use (e.g. **Plate 15**). The in-use treatment plant comprises a housed facility, constructed of brick, the elevation of which supports a pitched roof; access to this building is via the eastern elevation. Immediately north of this building is an associated cylindrical effluent silo (**Plate 16**). Although this building is relatively recent in terms of its construction, some of the fixtures and fittings derive from mid to late 20th stock, including a recessed metal-framed 8-paned window casement (**Plate 17**). Due to health and safety considerations, access to the internal sections of the two-storey building was not permitted; however, BAE Systems kindly provided plans. Much of the functionality of the apparatus inside this building is largely replicated with the redundant structures that stand outside. Basic apparatus include two filter tanks, a treated water tank and cake press. Each tank is connected by a series of pumps (sludge and treated water). The residues from the cake press are discarded via a skip, located within the loading bay.

The external structures include a single sludge tank (**Plate 15**) and a large rectangular treatment tank (referred to as a 'Neutralisation Tank' [sludge pit]) located to the west (**Plates 20, 21 and 22**). Both structures represent a late 20th/early 21st century phase of use. Immediately west of this facility are two open sludge/filtration tanks, both representing the earliest phase on the site (c. 1941). The eastern tank (**Plate 23**), rectangular in plan is constructed of a continuous brick wall which is capped by upturned brick coursing (**Plate 24**). Internally, the tank is divided into eight partitions (**Plate 25**) and is surfaced by a fluid-tight floor (**Plate 26**). In the recent past the wall sections of this structure have been demolished, allowing access. The construction methodology used to create a fluid-tight tank or partition includes two outer brick

courses which are infilled by a further two brick courses. A bitumen skin has been applied either side of the two internal surfaces of the brick outer courses (**Plate 27**).

Figure 8:
A diagrammatic plan of the currently in-use Effluent Treatment Plant



To the west of the brick structure is an earlier open sludge/filtration tank (**Plate 28**). This structure, probably dating to c. 1941 is constructed of riveted wrought iron plates. The walls of this tank stand around 1.5m above the current ground surface but it is more than likely that the base of the tank may be a little deeper. Internally, the tank is continuous with no partitions (**Plate 29**). The internal walls are reinforced by a series of diagonal struts that are connected between the base of the tank and the upper wall sections.

7.3 The Gauge Testing Centre (3)

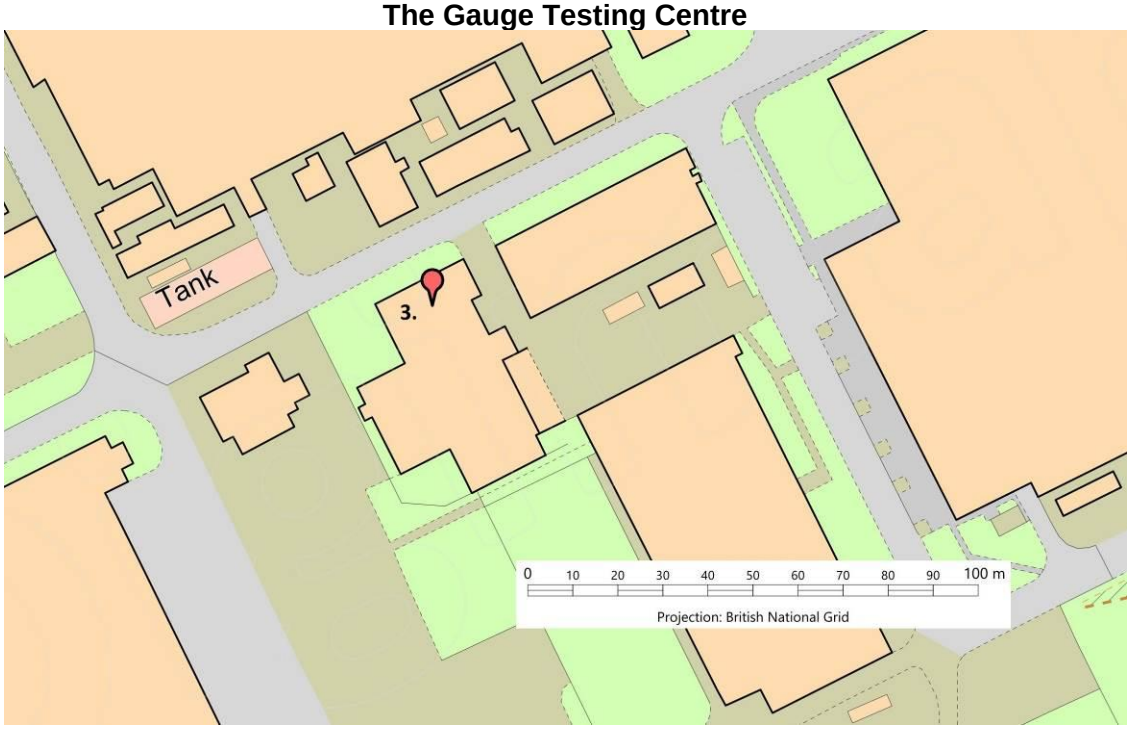
This building was constructed in three phases, the earliest of which dates to c. 1943 (**Figure 9**). The three building phases comprise a former satellite canteen (forming the northern section of the building and know on plans as Building No. 8); the testing areas (forming the southern section of the building) and a suite of single-storey offices that form the western (rear) section of the building complex. Based on supplied historic plans, the northern section of the building and the office suite probably form one phase (**Figure 10**). It is not clear though of the specific functions of this and other working rooms/spaces within this building complex.

The main access to this building is via the north-eastern elevation (**Plate 30**). This elevation has a steel-framed canopy that extends along the southern and central sections (**Plate 31**). The main entrance, comprising a double door opening is incorporated into the later building phase (**Plate 31**). Both the door opening and the window casements (**Plate 32**) are indicative of Interwar and World War II design. The window casement design, repeated throughout the Radway Green site comprises a slightly-recessed 12-pane steel moulded frame with a concrete lintel and brick sill (**Plate 32**). Inspection of the external brickwork revealed odd bricks with their batch stamp visible (**Plate 33**). Constructed along the NE elevation was a later-dated covered entrance with a roller-shutter which provided access into the laboratory (which was formally a canteen) (**Plate 34**). The NW gable faces [a tree-lined] Central Avenue (**Plate 35**). Much of this section of the building is single-phased, including a small storage annex, located on the SW corner of the building (**Plate 36**). West of this annex, a narrow denuded path leads to the suite of offices which occupy the western section

of the building complex (**Plate 37**). The office suite is a single-story complex with recessed window openings for each room. Rainwater runoff is collected in a series of compressed asbestos gutter channels that feed into several vertical asbestos downpipes. Both the guttering, the window openings, the brickwork and surviving fixtures and fittings (**Plate 38**) are indicative of World War II and early post-war construction. The south-east elevation could not be inspected owing to hedge-cover (**Plate 39**).

Internally, the building complex comprises two principle rooms (north and south) and the office suite. The double door access from the NE elevation provides access into one of the main gauge testing rooms (**Plate 40**). Inspection of the NW wall of this room shows it to be an external wall, probably the original SE gable of the former canteen (**Plate 41**). Similar to external walls elsewhere, batch-numbered bricks are present (**Plate 42**). In terms of the survival of fixtures and fittings within this complex, there are several that are located within the side offices located within the NE section of the building and includes a Calendar dated May/June 1993 (probably marking the closure of the building) (**Plate 43**). Within the southern section of the building are a series of rooms that house hard-standing benches constructed on brick walling that support a flat concrete surface (**Plates 45 and 46**). It is within this area that the physical gauge testing was performed. The large principle room within the northern section of the building has within its southern part an enclosed office which originally a production office and housed the testing gauge archive (**Plate 47**). The room retains its original linoleum flooring. Prior to refurbishment and the insertion of a suspended ceiling, much of the steel-framed roof space would have been exposed. Extending along the entire length of the northern gable is a continuous purpose-built laboratory bench.

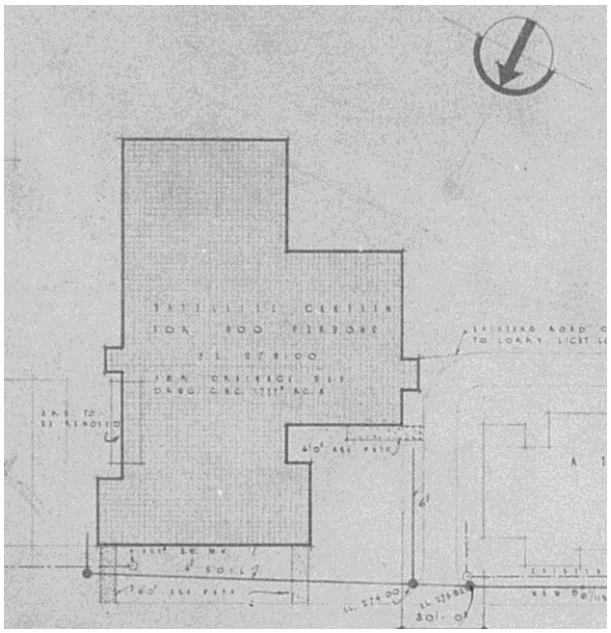
Figure 9:
The Gauge Testing Centre



The western section of the building – the suite of offices comprise a series of rooms or varying size (but not shape) that are accessed via a central corridor. The décor of each room identical; usually white-painted brick walls and blue woodwork (doors,

architraves and skirting). The rooms have been stripped of their fixtures and fittings; however, the function of each room is incorporated into the plaques on each of the door, such as The Computer Room and The Systems Audit Room (**Plates 49 & 50**).

Figure 10:
Detail of a plan showing the Satellite Canteen (Building No. 8), plan dated 1943 (Courtesy of BAE Systems)



7.4 The Boiler House (4)

The purpose-built coal-fired Boiler House, located within the central section of the Radway Green site was constructed in 1983 and in use for approximately 10 years, closing in May 1993 (**Figure 11**). This building replaces an earlier boiler house facility located within the eastern part of the site. The Building is divided into three principle areas: The Boiler Room (occupying the southern and central sections of the building, the welfare and office section within the SW section of the building, and the loading bays and generator rooms to the rear of the building. The building was officially opened by Norman Siddall, the Chairman of the National Coal Board (on the 19th June 1983) – **Plate 51**.

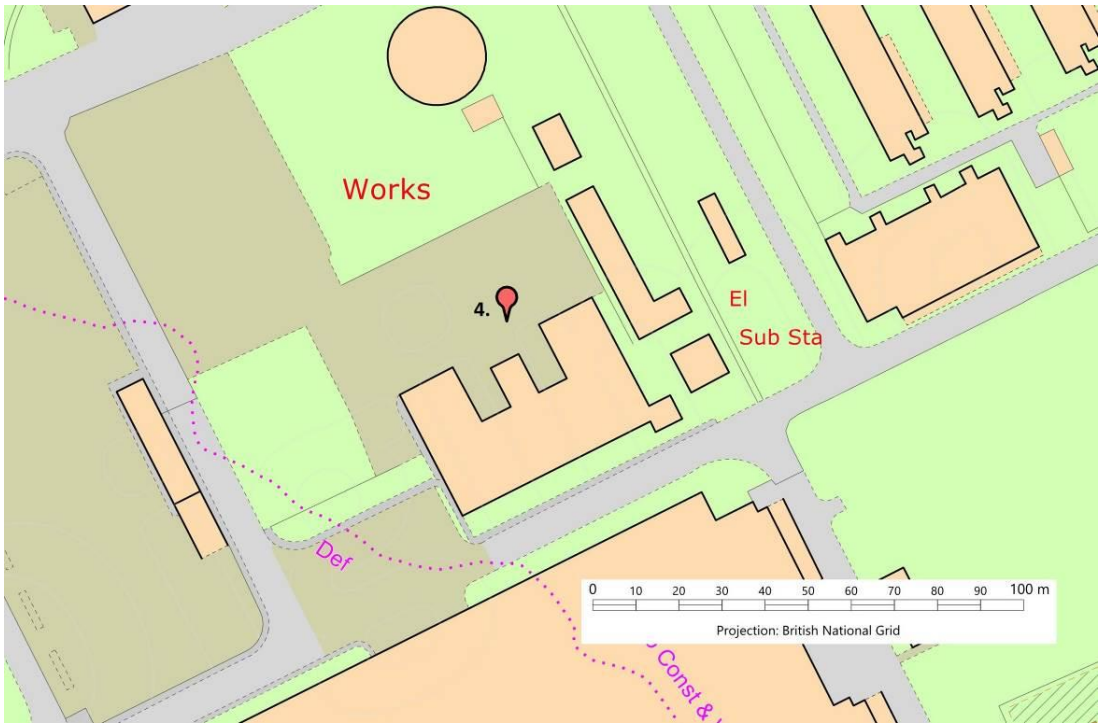
This large brick-constructed building with vertical corrugated metal-sheeted cladding stands approximately 10m in height and feeds steam and hot water via insulated piping through its western elevation. To the rear of this building is a large concrete floored maintenance yard (**Plate 52**). Incorporated into the western elevation are eight window casements that form part of the cladding arrangement. Access to the office area is via a side door, located within SW section of the elevation. The roof, constructed of corrugated metal sheeting comprises a single off-centre pitch (**Plate 53**) with a substantial overhang that skirts over all elevations (**Plate 54**). The building is constructed as a single steel-framed shell with [stretcher-bonded] brick and block infill. Sections of the brickwork above the window casements are covered by decorative corrugated metal sheeting (**Plates 55 and 56**). The front elevation, faces south, opposite the new factory facility and comprises a SW door double door opening and a large steel-framed window casement that extends along the entire elevation (**Plates 56 and 57**). The eastern [gable] elevation possesses no window openings but is

[decoratively] finished with a series of vertical steel corrugated stripes that extend from the eves (and underneath the overhang) to the ground (**Plate 58**).

To the NE rear section of the building is a large covered two-bay solid fuel hopper with recessed roller-shutters over each bay (**Plate 59**). This facility is constructed similarly to the rest of the buildings; i.e. a streel-frame section that is infilled or covered by brick. Internally, the hopper comprises a large above ground space, designed to allow large vehicles to deposit [graded] solid fuel. A grading mat separates the above ground space from a subterranean room in which graded solid fuel is collected and transported to the boiler furnaces (**Plate 60**). To the west of this facility, are several recesses which reveal a single floored north-facing room which houses the diesel generating and compressor facility, used to provide power to the boiler house plant (**Plate 61**). Another recess, located within the western section of the boiler house shows reveals a hexagonal feature representing a chimney base of unknown use and date (**Plate 62**).[6]

Internally, the boiler room comprises a large open-plan space in which five large cylindrical boilers are housed (**Plates 63 and 64**). These boilers, manufactured by Danks of Netherton (Black Country, West Midlands), are oriented roughly N-S (referred to as Boilers 1 to 5). Each identical boiler was fed solid fuel via a charging flue and hopper that stands to the rear (**Plate 65**). The maintenance area is situated within the eastern part of this principle room (**Plate 66**). Within the western section of the boiler house are a suite of rooms that comprise a computer room (**Plate 67**), welfare facilities and offices. This section of the boiler house appears to be a separate phase, constructed as a two storey building with a flat roof. The pump room is located immediately north of the office suit (this area was not accessed due to health and safety issues).

Figure 11:
The Boiler House



[6] Another chimney base is present within the second recess to the rear of the building. Based on the materials used within the fabric of the chimney base, the current boiler house building probably stands over an earlier facility.

The subterranean spaces that stand underneath the principle room are accessed by two vertical stepped stairwells (**Plate 68**). The function of this subterranean space could not be fully assessed owing to flooding issues; however, it is considered that this space (or spaces) provided access to each of the boiler furnaces.

8.0 DISCUSSION

In terms of cultural heritage significance, the buildings within the Radway Green site and their unique history they hold constitute an important archaeological and historical resource. The majority of the buildings date from 1941 and many are still in use. BAE Systems Properties Ltd. are currently involved in a rationalisation programme for the Radway Green site and as part of this, all buildings that are currently out of use are being assessed. As part of this assessment BAE Systems Properties Ltd. have commissioned SLR Consulting Ltd. to record and assess the historic and cultural heritage value of selected building stock. The building stock to be recorded included four buildings/building complexes that date from 1941 – the Firing Range, the effluent treatment plant, the gauge testing centre and the boiler house.

On initial inspection in May 2016 it was clear that little or no significant changes had been made to the four buildings surveyed since their initial construction (irrespective of date). In all examples, the building fabric and much of each of the building's fixtures and fittings had remained in situ. Supporting the physical evidence, BAE Systems (via Ian Swallow) provided SLR Consulting with digital copies of the original plans of all buildings that were recorded during this survey.[7]

The materials and construction methodology used is standardised throughout suggesting that much of the building stock was constructed at the same time (i.e. c. 1941). The brickwork style for the gauge testing centre and the firing range was English Garden Wall Bond and was used throughout, using the same brick-type - a rustic type, probably produced by the London Brick Company (LBC). Later phases and extensions have noticeably different brick colouration due to different firing temperatures (e.g. see **Plate 12**). In addition to the fabric of each building, much of the fixtures and fittings are standardised throughout, including door and window casements, door and window furniture, electrical switches, wire channelling, electrical transformers. The boiler house and the current effluent treating plant also use identical building materials.

Despite closure of several of these buildings in 1992-93, the firing range and effluent treatment plant continue to be in use. In all buildings, surviving fixtures and fittings are present and the building fabric is in a good state of repair.

The building record (at HE Level 2) has been greatly enhanced with the supply of original plans of each building/building complex. The Level 2 survey provides an adequate *preservation-by-record* account of the building stock surveyed. Based on the observations made in this report, no further action in terms of archaeological mitigation is required.

[7] A digital copy of each buildings will be uploaded onto a disc and filed with the Cheshire East LPA

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10.0 CLOSURE

This report has been prepared by SLR Consulting Limited with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of BAE Systems; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

PLATES
1. The Firing Range[8]

Plate 1. Entrance into the reception building (D) of the Firing Range complex, looking north

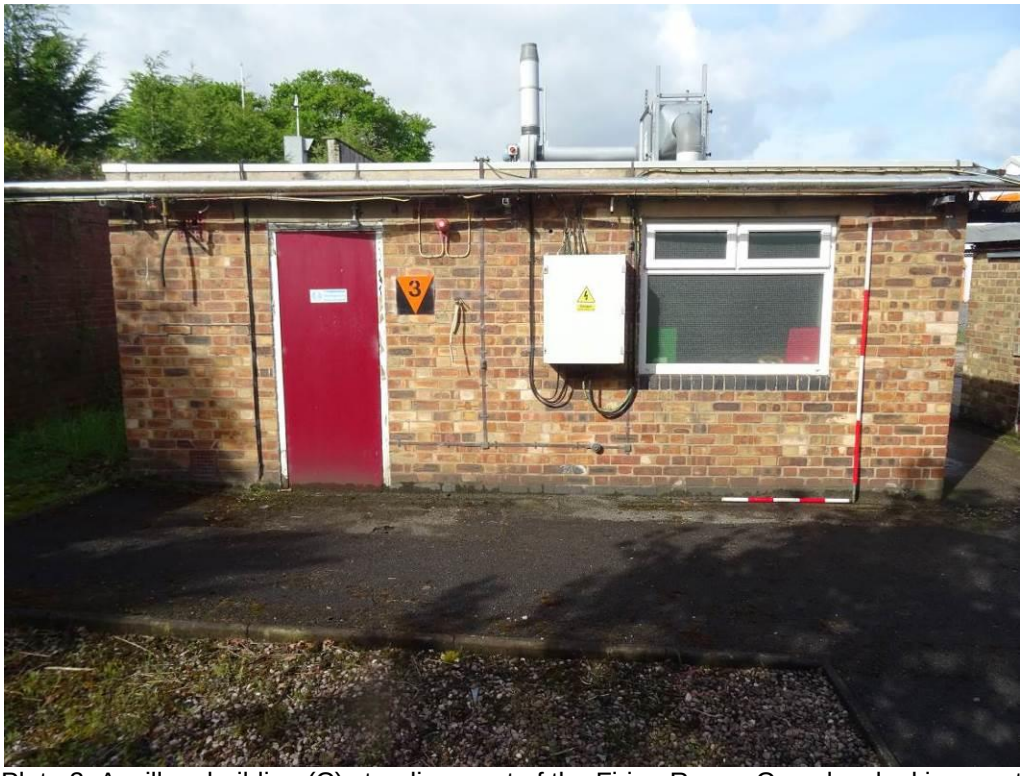

Plate 2. Ancillary building (C) standing west of the Firing Range Complex, looking west

[8] Note, that due to national security concerns various elements of this complex could not be accessed.

Plate 3. Southern ancillary building (A) standing west of the Firing Range Complex, looking south

Plate 4. Eastern ancillary building (B), located west of the Firing Range Complex, looking

Plate 5. Ancillary buildings A (foreground) and B (with water tower), located west of the main Firing Range Complex, looking north

Plate 6. Electrical transformer building (C), located outside the main Firing Range Complex, looking west

Plate 7. Rear western section of the reception building (image taken within the enclosed courtyard of the main Firing Range Complex), looking west

Plate 8. Internal image showing one of two enclosed firing ranges within Building E, looking NE

Plate 9. NE view of the southern section of Building E, showing the southern elevation (see Plate 10)

Plate 10. Multiple brick types within the southern elevation of Building E, suggesting periodic repairs

Plate 11. Corrugated lean-to shed, located along the north boundary of the Firing Range, looking N

Plate 12. The southern elevation of the Gunnery Room (Building F), looking nor

Plate 13. Sample of the brickwork from the northern elevation of Building E

2. The Effluent Treatment Works

Plate 14. General view of the effluent treatment plant (Buildings 2 and 3), looking SE

Plate 15. View of the effluent treatment tank (Building 2), looking SE

Plate 16. A recently-constructed effluent treatment building (Building 3) with adjoining silo, looking SW

Plate 17. Detail of the window casement, located on the NE elevation

Plate 18. Above view of the effluent treatment tank (Building 2), looking NE

Plate 19. Make-shift signage located on the 'Final Neutralisation Tank' (see Plate 20)

Plate 20. Northern section of the Final Neutralisation Tank (Building 4), looking south

Plate 21. Make-shift signage located on the ‘Sludge Tank (Building 4)’ (see Plate 20)

Plate 22. An above view of the sludge tank (4), looking north

Plate 23. NE section of the second set of filtration tanks, looking SW

Plate 24. NE wall section of the second set of filtration tanks, looking SW

Plate 25. Overhead view of the second set of filtration tanks showing individual brick sections, looking north

Plate 26. One of ten individual tanks with a brick-lined floor, looking north

Plate 27. Destroyed internal brick wall revealing the brick and slate construction, looking north

Plate 28. The earliest filtration tank (Building 6), constructed of riveted iron plates and located SW of the later tank system (Building 5), looking SE

Plate 29. Stagnant water within the earlier filtration tank, looking NW

3. Gauge Test Centre

Plate 30. General view of the NE elevation, looking south

Plate 31. Central NE elevation section of the building, looking SW

Plate 32. Detail showing a window casement incorporated into the NE elevation – see Plate 30

Plate 33. Brick sample from the NE elevation showing batch manufacture code

Plate 34. Later entrance incorporated into the NE elevation, looking south

Plate 35. General view of the building, looking south

Plate 36. Storage shed, forming part of the original build, located on the western corner of the building, looking south

Plate 37. Rear [western] section of the building (offices), looking north

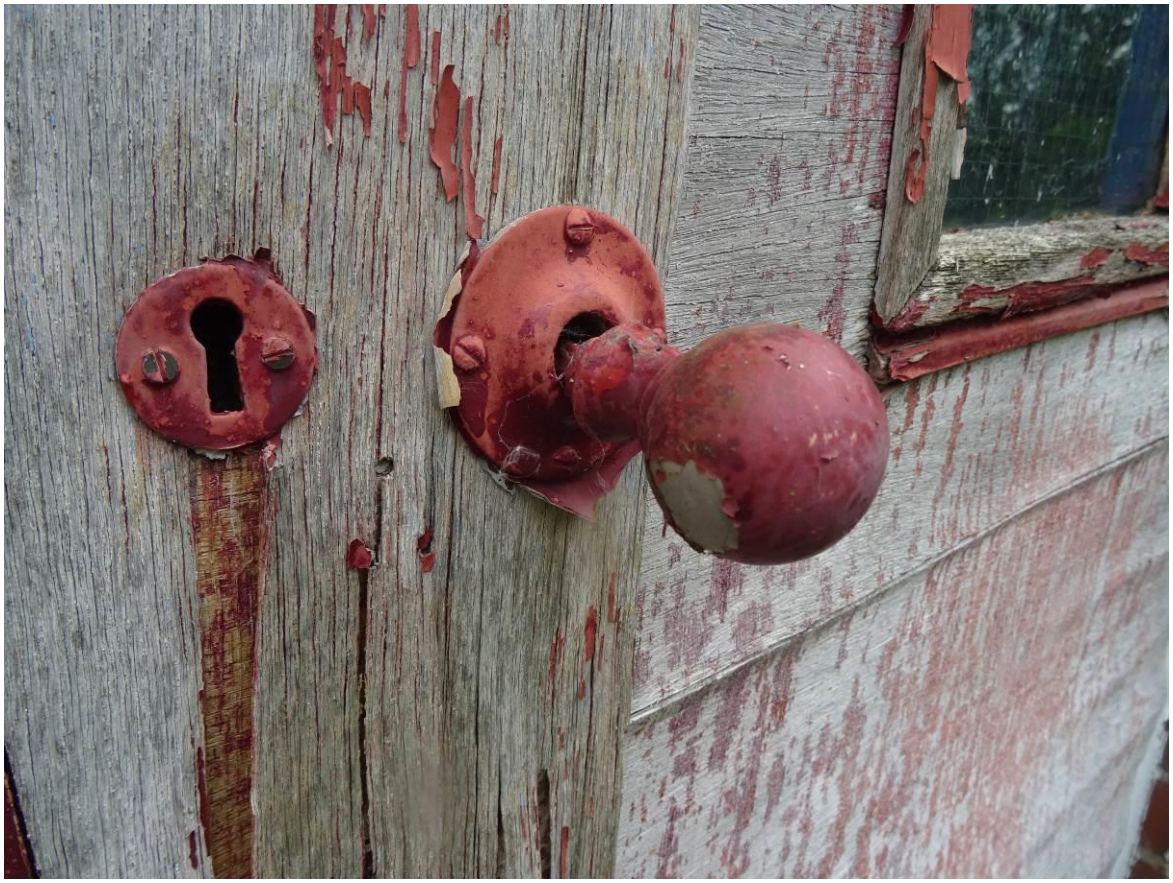

Plate 38. Original door furniture belong to a rear exit, located within the office range

Plate 39. Hedge cover hiding the southern gable end of the building, looking NW

Plate 40. Internal view of one of two principal rooms – southern room, looking NE

Plate 41. NW wall of the southern principal room,
originally an external wall belonging to a former canteen building (looking NW)

Plate 42. Brick codes found on brickwork belonging to the external wall of a former canteen – see Plate 41

Plate 43. Ferranti Ampermetre, located within one of the production offices

Plate 44. Calendar dating to May/June 1993 (marking the probable closure of the building)

Plate 45. One of the testing rooms, located within the southern section of the building

Plate 46. One of several laboratory rooms within the southern section of the building.

Plate 47. The principle [northern] laboratory room and shop-floor offices, looking SE

Plate 48. A row of laboratory benches built up against the northern [gable] wall, looking west

Plate 49. The computer room, located within the western [office] section of the building

Plate 50. Systems Audit Room, located within the western [office] section of the building

4. The Boiler House

Plate 51. Commemorative plaque celebrating the opening of the building in 1983, located on the southern elevation

Plate 52. Rear section of the Boiler House and the courtyard, looking SE

Plate 53. SW view of the Boiler House showing an array of pipework extending from the rear section of the building, initially providing heat for the site

Plate 54. View of the northern section of the building, looking north

Plate 55. Sample section showing the brickwork

Plate 56. Section of the southern elevation of the building, looking NW

Plate 57. Western view of the building

Plate 58. Eastern section of the building

Plate 59. Fossil fuel grading unit, located at the NE end of the building

Plate 60. Grading grille which allows coal nuggets to be graded by size

Plate 61. One of the recessed rear sections of the diesel generating and compressor facility building, looking SE

Plate 62. Chimney base located within the western recess within the rear section of the building

Plate 63. One of five cylindrical boilers located within the principle room of the boiler house

Plate 64. The row of Danks of Netherton coal-fired boilers located within the principle room of the boiler house

Plate 65. Steel hoppers located to the rear of the boiler unit

Plate 66. Maintenance area within the principle room of the boiler house

Plate 67. The computer room within the SW section of the boiler house

Plate 68. One of two subterranean access stairwells leading to maintenance areas beneath the boiler units

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